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Abstracts of the 23rd International Conference on Oral & Maxillofacial Surgery
31 March – 3 April, Hong Kong

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International Association of Oral and Maxillofacial Surgeons

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Aims and Scope

International Journal of Oral & Maxillofacial Surgery aims to publish papers of the highest scientific merit and widest possible scope on work in oral and maxillofacial surgery and supporting specialties, including interactions with neighbouring surgical specialties. The journal covers the following sections: congenital craniofacial deformities, cosmetic facial surgery, orthognathic surgery/trauma/TMJ disorders, head and neck oncology, reconstructive pre-prosthetic surgery/implantology, clinical pathology/dentoalveolar surgery, medicine/pharmacology, research and emerging technologies and evidence-based therapy.

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International Journal of Oral & Maxillofacial Surgery

Welcome Message



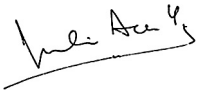
On behalf of the International Association of Oral and Maxillofacial Surgeons (IAOMS), it is my great honour and pleasure to welcome you to the 23rd International Conference on Oral and Maxillofacial Surgery (ICOMS) in Hong Kong.

My recognition to the Organizing Committee chaired by Professor Nabil Samman for arranging a superb scientific and social program which will offer an unique opportunity for the global community of Oral and Maxillofacial surgeons and all professionals interested in our field to exchange knowledge to share experience and to enhance friendship. The Hong Kong Convention and Exhibition Centre will be the place for a state of the art scientific program where outstanding speakers from all over the world will cover the full scope of our amazing specialty. The 23rd ICOMS will also offer a great opportunity for our young colleagues to learn and to share the results of their scientific work during the different sessions and very specially at the Next Gen Symposium with the theme ‘‘Masterclass from the Rising Stars”.

Besides the excellent scientific program, amazing social events like the Opening Ceremony and Welcome Reception, the Hong Kong Night at the Sky100 Hong Kong Observation Deck, the IAOMS Foundation activities and the Gala Dinner will allow us to enjoy meeting old and new friends with diverse cultures coming from around the world and to experience the dynamic city of Hong Kong, an unique blend of culture in the heart of Asia.

I am sure that the 23rd ICOMS will be a landmark in the IAOMS history which will contribute to the progress of Oral and Maxillofacial Surgery and will remain in our memory ever.

With best wishes for a wonderful Conference. Welcome to Hong Kong!



Dr Julio Acero
President, IAOMS

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Welcome Message



Dear Participants,

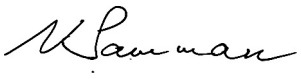
It is with great pleasure that I welcome you to the 23rd International Conference on Oral and Maxillofacial Surgery (ICOMS) 2017 — Hong Kong.

The Organizing Committee has put together a broad scientific program covering all aspects of the specialty while at the same time reaching the forefront of research and developments in all areas of current endeavour. Our one hundred and forty invited speakers and other symposium speakers represent current achievements of our specialty not only in the most developed research and clinical centres, but in all corners of the world.

The Committee has also planned a series of social events and Foundation events including a program for accompanying persons. I hope you will all participate and enjoy these events designed both to entertain and to elicit cultural interest.

Hong Kong is a safe modern city where everything works, and works well. Our population is busy but friendly, and the environment holds many good surprises for you: small islands, sandy beaches, green peaks, vibrant art scene, entertainment for children, effective and varied means of transport. Do go out and enjoy the city when you are not busy with ICOMS.

I would finally like to wish you all a happy and fruitful time at ICOMS 2017 — Hong Kong and thank you for your participation.



Professor Nabil Samman
Past President, IAOMS
Chairman, ICOMS 2017

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International Journal of Oral & Maxillofacial Surgery

Presidential Lecture and Plenary Lectures

Presidential Lecture

Expansion of oral and maxillofacial surgery: luxury or necessity?

R. Fernandes

Chief of Head and Neck Surgery, The University of Florida College of Medicine, Jacksonville, FL, United States

It is often said that change is inevitable. We accept this as truth in our everyday lives and those of our patients, family and friends, and yet we hesitate to embrace this view when it comes to our own specialty. Many objections are made to the need for procedural expansion in oral and maxillofacial surgery, with the main argument usually being that expansion would mean encroaching on the work of other specialties. However, can we continue to thrive without expanding?

The evolution of training and technological advancement have been major catalysts for change in our clinical landscape. If we examine medicine over the past ten years, it is clear that some specialties have proactively adapted to change while others have been more reactive and forced to play catch up. To demonstrate this point, we can consider the interplay between interventional radiology and vascular surgery. Not too long ago, vascular surgery was one of the premiere surgical specialties, revered for its vast territory and the allure of major surgeries performed on a daily basis. At the same time, interventional radiology was a stable specialty but not so attractive to those interested in doing procedures rather than reading images. However today, interventional radiologists are major players in endovascular interventions, to the point that vascular surgery programs have now had to incorporate interventional radiological techniques in their training to remain relevant.

In dentistry we can look to periodontology as an example of proactive, dynamic change. It has expanded from a focus on the periodontium to the inclusion of dental Implantology, minor surgeries within the oral cavity, bone grafting, third molar surgery, and in many instances anaesthesia. This evolution has begun to blur the line between periodontology and oral and maxillofacial surgery.

So what have we achieved? Where have we expanded and where do we as oral and maxillofacial surgeons go in the future?

This lecture will consider examples of transformational events that highlight our specialty's expansion as well as our need to continually develop and adapt.

The argument is a simple one, continued adaptation to technology and investment in education will keep our specialty in the forefront of medicine and dentistry. This is imperative if we are to attract bright, energetic minds into our specialty and not lose them to others who might be perceived as the innovators.

Continued expansion with excellent training is a necessity for our specialty.

http://dx.doi.org/10.1016/j.ijom.2017.02.009

Plenary I: Trauma and Deformity

The potential use of digital technology in dental education and training

J. Chow

The University of Hong Kong, Hong Kong

The recent advances in digital technology have improved the diagnosis and treatment planning processes in oral and maxillofacial surgery. In addition to these benefits, digital technology is increasing employed by educators in training and education. In this presentation, the potential use of three-dimensional videos, virtual reality and additive manufacturing in dental education will be discussed.

http://dx.doi.org/10.1016/j.ijom.2017.02.010

Do all zygomaticomaxillary complex fractures require internal orbital reconstruction?

E. Ellis III

University of Texas Health Science Center at San Antonio, TX, United States

By definition, the orbital floor is fractured in zygomaticomaxillary complex (ZMC) fractures. However, the magnitude and extent of orbital floor disruption varies from a linear crack to fragmentation of the entire floor. Although some surgeons feel that reconstruction of the orbital floor should be performed routinely when operating a ZMC fracture, most do not.

Exposing the orbital floor requires a surgical procedure that has its own set of complications. Palpebral asymmetries, entropion, ectropion, and symblepharon have all been reported as complications or orbital floor exposure. Therefore, if one can avoid the

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surgical exposure of the orbital floor, the chance of a postoperative eyelid deformity can be obviated.

Studies have shown that reconstruction of the internal orbit is unnecessary in a considerable percentage of ZMC fractures. The big question, however, is how does one decide about the need for internal orbital reconstruction when a patient presents with a ZMC fracture?

This lecture will discuss using either the pre-treatment computed tomography (CT) scan or an intraoperative CT scan in making this determination. Treatment algorithms will be presented that can be used to sequentially treat many ZMC fractures with the goal of doing as little surgery as is absolutely necessary to attain a satisfactory outcome.

http://dx.doi.org/10.1016/j.ijom.2017.02.011

Current concepts in the craniofacial surgery

G.E. Ghali

LSU Health Sciences Center Shreveport, LA, United States

The past quarter of a century has seen significant advances in craniofacial surgery. These advances range from improvements in diagnosis to resorbable technology to bone cements and morphogenic proteins.

This presentation will provide an overview of the common craniofacial and cleft deformities, along with their contemporary management with an emphasis on both skeletal and soft tissue correction.

http://dx.doi.org/10.1016/j.ijom.2017.02.012

Facial ballistic injuries — our experience from Afghanistan and Iraq

S. Parmar

University Hospital Birmingham, Birmingham, United Kingdom

Ballistic injuries are rare in the United Kingdom compared to many other countries. The Centre for Defence Medicine for the United Kingdom centralised the treatment of all casualties from conflicts to the University Hospital Birmingham. This resulted in a rapid learning curve for the treatment of these high-energy avulsive injuries during the Iraq and Afghanistan conflicts.

We present our algorithm for the treatment of these complex injuries.

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Navigation-guided oral and maxillofacial surgery

S.G.F. Shen

Shanghai Ninth People's Hospital, Shanghai Jiaotong University School of Medicine, Shanghai, China

The anatomic complexity with the most important vital organs in the head and neck region remains a big challenge for oral and maxillofacial surgeons. With the great and fast development of computer technologies, navigation-guided surgery has been widely used for minimising the risks and improving the precision of the maxillofacial surgery.

The aim of this presentation is to provide a current development of navigation-guided oral and maxillofacial surgery including surgical planning, simulation and navigation in tumour resection, reconstruction of mandibular or maxillary defects, correction of posttraumatic deformity and developmental jaw deformity and so on. Compared with the traditional oral and maxillofacial surgery, navigation-guided surgery improves quality of operation in precision and overcomes the disadvantages that majority of surgeons encounter when performing conventional operations.

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Skeletal surgery for mandibulofacial dysostosis (Treacher Collins, Nager Syndrome)

T.A. Turvey

University of North Carolina, Chapel Hill, NC, United States

Mandibulofacial dysostosis is a relatively rare autosomal dominant facial clefting disorder effecting about 1 in 50,000 live births. The expression of the condition is variable and involves both soft tissue and bone of the face primarily in the periorbital region and the lower facial regions. The condition is always bilateral but never symmetrical.

Shortly after birth two issues must be addressed: protection of vision and preservation of the airway. Protection of vision is more associated with eyelid competency but airway preservation may involve mandibular advancement via distraction osteogenesis or conventional osteotomies, depending on bone stock. Periorbital construction is usually directed toward bone grafting of the zygomas, lateral and inferior orbit prior to soft tissue construction and this is normally deferred until age 7–10 years. Genioplasty is always beneficial and can be performed once the mandibular cuspids are no longer at risk. Definitive orthognathic surgery including orthodontic treatment usually occurs between 14–17 years, depending on the patient's and parents' wishes. This usually involves zygomatico-orbital augmentation, bimaxillary osteotomies with counter-clockwise rotation of the anterior face and elongation of the posterior face. Genioplasty can be redone as needed.

The final phase of treatment includes soft tissue procedures such as fat grafting or other soft tissue transfer surgical procedures.

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Plenary 2: Pathology, Oncology and Reconstructive Surgery

Immunotherapy for head and neck cancer: integrating the fourth modality into treatment

R.B. Bell

Providence Cancer Center, Portland, OR, United States

The practice of oncology is being transformed as a result of our understanding that the presence of an endogenous anticancer immune response prior to treatment plays an important prognostic role in the long-term therapeutic effects seen following conventional therapy as well as immunotherapy. Adoptive cell transfer with tumour infiltrating lymphocytes or receptor-engineered T cells, as well as checkpoint inhibitors, such as cytotoxic T lymphocyte antigen-4 (CTLA-4) anti-programmed death-1 (anti PD-1), that function by taking the brakes off pre-existing anticancer immunity are resulting in objective clinical responses or durable stable disease in patients with a wide spectrum of cancers.

Collectively, the success of immunotherapy has lead to multiple Federal Drug Administration (FDA) approvals in numerous indications and has catapulted the status of this modality into standard of care for patients with metastatic melanoma, non-small cell lung

cancer, renal cell carcinoma, and most recently, head and neck cancer, truly making it the 'fourth modality' of cancer treatment. This lecture will review FDA-approved agents in the metastatic setting, highlight the evolving slate of immunotherapy trials currently accruing patients with head and neck cancer, and explore future directions for integrating the checkpoint inhibitors and other therapies into the definitive setting.

http://dx.doi.org/10.1016/j.ijom.2017.02.016

Lessons learnt over 25 years of mandibular reconstruction

J. Brown

Aintree University Hospital, Liverpool, United Kingdom

A systematic review of reported composite free flap reconstruction techniques and outcomes has recently been completed and in press.[1]

A total of 9499 mandibular defects were reported to be reconstructed with 6178 fibulas, 1380 iliac crests, 1127 composite radials, 709 scapulas, 63 serratus anterior and rib, 32 metatarsals and 10 lateral arm flaps including humerus. An average of 1.3 osteotomies (1082 osteotomies/856 cases) were described for the fibula compared to 0.56 (304/544) when using iliac, radial or scapula. The flap failure rate was higher for the iliac crest at 6.2% (66/1059) compared to 3.4% (202/6018) if the fibula, radial or scapula was used ($P < 0.001$). The fistula rate of 4.9% for the fibula (52/1067) was less than the 3 other flaps combined at 6.9% (47/678) [$P = 0.07$]. The non-union rate for fibula was 4.3% (86/1986) compared to iliac crest at 2.6% (17/646), but the rate was also high for radial at 6.1% (30/491) and scapula at 13.1% (49/375) [$P < 0.001$]. Iliac crest was most often rehabilitated with implant-retained prosthesis (44%, 100/229), compared to 26% (605/2295) [$P < 0.001$] if another flap was used.

The main finding in all this work was that few publications were up to a standard to allow a fair comparison of techniques, types of defect reconstructed and complications including non-union, fistula rate and rehabilitation. As shown above the non-union rate for fibula was 4.3% but the data came from only 32% (1986/6178) of the flaps reported, which illustrates the lack of valid data in reconstructive surgery outcomes.

Reference

Brown, J. S., Lowe, D., Kanatas, A., & Schache, A. S. (2017). Mandibular reconstruction with vascularised bone flaps: a systematic review over 25 years. *Br J Oral Maxillofac Surg*, *55*, 113–126.

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Sentinel node biopsy for oral cancer

M. McGurk

Guy's Hospital, London, United Kingdom

The N0 neck has posed a clinical problem for over four decades. A comprehensive study from India has shown that elective neck dissection (END) has a significant survival advantage over a 'wait and see' policy. But only 25% of patients with early oral cancer have occult metastasis. By adopting an END policy, 75% of patients get an unnecessary neck dissection.

Sentinel node biopsy is now a well-established investigative technique but has only recently been applied to the management of oral cancer. It completely and succinctly answers the dilemma of how to manage the N0 neck. It can detect occult metastasis with a false negative rate of 6–13%. The results of the Sentinel European Node Trial will be presented with subsequent development is the technique using intraoperative navigation and fluorescent markers to reduce the false negative rate to 6–8%. New applications of the technique will be discussed.

http://dx.doi.org/10.1016/j.ijom.2017.02.018

Problems of managing advanced stage oral cancer

R. Ord

University of Maryland, College Park, MD, United States

Advanced stage oral cancer represents Stage III and IV disease as defined by the tumour-node-metastasis (TNM) system. Studies have shown that outcomes are poor in these cases but the best results are given with multi-modality therapy and in the United States of America the National Comprehensive Cancer Network guidelines are used as the protocols for therapy. This presentation will discuss philosophically whether the TNM system is still the best way to classify advanced disease and which adverse prognostic signs postsurgery truly justify adjuvant therapy. The talk will also question the true role of chemotherapy and whether recent trials have justified the resurrection of neoadjuvant chemotherapy.

The outcomes for unresectable or advanced locoregionally recurrent cancer of the oral cavity have always been very poor usually representing a palliative approach. However, recently there have been remarkable results seen with the use of the checkpoint inhibitors in melanoma and non-small cell lung cancer, and these agents are now being tested for head and neck cancers. Early results with the use of these immune checkpoint inhibitors PD-1, PD-L1 and PD-L2 have shown great potential and may revolutionise the management of these patients.

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Differential diagnosis of multiple enlargement of salivary glands

G. Yu

Peking University School of Stomatology, Beijing, China

Immunoglobulin G4 (IgG4)-related sialadenitis (IgG4-RS) is a component of IgG4-RD. One of its clinical characteristics is multiple enlargement of salivary glands, which is also seen in other diseases, such as Sjögren's syndrome, Kimura's disease, sarcoidosis and lymphoma. However, the essence and treatment principles of these diseases are different. Therefore, differential diagnosis of multiple enlargement of salivary glands is critical.

Case history and symptoms could provide important clues for diagnosis. Serious xerostomia is seen in Sjögren's syndrome. Diet-induced swelling of SMG ('meal syndrome') is the typical symptom of obstructive sialadenitis due to sialolithiasis. Bilateral painless swelling of submandibular gland is frequently seen in IgG4-RS. Local skin itching is a common complaint for the patient with Kimura's disease.

Clinical examination will show the characteristic appearances of various diseases. Obvious dryness of mouth and eye with very low saliva flow rate and Schirmer test value are seen in Sjögren's syndrome. Stone may be fond by palpation in sialolithiasis. Multiple bilateral enlargement of major salivary gland and lacrimal gland is frequently seen in IgG4-RS. Local coarse skin over the lesion is one of the clinical sign of Kimura's disease.

Imaging examination is very helpful for the differential diagnosis of IgG4-RS. 'Fruit-laden, branchless tree' is typical sialographic feature of Sjögren's syndrome. Radiopapue submandibular calculi is readily recognised on plain radiographs in sialolithiasis. There are also computed tomography and ultrasonographic features in IgG4-RS. Enlargement of pulmonary lymph node is seen in sarcoidosis.

Laboratory examinations provide important information for the diagnosis. Positive reaction to the various autoantibodies, such as SS-A, SS-B, ANA, and salivary duct autoantibody, may be detected in Sjögren's syndrome. The serum level of IgG4 is significantly elevated in IgG4-RS. Peripheral blood test showed elevated eosinophils in Kimura's disease.

The final diagnosis usually depends upon the histopathology. Immunohistochemical staining is critical for the differential diagnosis.

http://dx.doi.org/10.1016/j.ijom.2017.02.020

Digital technique in jaw reconstruction

C. Zhang

Shanghai Ninth People's Hospital, Shanghai Jiaotong University School of Medicine, China

Microvascular bone flap reconstruction still continued to be the standard of treatment. Fibula bone flap, iliac flap and scapular flap were mostly frequent used, total of which was over 2000 cases performed in Shanghai Ninth People's Hospital in over two decades.

In our experience, with regard to improving the quality of mandible, we should pay attention to record residual mandible position before resection and restore framework of mandible. The point of gonion, articulare and pogonion (Go, Ar and Po point) was very important landmark for framework.

Four segments were recommended for mandibular body contour. The three angles of four segments were 140°, 115° and 140°. The angle between ramus and body segments was 120°. Distance of Go-Go, Go-Ar, Go-Pg was regular and should be remarkable. For the mandible with buccal cortex extension, we could use Ω-like reconstruction plate, miniplates fixation with maxilla and fixing bridge system which we have improved.

Digital technique included computer assisted digital model, virtual surgery and navigation surgery. With digital technique, we can perform accurate positioning the residual mandible, determining the angle of mandible segments and maxilla-mandible relative position.

Dental implant combined with mandibular reconstruction was a real sense of challenge for oral and maxillofacial surgery and oral implantology. Dental implant distractor was used with simultaneous fibular flaps for functional mandibular reconstruction, of which has been applied in over 60 cases. In the aid of digital technique, we can determine path of implant insertion and distraction. It can simplify operation processes, and is beneficial for popularisations and applications.

Every coin has two sides, digital technique indeed can help us to simplify processes, shorten operation time and benefit young surgeon learning. However, before we use digital technique, we should master the principle and key points of mandible reconstruction to correct any possible mistakes during operation.

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Symposia

Progressive condylar resorption: diagnostic process, imaging, and functional considerations

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Progressive condylar resorption (PCR) is a condition that causes bilateral mandibular condyle resorption with an unknown underlying mechanism. Oral and maxillofacial surgeons and orthodontists encounter this condition and have developed a management strategy for PCR. However, a comprehensive approach by all dental specialties would be important to diagnose and prevent PCR. Previous reports have successfully documented the characteristics of PCR. Currently, the diagnosis of PCR is fairly difficult and therefore PCR patients are not always appropriately managed. To diagnose this condition correctly, simple diagnostic tools for PCR must be proposed.

Furthermore, an appropriate diagnostic protocol and the relation between temporomandibular joint (TMJ) functions and morphological changes of the mandibular condyle have not been ascertained. We hypothesise that PCR may be associated with not only morphological changes but also TMJ dysfunctions. To assess TMJ function in PCR patients, we adapted the Helkimo clinical dysfunction index. In this presentation, the results of a case-control study will be presented and TMJ dysfunctions related to imaging in PCR will be discussed.

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Managing the complexities of obstructive sleep apnoea syndrome, reankylosis and poor aesthetics in temporomandibular joint ankylosis — an experience of 18 years in the Indian population

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Background: Temporomandibular joint (TMJ) ankylosis is a complex disorder, the problems associated with it can be multiple e.g. difficulties in mastication, speech, poor nutrition, poor oral hygiene, malocclusion, compromised airway, poor aesthetics and recurrence. All of these invariably result in the physical and psychological disability of the patient. Management of TMJ ankylosis is challenging, being associated with intraoperative risks, rehabilitation difficulties and chances of recurrence. Though its treatment has been discussed in the literature for over 200 years, no single technique has produced long-term successful outcomes. In a clear understanding TMJ ankylosis is not a neoplastic disease yet recurrence rates as high as 25% are reported in long-term studies.

Objectives:

1. To introduce new reforms and modifications in the existing surgical procedures for prevention of reankylosis.
2. To discuss the timing and importance of distraction for obstructive sleep apnoea (OSA) to prevent reankylosis and its role in rehabilitation with or without genioplasty.
3. To highlight the role of dermis fat as an interpositional material.
4. To introduce a system of classification for recurrent ankylosis for planning the treatment modality.
5. To scrutinise reasons for reankylosis with old protocols and report the success of new protocols that were used to suit the Indian population for the economically backward population.

Methods: A retrospective statistical analysis and scrutiny of a total of 125 patients of ankylosis over 18 years who received treatment with old (33 cases) and new protocols (48 cases) and further revised protocol (23 cases) with recent new reforms was carried out.

Conclusions: Based on our clinical experience with the introduction of new reforms and the adaptation of modified protocols we were able to achieve a drastic reduction in the recurrence rates from 18.1 to 5.8% to nil, besides minimising the postoperative adverse sequel, correcting OSA and improving aesthetics with distraction osteogenesis.

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Pierre Robin sequence treatment — experience in Indonesia

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Pierre Robin sequence or Pierre Robin syndrome first described by Lannelongue and Menard in 1891 as they reported 2 cases with micrognathia, cleft palate and retroglossoptosis. The term of Pierre Robin syndrome was reserved for those errors of morphogenesis with the simultaneous presence of multiple anomalies caused by a single aetiology. Since 1974, the term of Pierre Robin sequence includes any condition that include a series of anomalies caused by a cascade of events initiated by a single malformation.

Dr. Hasan Sadikin Hospital is one of the national reference hospitals in Indonesia. The Oral and Maxillofacial Department is known for congenital oral and maxillofacial treatment. The basic

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treatment of babies with suspected Pierre Robin sequence at the hospital is to secure the pulmonary tract. Depending to the severity, the tracheostomy is one of the options. In this decade, distraction osteogenesis has been introduced for patients with Pierre Robin sequence. Distraction osteogenesis makes a longer mandible and secures the upper pulmonary tract.

The distraction osteogenesis is a treatment of choice for Pierre Robin sequence, yet there some issues in health care system in Indonesia that should be discussed.

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The application of two-dimensional, three-dimensional, four-dimensional facial imaging for the diagnosis, management of dentofacial deformities

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This presentation highlights the advances in the diagnosis and management of dentofacial deformities using recent imaging modalities. The limitations of two-dimensional (2D) prediction planning will be presented. The applications of three-dimensional (3D) imaging for the prediction and the evaluation of changes following orthognathic surgery will be demonstrated. Dynamic stereophotogrammetry (four-dimensional [4D]) is a recent innovation that allows capturing facial expressions at a rate of 60 3D frames/s and generating sequences of 3D images of facial expressions. Facial movements were extracted for full analysis in orthognathic and cleft cases as well as for the evaluation of facial paralysis.

Findings:

1. 3D assessment highlighted nasal changes following maxillary osteotomy. The prediction accuracy was within 80% of the achieved surgical changes.
2. The quality of facial expressions has improved after orthognathic surgery.
3. 3D and 4D virtual reality informed the patients of the surgery and potential complications.
4. The "Oculus Rift" technology provided an excellent 3D visualisation of the orthognathic surgical procedure, operating theatre and instrumentation for training.

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Intraoperative challenges and management strategies in orthognathic surgery

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Orthognathic surgery is the major "work-horse" oral and maxillofacial surgery to correct skeletal deformities. Surgeons have to address skeletal and soft tissue adjustments to achieve optimal outcomes. Most operating difficulties are encountered during skeletal corrections of severe facial asymmetries and hypoplasia.

The orthognathic surgeon should be skilled enough to solve intraoperative challenges to provide safe and predictable reconstruction. Main errors, management of difficult cases and surgical tricks will be discussed entirely from A to Z.

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Composite reconstruction of the midface

M.D. Batstone

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The midface serves multiple important functions, which must all be addressed, in an ideal reconstruction. Facial aesthetics, dental structures, support for the orbital contents and the nasal airway should all be reconstructed. Although obturators or soft tissue flaps have been used in the past, and still serve a purpose in the occasional situation they should not be considered the gold standard.

Reconstruction of the bony substructure requires bone in a different volume and orientation for different scenarios and no single composite free flap can fulfil all requirements.

The iliac crest, scapula, fibula, composite radial and medial femoral condyle bone containing free flaps all have a role to play in the reconstruction of the midface for defects generated by benign and malignant pathology, iatrogenic causes, cleft and trauma.

The development of short and wide osseointegrated implants has made long-term restoration of the dentition feasible with different bone volumes and orientations.

This presentation will address the reliability and technical aspects of composite reconstruction of the midface with a wide variety of reconstructions for defects of different aetiology. Challenges particular to the midface such as pedicle length will be examined. The short and long-term success of osseointegrated implants and soft tissue management will also be discussed.

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Surgical margins in oral cavity cancer

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The aim of surgical removal of oral cavity cancer is to remove all malignant tissue, but without excessive removal of normal tissue leading to increased morbidity. Recent publications have challenged the traditional parameters of clear, close and involved surgical margins with varying distances proposed. Despite the controversy, obtaining tumour free margins remains important because of its impact on local recurrence, and the application of adjuvant therapy.

Achievement of tumour free surgical margins commences with the use of imaging and adjunctive techniques such as narrow band imaging and vital tissue staining. The application of these technologies into surgical practice allow for enhanced visualisation of the margin between tumour and normal tissue.

Technical aspects relating to the surgical procedure are important including the appropriate venue for cancer surgery, access procedures, tumour site and type, and the relationship between surgeon volume and outcome. The utility of frozen sections has been questioned with no prospective trials available to support its use.

Postoperative radiotherapy is routinely applied in many centres in cases of "close margins". Radiotherapy comes with significant side effects and its application should consider the potential morbidity as well as potential benefits. Surgical margins must be considered in conjunction with other tumour biology parameters such as nodal disease, perineural and lymphovascular invasion, and T stage before deciding on adjuvant treatment.

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Complications in orthognathic surgery, what do we tell our patients?

A.G. Becking

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Good clinical practice comprises complication management according to local, national and/or international guidelines. Distinction between calculated risks and complications are merely made to ease the minds of clinicians. For patients, terminology is not relevant; all adverse outcomes are considered complications.

Technical issues as bad splits and sensory disturbances are rather easily assessable: incidences are known and can be categorised and shared with future patients as statistic changes.

Planning errors do occur at relevant levels in orthognathic surgery and they may lead to unacceptable outcomes and reoperations. Asymmetries may in this respect be more prone to planning errors and changes may be depending on complexity of the caseload and skills and experience of the surgical team. These items are harder to discuss, on an individual basis, but need attention.

Psychological issues and dissatisfaction are not uncommon in orthognathic cases and are merely based on cosmetic expectancies and outcomes. Case selection is paramount in this respect and it may be argued that a psychological assessment is mandatory as part of an orthognathic work-up.

On an international level, the other race effect or the other race bias may be an important factor to cope with in planning orthognathic surgery. An orthognathic surgeon ideally should be informed and familiar with different ethnic canons, if not third party consultation or referral may be indicated to prevent miscommunication and complications.

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Diagnosis and treatment of unilateral condylar hyperplasia

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Unilateral condylar hyperplasia (UHC) is the most common growth disorder of the mandible. However, aetiology, incidence and histopathology remain an enigma. It is considered a unilateral disease of the mandible, producing a growth-resembling enlargement of the hemimandible. However, the resulting asymmetry is pluriform and not well understood.

Diagnosis is first aimed at progression of the disease, maybe necessitating a condylectomy and secondly at the asymmetry and its indication for orthodontics, orthognathic surgery and adjunctive symmetry correcting procedures. Current treatment concepts combine therapies, to shorten treatment time, but overtreatment may be a serious problem.

A treatment plan for patients with UCH needs to be tailor made, with some use of current algorithms, but still need to be individualised towards patients needs and wishes.

Some minimal invasive surgical procedures and three-dimensional virtual planning concepts will be included in current treatment protocols for condylar hyperplasia.

http://dx.doi.org/10.1016/j.ijom.2017.02.031

Transoral robotic surgery for head and neck cancer

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The Food and Drug Administration approved transoral robotic surgery (TORS) in 2009 for surgical treatment of head and neck cancer and since that time there are an increasing number of patients being treated with a transoral surgical approach in an effort to tailor and de-escalate therapy where possible.

There is now 2–5 year follow-up data that locoregional control using TORS with risk adapted adjuvant therapy is at least not inferior to definitive radiation/chemoradiation for the treatment of human papillomavirus-associated oropharyngeal squamous cell carcinoma. Though survival outcomes are excellent with either modality, the major benefit of surgery in this setting is that it allows the treatment to be tailored based upon histopathologic interrogation and risk stratification, thereby eliminating the need for radiation therapy or chemotherapy in some patients and potentially resulting in a lower incidence of dysphagia and long-term gastrostomy tube dependence as well as better quality of life indices.

This lecture will review the current indications and techniques for TORS, provide an update on currently accruing clinical trials, and explore future directions and technological innovations.

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Three-dimensional tools in cleft and craniofacial surgery

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Documentation, diagnosis, analysis, treatment planning and surgery of orthognathic, cleft, craniofacial and patients with complex facial problems improved using information from the cone-beam computed tomography scan, the three-dimensional (3D) stereophotogrammetry and intraoral scanning. The information from all separate techniques finally resulted in an augmented model of the head with accurate textured soft tissue information, accurate skeletal information and accurate dental information. This new method proved to be a non time-consuming, patient and user-friendly method and seemed not to be prone to errors.

Nowadays, all orthognathic, cleft, oncology, trauma, implantology in craniofacial patients at the Nijmegen department are planned completely in a 3D environment using this augmented model technique. Based on this information, we will present the added value of 3D-printing, intraoperative navigation, augmented reality, robotica and further automation of surgical procedures. This presentation has a focus on the added value of 3D imaging in cleft and craniofacial surgery.

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Bilateral cleft lip repair: an outcome assessment

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Cleft lip and palate is the most common birth anomaly of the face with prevalence of 1:800 live births. Treatment of bilateral cleft lip and more importantly the assessment of the outcome pose a major

challenge to the surgeon, as there is no standard or universally accepted scale to measure the results.

Studies in the past have described methods to assess the outcome of unilateral cleft lip cases. In this study, we have assessed the outcomes of the repair of bilateral cleft lip cases using a newly developed scale taking into account the lip, nasal components of the repair and the scar assessment using two-dimensional photographs in frontal and worms eye views 6 months postoperatively. The scale aims at overcoming the shortcomings of other outcome measures and need of software analysis that is expensive and time consuming. The introduction of this scale will help identification of the areas that require secondary correction and also is easy and simple to use.

Our studies indicate that this scoring system when used consistently can help in evaluating the outcomes of various techniques, and might provide an insight to the most pertinent technique in future and also help to improve outcomes by focusing on the areas that need further correction.

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Bilateral cleft lip revision: techniques and results

K. Bonanthaya

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Bilateral cleft lip deformities can be difficult to correct and it is universally agreed that a large number of cases will require further revisions after the primary repair. The need for secondary repair and the type of secondary deformities is determined by the following:

1. Type and severity of the initial cleft.
2. The principles applied in the primary repair of these deformities.

This presentation will look at the effect of different principles applied during the primary repair and how to manage the secondary deformities resulting from use of different principles of repair. The principles of repair will be considered under the following heads:

1. Presurgical orthopaedics
2. Lip adhesion procedures
3. Staging of bilateral lip repair
4. The utilisation of the prolabial tissues
5. Muscle approximation
6. Reconstruction of the central vermilion
7. Sulcal release incision
8. Management of the nasal deformities.

http://dx.doi.org/10.1016/j.ijom.2017.02.035

Orthognathic surgery in cleft and craniofacial patients

P. Bordbar

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Orthognathic surgery is used to surgically correct dentofacial deformities. This is usually in conjunction with orthodontic treatment. These dentofacial deformities may be acquired or congenital in nature. In the latter group, the management of the cleft and craniofacial patient can present some additional challenges, and considerations, for the clinicians involved in caring for these patients.

This presentation will provide an overview of current treatment pathways and objectives for these patients as part of multidisciplinary team within a tertiary setting. Case presentations will be used to demonstrate treatment challenges, including consideration of complex medical co-morbidities, psychosocial interactions, anatomical variations, missing soft and hard tissues, including missing and malformed teeth.

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Is there a difference in frequency and type of maxillary sinus septa between dentate and edentulous posterior maxillae?

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Background and Objectives: To evaluate and compare the frequency, type and origin of maxillary sinus septa in patients with a dentate and an edentulous posterior maxilla using cone-beam computed tomography (CBCT) imaging.
Methods: The study included 100 maxillary sinuses – 50 from patients with a dentate and 50 from patients with an edentulous posterior maxilla – to evaluate the frequency, morphology and location of maxillary sinus septa in axial, sagittal and coronal CBCT images. Differences regarding age, gender, side, septa location and type of dentition (dentate/edentulous posterior maxilla) were analysed.
Findings: The mean age of the patients was 58.3 years. A total of 60 sinus septa were found in exactly half of the evaluated sinuses. Most of the septa were located on the floor of the maxillary sinus ($n = 34$; 56.7%). Of these, the majority was found in the region of the second maxillary molars ($n = 27$; 79.4%). Regarding the distribution of sinus septa, septa were present in 26 (52%) dentate and in 24 (48%) edentulous regions. Thus, for a potential influence of the status of the dentition in the posterior maxilla on the frequency of sinus septa, no significant impact was found ($P = 0.69$).
Conclusions: Sinus septa are equally often found in patients with a dentate and an edentulous posterior maxilla. As sinus septa are reported to be an important reason for surgical complications during sinus floor elevation procedures, a three-dimensional radiographic examination using CBCT prior to surgery might be helpful for diagnosis and treatment planning.

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Through and through cheek defects: a systematic review and proposition of a classification

J. Bouguila

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Background: Reconstruction of through-and-through cheek defects has always been difficult and remains a challenging aspect of facial plastic and reconstructive surgery. Several options have been reported with variable results. No classification has been proposed in the literature for a better comparison of results and better indication of flaps.
Methods: A systematic review of the literature using PubMed and Medline searches on reconstructing these defects were performed of the English literature. The PRISMA criteria were conducted.

Search terms included: "reconstructive surgical procedures", "free tissue flaps" and "cheek".

Results: 25 studies, representing 339 patients and published between April 2002 and April 2016, were included. Most of the articles (15) presented are retrospective reviews, number of patients, the average defect size, characteristics of the defect, flaps used for the reconstruction, was observed in all studies.

Discussion: Although classifications exist for bone and soft tissue defects, they do not consider the complexity of the through and through cheek defects. When considering the management, we found that it is helpful to group through and through defects in the following 2 types:

I: Central upper defect: maxillo-zygomatic (M: maxilla, Z: zygoma, OP: orbito-palpebral, N: nose, UL: upper lip).

II: Lateral lower defect: mandibular (R: ramus, B: body, H: hemi-mandibulectomy, LL: lower lip).

Various surgical options have been described for repair of these conspicuous defects. With the advancement of microsurgery, free flaps have become the first choice for the reconstruction of these defects.

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The role of simulation in surgical education

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Traditional surgical training has been based on the preceptor or apprenticeship model, first proposed by William in the 1890s. In this model, the student surgeon learns with a small group of peers and superiors, over a given period, gradually assuming more responsibility for patient care. More recently, the advent of restricted trainee working hours and a renewed emphasis patient safety, not to mention the struggle with the methods to objectively assess the trainee's technical skills have led to the search for a better way to train surgeons.

Surgical simulation, with its proven validity and demonstrable transfer of surgical skills to the clinical setting lays the foundation for a new innovative method of surgical education. This presentation will discuss the need to incorporate virtual surgical simulation with robust, reliable metric-based solutions for procedural training and assessment in the oral and maxillofacial surgery curriculum.

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The reconstructive approach in the treatment of maxillofacial trauma — when biology and technology work together

N. Casap

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The sequence of maxillofacial reconstruction has undergone a tremendous transformation over the recent decades, with countless publications of innovative technological developments and clinical applications.

Alongside the traditional surgical toolbox, the modern oral and maxillofacial surgeon's armamentarium includes a variety of technological applications, such as software for preoperative planning and virtual surgery, three-dimensional printers and real time surgical navigation.

Nevertheless, and despite major advancements in the understanding of bone biology and vital discoveries of central elements in the mechanism of bone growth, the research of the biological aspects of maxillofacial reconstruction has not gained the same popularity.

The lecture will present a unique approach to integrate modern technological tools together with the implementation of new biological surgical techniques in the process of maxillofacial reconstruction.

A new concept will be offered – bone growing, in which the medical team will no longer aim to graft and augment, nor to regenerate the lost bony structures, but rather use the power of biology and the advancement of technology to grow vital, healthy and native human maxillofacial bone.

http://dx.doi.org/10.1016/j.ijom.2017.02.040

Temporomandibular joint the key of orthognathic surgery

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Temporomandibular joint (TMJ) plays a major role in determining the development of the face. Dealing with orthognathic surgery international literature has always recognised a predominant aesthetic role in this kind of procedure. However the facial appearance could reflect the good or bad function of stomatognathic system.

TMJ should be deeply studied and eventfully treated in any procedure of orthognathic surgery in order to improve the outcomes and to minimise the relapse.

The objective of treatment should always be morphofunctional rehabilitation.

Many different pathologies may affect this peculiar joint ranging from the most common that is represented by temporomandibular disorders (TMD). This pathology is very often associated with disabling symptoms such as chronic headache or TMJ pain, cervical pain and others. The comprehension and treatment of the underlying pathogenetic mechanisms should address to long-lasting results. In addition TMJ can be affected from traumas with condylar fractures, deformities for excess of condylar growth or congenital anomalies.

Objective of the lecture is to provide a comprehensive view of the different pathologies affecting TMJ and to provide the most up-to-date therapies.

Key words: TMJ, orthognathic surgery.

Issues to be addressed: For stable results TMJ must be studied and if necessary treated before, during and after surgery.

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Global surgery — Mercy Ships and maxillofacial reconstructive and thyroid surgery

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Millions of people are suffering from diseases that can easily be cured if they had access to modern health care. This often leads to a poor health outcome or death from treatable diseases due to poverty affecting the poorest of the poor in Africa. For surgical treatment, two-thirds of the world population do not have access to safe and affordable surgery. Less than 4% of surgery is carried out in low-income countries, which is comprised of one third of the world's population. Because of the lack of basic health care, benign jaw and neck tumours can grow to a gigantic size which results

in a slow suffocating death. Patients with deformities are often ostracised by their families and friends because they are believed to be demon-possessed. Some cleft lip babies are buried alive by witch doctors! Hot pokers have been used by voodoo chiefs to release evil spirits from extensive goitres. A gangrenous bone and flesh destroying infection called Noma is caused by lack of basic health care, vaccinations and malnutrition and is often fatal. For every one patient with noma-induced severe facial deformities saved, nine have already succumbed to this debilitating condition (World Health Organization).

For hope to be credible and believable in the future, it needs to be tangible and felt in the present. Surgery is what Mercy Ships can provide in West Africa. The Africa Mercy is a hospital ship with free world class life-saving and life-transforming surgery, and land-based clinics for ophthalmology, dentistry, public health education, . . ., etc. Medical facilities on the ship include laboratory, pharmacy, blood bank, computed tomography scan, . . ., etc., supporting 5 operating theatres, 80 inpatient beds and 3 ITU beds. Other facilities for volunteer crewmembers are similar to those found in a village. In order to empower local health care providers, Mercy Ships has engaged in local health care capacity building by training nurses, anaesthetic providers, surgeons, . . ., etc., and renovating and equipping operating theatres. Selfless volunteers fund their own traveling expenses and accommodation on the ship. Mercy Ships truly demonstrates the essence of 'love in action' by bringing hope and healing to the forgotten poor in Africa.

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Management of sleep apnoea in infants and children

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Maxillomandibular advancement (MMA) surgery and continuous positive airway pressure (CPAP) therapies are the only two treatment methods that have medical evidence proven to be highly effective for obstructive sleep apnoea (OSA). MMA involves surgical advancement of the both jaws by Le Fort I maxillary osteotomy and bilateral sagittal split mandibular osteotomies and this treatment method has been able to achieve over 90% long-term success even in the severe OSA adult patients. For the infants, the bone is too soft for internal fixation and a lot of developing teeth inside the jaws making the MMA surgery not stable and potentially damaging to the tooth germs. Hence, distraction osteogenesis is commonly advocated for the severe OSA children commonly associated with craniofacial syndromes. This technique can achieve jaw advancement of dimension well beyond the biological limit of the MMA but with less surgical risk.

From the systematic review of mandibular distraction osteogenesis, this technique could enable 97% of OAS children relieved or improved after surgery. 91% of infants and neonates could avoid tracheotomy and 78% tracheostomized children could be successfully decannulated. Internal mandibular distractors attached to the posterior mandible behind the developing teeth were commonly used in children whereas external distractor was used in infants, particularly in Pierre Robin sequence. On Crouzon and Apert syndromal children suffering from OSA, a combination of internal and external distractors are advocated with the external distractors removed at completion of activation period as to avoid social disfigurement. The presentation will cover the principles of OSA and distraction osteogenesis, the benefits of distraction for OSA children and the full range of maxillofacial surgery for children and illustrate the clinical dentofacial changes and improvement of OSA from this treatment modality.

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Breakthroughs in orthognathic surgery: faster and safer operation

Y.J. Choi

Chung-Ang University, Seoul, Republic of Korea

I will introduce special know-how for faster, safer and more accurate orthognathic surgery as follows:

1. Trimming of dental cast model for facial asymmetry correction.
2. Maxilla finder, a ruler measuring cant and yaw of the maxilla.
3. Point 60, a new landmark for maxillary superior impaction.
4. Surgical technique and useful instruments.
5. Ventilation drainage system through maxillary sinus.

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Optimal positioning of the zygomatic implants — free hand surgery versus guided surgery

J. Chow

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Zygomatic implants are indicated for rehabilitating severely atrophic maxilla. Similar to standard implant placement, optimal position of the zygomatic implants is essential for predictable prosthetic-driven treatment outcome. Stereolithographic templates, bone-supported or mucosa-supported, have been used to install the zygomatic implants to the planned position based on computer-assisted planning. However, there is no effective mechanism, which could physically control the drilling trajectory of the zygomatic implants. Therefore, deviation between actual and planned implant position is inevitable. To increase the precision of guided surgical placement of zygomatic implants, a novel device is designed to guide the osteotomy from the entry point to the exit point for the optimal positioning of the zygomatic implants.

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Digital workflow in orthognathic surgery

K.C. Chow

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This is to share our eight years experience in gradually adopting, modifying and improving the digital workflow in orthognathic workup for our patients in a private maxillofacial surgical centre. Cone-beam computed tomography gives three-dimensional (3D) information about the skeletal and dental tissue. Combining the scanned dental casts using laser or optical scanner augments the accuracy at the occlusal level. This has been recently replaced by using intraoral scanner directly. The surface texture of the soft tissue mask is further improved by fusing with image taken by 3D photogrammetry. The combined result is a digital copy of our patient. We can perform 3D cephalometric analysis to quantify the deformity.

Different commercially available software have been tried to do the virtual surgical planning. Digital wafers can be designed and produced by 3D printing for transferring of our surgical plan

to the operating theatre. Similarly cutting templates can also be fabricated. Physical models of the preoperative or operated facial skeleton can be produced if necessary for better communication. Soft tissue simulation helps our patients to understand the effect of our surgical movements on their appearance besides the change in their occlusion. Clinical audit of the surgical outcome comparing with the surgical plan and the monitoring of the stability of the surgery can be achieved in a more comprehensive way using 3D data. The digital workflow also facilitates multidisciplinary collaboration in providing better and more predictable outcome for our patients.

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Evaluation and surgical treatment selection for adults with obstructive sleep apnoea

J. Cifuentes

Clinica Alemana, Santiago, Chile

For patients with obstructive sleep apnoea there are surgical and nonsurgical treatments.

This lecture will present the systematic approach for surgical treatment in adults with obstructive sleep apnoea that we use at Clínica Alemana, Santiago, Chile.

The diagnosis, the evaluation for surgical treatments will be discussed: medical history, physical examination, home and in-lab sleep studies, nasopharyngoscopy and diagnostic imaging.

The patient selection and the rationale of the different surgical treatment options (intrapharyngeal and extrapharyngeal approaches) to improve patient satisfaction and outcomes will be presented.

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Vertico-sagittal osteotomy — a safe option to avoid neurosensory disturbances during orthognathic procedures

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The sagittal split ramus osteotomy (SSRO) and intraoral vertical ramus osteotomy (IVRO) are common surgical procedures used to correct mandibular deformities. The SSRO maintains its popularity because of its versatility and allows rigid internal fixation. The risk of long-term nerve injury is variable, but considerable, and this complication should be avoided if possible. The IVRO results in a lower incidence of inferior alveolar nerve damage with increased chances of improving temporomandibular joint symptoms. The main disadvantage of IVRO is the need for maxillomandibular fixation for 2–3 weeks.

An alternative procedure, intraoral vertico-sagittal ramus osteotomy (IVSRO) was first reported by Choung in 1992 to correct mandibular prognathism. Comparing with the traditional techniques, IVSRO provides a larger area of contact between the proximal and distal segments than the IVRO. In addition, IVSRO is performed without exposing the inferior alveolar nerve with a decreased risk of neurosensory disturbances when compared to SSRO.

This presentation will show the author's experience using IVSRO and its advantages to treat orthognathic patients with mandibular deformities.

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Endocrine orbitopathy (Graves' disease): a surgical treatment algorithm

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Endocrine orbitopathy (EO; Graves' disease) is a very complex disorder.

Each patient requires an individually customised approach, depending predominantly on the surgeon's background, knowledge, and experience with different primary and secondary surgical procedures. There is certainly no standardised treatment protocol that should be pursued universally.

The choice of the surgical treatment is based on the medical history, clinical examination, degree of exophthalmos, amount of fat and muscular involvement or both, changes in eye motility, optic neuropathy, and palpebral retraction. Each surgical technique should be adapted to the individual patient's situation. In severe cases intraorbital fat removal and bony decompression can be performed in one operation. An integrated global approach by a multidisciplinary team is strongly recommended. General surgical guidelines and a surgical treatment algorithm are suggested.

Strabismus surgery is a significant part of the overall treatment.

Accurate evaluation of dysthyroid status and its treatment by antithyroid drugs, immunosuppressive therapy, radioiodination, and thyroidectomy are the mainstay in the earlier active stage of endocrine orbitopathy (EO).

In severe cases with greater globe protrusion after surgery, diplopia usually remains stable or worsens and requires strabismus correction at a minimum of six months after surgery.

Even if the operation is quite complex, the results show that no major complications are reported when performed by a skilful well-trained surgeon with adequate experience.

The patient and surgeon must be aware that most of the time the EO stigma cannot be completely eliminated, the reason being that EO is a medical disease treated by surgery and patient's signs and symptoms are often present for a long time before surgery.

In spite of this, functional, morphologic, and aesthetic rehabilitation, when appropriately applied, can alleviate signs and symptoms with considerable increase in self-esteem and social–familial acceptability.

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Dentofacial asymmetries, the study of the morphological and functional aspects with tractographic imaging

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Objectives: The aim of this study is to look for something that enables to examine muscle activity in dentofacial asymmetries, in all those patients with a biomorphological and structural alteration of skeletal muscle tissue.

Methods: We examined 10 patients with facial asymmetries with masseter muscle overgrowth. We assessed the volume and degree of the muscle asymmetry through a tractographic magnetic resonance imaging (MRI) study "3-Tesla (3T) Philips Achieva scanner using a head coil". A muscle biopsy has been performed during the surgery and studied with immunofluorescence. We also performed a tractographic MRI guided cerebral investigation pre- and postsurgery, regarding the areas of brain activation during joint movement.

Results: The aetiology of dentofacial asymmetry is multifactorial (genetic, congenital and environmental aspects). Clinical examination is an essential aid for the diagnostic classification of these anomalies and to understand the degree of skeletal asymmetry. The application of tractographic MRI study in dentofacial deformities helps to understand the volume and the orientation of the muscular fibres associated with the brain areas activated during the joint movement. Our preliminary data suggest us to propose a new therapeutic protocol.
Conclusions: Diffusion tensor tractography 3T MRI in dentofacial deformities might revolutionise all planning strategies, both surgical and functional.

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Is there a role for antibiotics in the management of open mandible fractures?

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The widespread liberal use of antibiotics contributes to the development of bacterial multidrug resistance, which is a growing worldwide problem. The Centers for Disease Control and Prevention estimates that in the United States (US), at least two million people acquire antibiotic-resistant infections annually; of whom 23,000 die from those infections per year.

In addition to the human costs, current antibiotic use practices contribute to the US$1.5 billion spent annually managing adverse antibiotic effects, which include antibiotic associated colitis (e.g. *Clostridium difficile* colitis), antibiotic-related allergic reactions and drug-drug interactions. Current antibiotic prescribing practices for managing open mandible fractures varies widely among clinicians throughout the world. Regimens range from no antibiotic use to continuous oral or intravenous antibiotic administration before, during and after operative intervention. This lecture will review the literature and indications to limit antibiotic usage for open mandible fractures.

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Use of intraoperative navigation in oral and maxillofacial surgery

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In recent years, a trend towards computed tomography (CT) guided navigation has evolved to improve intraoperative accuracy during maxillofacial surgery. This modality allows the surgeon to link previously acquired imaging with clinical findings in the operating room in real time enabling a live three-dimensional map of the patients' anatomy in relation to the surgical problem.

The maxillofacial region presents a unique challenge with respect to surgical approaches and complex anatomy. The utility of dynamic imaging to aid in reducing surgical error is an area of great interest in the head and neck region. Advances in navigation-assisted surgery allow for its utilisation in several fields within maxillofacial surgery including oncology, trauma, pathology, orthognathic surgery, and implantology. This lecture will review the indications, surgical set up and uses of intraoperative CT guided navigation.

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Innovative three-dimensional printed medical devices in oral and maxillofacial surgery

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Digital technology has revolutionised the way we live, and the advent of three-dimensional (3D) printing has produced a flurry of interest in all sorts of applications ranging from jet engine components to body parts. While dentistry has been an early adopter of 3D printing tools for crown and bridgework, jaw surgery is a relatively new field of interest where Melbourne leads the world in exciting new developments.

A recent 3D printed prosthetic temporomandibular joint developed and surgically implanted by the presenter in May 2015 attracted nationwide media attention. This presentation will outline some of the exciting new developments in 3D printed jaw parts, which are being created in Melbourne, Australia, that have the potential to revolutionise reconstructive jaw surgery throughout the world.

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Posterior calvarial distraction — a 10-year review of clinical practice and outcomes

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Background: Since publication of the first series,[1] posterior calvarial distraction (PCD) has become established in the management of craniosynostosis. The advantages of using this technique include increased cranial volume, decreased intracranial pressure (ICP), relief of posterior fossa crowding, improved cerebrospinal fluid (CSF) circulation at the craniocervical junction and resolution of a syrinx. We retrospectively reviewed 50 patients who had undergone PCD.
Methods: We recorded the demographics, specifics of diagnosis, operation, distraction details and outcomes from the patient notes and our database. We analysed our complication rates (bleeding, distraction problems, CSF leaks and infection).
Results: 31 boys and 19 girls underwent the procedure between October 2006 and September 2015. Median age was 17.7 months (range, 4 months to 19 years). 34 of the cohort were genetically syndromic. Median length of inpatient stay was 9.4 days (range, 3–43 days). Average distraction distance was 24 mm. The overall complication rate was 50% – most were minor. Complications included CSF leaks, bleeding, distractor problems and one significant morbidity will be discussed. Favourable outcomes including resolution of Chiari, syrinx, and raised ICP will be presented.
Conclusion: PCD is now the primary treatment for increasing calvarial volume. We discuss our experience and changes in technique over the past decade.

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21 years of distraction and counting, the New York Center for Orthognathic and Maxillofacial Surgery experience on Long Island. . .

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The advent of distraction osteogenesis (DO) applications to the maxillofacial skeleton opened up the door to treat severe skeletal facial and craniofacial deformities not amenable to standard reconstructive surgery techniques. The indications for utilising distraction surgery as well as many protocols have been established to guide the surgeon to use the techniques successfully.[1–4] The evolution of distraction surgery has been remarkable. Devices made smaller and stronger. Some have the ability to adjust in three dimensions. Some that can even resorb as the bone heals. The advent of virtual three-dimensional (3D) planning has also enabled more precise with vector planning, accurate device choice and placement as well as the actual surgeries using 3D printed cutting and drilling guides for not only DO but orthognathic surgery.[5]

Over the past 21 years our team has treated 77 patients with the use of distraction including both adults and children. The distraction technique has been used to operate during growth to decrease the skeletal deformation in children and try to normalise the skeletal bases. One of the significant benefits is the opening of the airway to provide a healthy and functional life. Distraction surgery is a great help to solve difficult surgical problems associated with the cleft maxillary skeletal hypoplasia. Cases where either the bone or soft tissue in standard corrective jaw surgery cannot withstand the amount of movement needed for long-term stability. Distraction has truly challenged me to think outside of the box. I have had the opportunity to follow these patients throughout my career. My team's long-term results recorded thus far will be presented. The specific protocol we follow for Cleft Le Fort DO surgery will be presented.

Long-term outcomes depend upon the protocol that is followed. From reviewing our patient population, it appears that any of the growing syndromic patients that have the genetic predisposition to have a micrognathic growth pattern as well as the cleft patients that have early Le Fort surgery (aged between 11 and 14 years), we have found that they will not continue to grow normally after DO surgery done during this time. In these cases, we planned to correct the remaining deformity after growth with orthognathic surgery. We used a surgical protocol during growth to achieve the necessary amount of DO to get the patient in range of normal function and biologically acceptable tolerance of tissue stretching. The plan is next for orthognathic surgery movements to be done at the completion of growth if necessary.

The adult patients with cleft lip and palate that required distraction followed a slightly different process. Ideally, the dentition should be aligned prior to distraction. Then the vector planned to advance the maxilla and stretch the tissues. If the occlusion was not acceptable once the forward movement was achieved, after a period of 16 weeks of consolidation (with confirmation of bone consolidation on computed tomography) we would remove the distractors and re-cut the Le Fort to set the occlusion. There has been no relapse. All distractors have been internal with the Le Fort patients at this time. This surgical protocol used DO surgery as a staging surgery to get stability of the advancement. Compare this to using a SARPE (surgically assisted rapid palatal expansion) to gain width in a very transverse deficient maxilla prior to Le Fort advancement.

Other issues related to obstructive airway disease in the infant and growing child have been a challenge. When operating on the infant to open the airway, we have observed during growth so far, if the child has a normal condyle anatomy, the airway seems to remain open. That is the jaw continues to grow well. Of course if there are no joints or poorly formed joints, they fall into the syndrome category. Their inherent potential for normal growth is already diminished. In these patients we have observed they will most likely have restricted or minimal growth and develop further airway disease as growth continues. If obstructive sleep apnoea syndrome develops when they are older children and the skeletal deformity is significant, we have used a second round of DO to get the airway open and get them in a more functional position. Then reassess later on for corrective jaw surgery if needed.

DO surgery has enabled us with a powerful tool to help patients that otherwise would have even more complicated and unpredictable surgical procedures to solve issues of tissue deficiency and malposition. Today with careful planning and respect of the biology of distraction, successful outcomes are possible for most patients.

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The use of recombinant human bone morphogenetic protein-*2* combined with allograft in alveolar cleft grafting. A review of the outcome of 98 patients between 2008 and 2016

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Purpose: The use of recombinant human bone morphogenetic protein-*2* (rhBMP-2) as an alternative bone grafting enhancing

material has been used in cleft lip and palate patients requiring bone grafting of the alveolar cleft defect.[1–5] Its use has been often combined with autogenous bone, requiring a second surgical site to harvest the bone. This is a review of the outcomes of 98 patients that have received only Infuse® rhBMP-2 plus allograft (Puros®) between 2008 and 2015.

Methods: Patient charts from 2008 to 2016 were reviewed. The patients were all grafted with a small rhBMP-2 kit (4.2 mg) plus 1 g of Puros for the unilateral case and a medium rhBMP-2 kit (8.4 mg split evenly between sites) plus 2 g of Puros (split evenly between sites) for the bilateral cleft patients. ICAT scans were used preoperatively, 1 week postoperatively and from 3 months to 99 months of follow-up changes were used to evaluate the eruption of the canine in the cleft site, the need for exposure of the canine, the density change (in Hounsfield units) of the graft and the percentage of graft retained in the site. The height, width, and depth of the grafted bone were also measured and the change over time recorded. 15 cases were chosen randomly to assess the ICAT cone-beam scans changes in volume and density, height, width and depth of the grafts. Two were bilateral and 13 were unilateral. The engineers at 3D systems used software to overlay the scans and assess then record these changes.

Results: Of the 98 patients, 61 were males and 37 females. Age of the patients ranged from 4 to 48 years. There we 63 unilateral and 35 bilateral cases. For the purpose of this evaluation the right side was used in the bilateral cases to evaluate ICAT measurements for the volume studies. The canines were still developing in 48 patients, the canines erupted in 46 patients and the canines needed exposure in 4 patients. The ICAT scans of the 15 patients showed the following changes and overall 5.76% increase in overall volume. A 6.89% increase in average height, a 17.19%decrease in average width, and a 7.39% decrease in average depth. The Density change was an 82.23% increase.

Conclusion: The use of rhBMP-2 demonstrated predictable results for maintaining enough volume and density to allow for development and eruption of the permanent canine in 46 out of 98 patients thus far. The remaining 48 patients will be followed and recorded. Only 4 patients have required exposure. The volume changes of the graft show an increase over time of 5.76 percent along with an 82.23% increase in density. The bone achieved has thus far provided stability of the dentoalveolar unit as well as adequate bone volume to support the dentition.

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Craniofacial fibrous dysplasia: current treatment options

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Fibrous dysplasia is a rare, benign, slowly growing fibro-osseous disease, resulting in bone deformities, fractures and neurologic compression. Epidemiology, clinical signs and symptoms and radiologic findings in a cohort of 35 patients with periorbital craniofacial fibrous dysplasia will be discussed with emphasis on occurrence and treatment of optical nerve compression.

Computer-assisted planning and surgery shows very promising results in simultaneous static and dynamic guidance in correcting craniofacial fibrous dysplasia. With virtual planning it is possible to transfer the preoperative planning to surgery with the use of helpful guides in order to exactly achieve the planned result. Static guidance is delivered with the use of additive manufactured templates, which are inserted during surgery and define the planned position and orientation. In dynamic guidance image-guided navigation is used. Templates will be rigidly positioned with use of navigation and they will deliver control at local level, as in acting as a sawing or drilling mall. Navigation can subsequently be used to assess the overall result in surgery.

The combination of these two modalities is rather new and delivers extraordinary benefits for surgical outcomes.

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Management of ameloblastomas: maxillary, mandibular, and malignant types

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To this day, controversy exists in the management of ameloblastoma. The University of Maryland Oral Maxillofacial Surgery department, Oncology Service, has had the opportunity to treat a large number of these benign aggressive tumours. We would like to share our observations and lessons learned on the behaviour, management and reconstruction of these three unique types of ameloblastoma.

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"Tips" to facilitate orthognathic surgery

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Orthognathic surgery can be facilitated and/or enhanced by various techniques and procedures. This lecture will present several diverse orthognathic surgery topics that can be useful when treating patients.

Creating maxillary primate spaces prior to surgery: A simple way to facilitate the best possible occlusion is to have the

orthodontist make space between the upper lateral incisors and canines prior to surgery. This allows the attainment of a solid Class I canine relationship without interferences caused by the incisors.

Use skeletal wires to pull maxillary segments in splint after segmental surgery: Segmental maxillary surgery requires that a splint of sufficient rigidity be fabricated so that it will not warp when the tooth segments are wired into the splint. However, some times there is force needed to properly seat the teeth into the splint. If wires around the orthodontic brackets are used, the teeth can extrude from the supporting bone. Skeletal wires can prevent this from happening.

Maintenance of the transverse maxillary dimension after expansion with segmental surgery: The least stable surgical procedure is increasing the transverse dimension of the maxilla with segmental surgery. A method to retain the expansion will be presented.

Splitting along inferior border in Sagittal Split Ramus Osteotomy (SSRO): The Dal-Pont modification of the SSRO is commonly used in the United States. However, if the inferior border of the mandible and part of the lingual cortex remains attached to the proximal segment, a gap along the inferior border can occur after the mandible is advanced. This can occasionally result in a "notch" that is visible in thin people. The technique can be modified to achieve a split between the buccal and lingual cortices of the inferior border, preventing a gap after mandibular advancement. This will be demonstrated.

Fixation requirements of the SSRO: Plates, screws, or combinations can successfully stabilise the SSRO. However, not all plates are created equally and functional deformation of the plates with resulting malocclusion can occur. Satisfactory techniques for fixation of the SSRO will be presented.

Treating transverse arch incompatibilities in the mandible: Most commonly, transverse arch incompatibilities are treated by maxillary expansion. However, for patients who are scheduled for isolated mandibular surgery, arch incompatibilities can just as easily be treated by narrowing the mandible. The technique will be presented.

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Orbital reconstruction using patient specific implants providing reference information

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Reconstruction of orbital wall fractures can be challenging due to the complex anatomy and the limited surgical approach. For precise reconstruction computer-assisted planning and intraoperative control with navigation or intraoperative imaging is very supportive.

A sophisticated approach using individually manufactured titanium implants for daily routine is presented to further increase precision in orbital reconstruction and decrease surgical time. Therefore preoperative three-dimensional imaging (computed tomography [CT]; cone-beam CT) is used to generate construction data for patient specific implants (PSI).

This technique allows to include reference information for primary and secondary reconstruction. Especially in secondary reconstruction with osteosynthesis material in place, position of existing screws could be implemented into the computer assisted planning and design of patient specific reconstruction. Thus, PSI implants could also indicate the planned position as reference marker.

PSI could be considered superior to manually bent titanium implants and osteosynthesis.

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Ultra-short implants versus augmentation and bone transplants

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Since 2011 we are performing studies with 4 mm × 5 mm ultra-short implants on tumour patients after microanastomosed fibula transplantation as well as on patients with extreme atrophy of the maxilla with less than 6 mm bone and extreme atrophy of the mandible with less than 7 mm bone.

Until now we applied on 40 patients either in the maxilla in the interantral and/or in the mandible in the interforaminal region respectively four 4 mm × 5 mm ultra-short implants.

In our over 4-year follow-up experience we are able to report about extremely good result with less than 3% implant losses due to missing osseointegration. Osseointegrated implants we have not lost yet.

Similar good results we also observe in patients with complicated re-implantations or in compromised bone.

Should these very good results also be observed over a longer follow up time than 5 years, the statement should be allowed that it will be not necessary any more to perform extensive augmentations and bone enhancement operations with good results as I will show in my over 30 years' experience and recall statistics but there are much higher risks, morbidity and costs.

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Structural grafting in rhinoplasty

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Grafting in open rhinoplasty is an integral part of contemporary rhinoplasty. The purpose of this presentation is to familiarise the audience with the latest principles of cartilage grafting in open structure rhinoplasty. Various techniques as well as indications for several grafting procedures will be described. Emphasis will be placed on both functional benefits and aesthetic advantages of grafting procedures. Case presentations will highlight the grafting techniques.

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In vitro fabrication of mucocutaneous constructs for use in lip reconstruction

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Objective: To develop a technique for the construction of a mucocutaneous junction (MCJ) equivalent to be used in the fabrication of the lip.

Methods: Cultured primary human skin and oral mucosal keratinocytes at premixed ratios on a dermal equivalent to create a MCJ equivalent with a lip or transitional zone (vermilion) using a novel three-dimensional (3D) culture device with a barrier to separate co-cultured skin and oral cells. Different cell ratios were compared by staining for specific differentiation markers to define the different areas of skin and mucosa.
Results: Immunohistochemical results showed MCJ equivalents seeded with premixed cells were similar to differentiation patterns of tissue-engineered 3D cultures using 100% oral mucosal or skin keratinocytes. The engineered MCJ-equivalent constructs, grown in the 3D device specifically constructed with a cell-free gap at the barrier site, formed a transitional zone (vermilion) at the barrier site with intermingling of the skin and oral keratinocytes. The results showed different and unique expression patterns of filaggrin, cytokeratin 10, cytokeratin 19, and small proline-rich protein 3 by cells migrating into the gap, similar to those seen in human lip tissue. This pattern was not seen in MCJ equivalents created using premixed skin and oral cells.
Conclusion: Using a device to separately co-culture human oral and skin keratinocytes to allow the cells to migrate into a cell-free zone resulted in phenotypic expression closer to what is seen in native tissue, in comparison to premixing the skin and oral cells before seeding.

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Maxillary reconstruction with osseous free flaps

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Background: Maxillary can be approached in different ways, depending on extension of resection, involvement of bony structures and patient's features in terms of age, comorbidities and previous treatments. Osseous free flaps are nowadays considered the gold standard for such purposes, with fibula, iliac crest and scapular angle flaps as the most used worldwide. Appropriate flap selection is certainly the key point for the reconstruction and should be based on kind of maxillectomy in terms of vertical extension, needing for soft tissues reconstruction, and donor site availability.
Methods: The experience of the Maxillo-Facial Surgery Division of the University Hospital of Parma will be presented, focusing on flap selection, donor site management and morbidity.
Results and Conclusions: Reconstruction of alveolar ridge defects, with limited vertical extension can be adequately reconstructed with the fibula free flap: long pedicle, ideal bone for implants rehabilitation, skin availability are the main advantages of this option. Total or subtotal maxillectomies with vertical extension, especially when orbital rim and floor of the orbit are resected, are ideally reconstructed with iliac crest free flap that provides large amount of bone, adequate support to the cheek and good reconstruction of the orbital rim, with oblique internal muscle that can be used for internal oral lining restoration. Scapular angle free flap, especially in the chimeric version, is the most versatile flap, that can be used either for lower defects (if placed horizontally) as well for the highest (if placed vertically). The possibility of harvesting latissimus dorsi and/or serratus components makes this flap ideal for complex three-dimensional reconstructions. Finally the low morbidity of its donor site allows its use also in elderly patients or in those where other flaps are not available.

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Orthognathic surgery: Le Fort II set back in Class II malocclusions

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Class II jaws relationship is one of the most frequent malocclusion that surgeons face. It is usually treated by orthognathic surgery. The majority of surgical procedures include bilateral sagittal split osteotomy which provides generally excellent results with a significant improvement of the occlusion and the aesthetical aspect. However some particular cases require more sophisticated approaches when the malocclusion is related to maxillary and/or centrofacial protrusion. In these situations systematic mandible advancement do not offer the best outcomes leading sometimes to very "protrusive" faces. In the past some cases were treated by Le Fort I or segmental set back osteotomies that avoid some adverse effects of the "systematic" advancement treatments. However some patients that have true centrofacial protrusion must be considered for another treatment option that take into account they particular situations. For them the option can be a centrofacial set back osteotomy (Le Fort II).

Technically this procedure requires finding space in the posterior part of the face that is easy to get by the section of the pterygoid processes. In the central part some bone have to be remove to allow posterior displacement of the nose. Nasal septum has also to be reduced and the lachrymal ducts have to be protected.

Properly carried out when real centrofacial protrusion is present the Le Fort II set back osteotomy is the way to achieve the best results in some very particular Class II malocclusions.

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Full mouth rehabilitation of the maxilla using precise implant guided surgery (from extracting teeth to zygoma implants and immediate loading)

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The usage of zygomatic implants for maxillary rehabilitation has been increased during the last years due to the popularity of the All-on-Four protocol.

Zygomatic implants require good knowledge of the facial mid third anatomy, increased mandibular opening, malar bone stability, and requires surgical training. Previous techniques been described for guided placement of zygomatic implants including external navigation guidance and direct wire guidance. None of the previous techniques have described the placement of immediate loading with fixed bridge.

This innovative protocol allows the placement of zygoma implants with minimal periosteal dissection or skeletalinisation of the maxillomalar complex. It helps with excellent position based on the future prosthetic design as well as emergence of the abutment for better oral hygiene and long-term stabilisation.

It looks also for the best bone available in the body of the zygoma bone. It allows simultaneous dental extractions, bone reduction guides for radical alveoloplasty and integration of regular implants with zygomatic fixtures for immediate rehabilitation in the same surgical stage.

Advantages, surgical tips and disadvantages will be illustrated with the presentation of clinical cases.

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Total custom temporomandibular joint reconstruction and simultaneous orthognathic surgery in ankylosed patients using virtual surgical planning

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Multiple techniques have been described for treatment of temporomandibular joint (TMJ) ankylosis. The use of total joints with fat graft is a commonly employed technique. Patients who present with this pathology usually have skeletal facial deformities such as mandibular hypoplasia and skeletal open bites. The majority of these cases requires a two stages and some times even a three stages surgical approach including, removal of the TMJ ankylosis and placement of TMJ acrylic spacers.

This requires a repeat scan of the patient, fabrication of the custom made joint and then placement of the prosthesis before, after or simultaneously with the maxillary orthognathic surgery associated with the correction of the facial deformity.

This presentation addresses an innovative technique, which involves the usage of virtual surgical planning to fabricate the prosthesis, custom surgical cutting guides, measurement gigs for removal of the ankylosis and to determine the size for the removal of the ankylosis and splints for the orthognathic surgery.

I summary this technique utilises virtual surgical planning along with guided surgery to allow the surgeon to use a novel one-stage technique for complicated combined skeletal facial deformities and TMJ ankylosis.

Advantages, surgical tips and disadvantages as well as steps of the surgical sequence will be presented.

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Reconstructive challenges in craniofacial malformations

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Education and Training Officer, EACMFS

Craniofacial congenital deformities can involve the skull, forehead, orbits, zygoma, nasal complex, maxillary and mandibular jaws and temporomandibular joint.

The spectrum of such malformations is various and includes syndromal and nonsyndromal craniosynostosis, syndromes with HTO, as well as many other syndromes.

Craniofacial surgery has witnessed tremendous advancement over the last decades: new techniques for diagnosis, assessment and surgical treatment are today available.

An essential part of the treatment of all craniofacial malformations is represented by bone surgery: osteotomies, mobilisation, rotation, fixation of bony segments in order to restore a more balanced skeleton.

Soft tissue restoration is mandatory as well, in order to obtain long-term stability. A variety of craniofacial conditions present with orbital deformity. The orbit may be regarded as a "cross roads" between pathologies, anatomical regions, and different specialities.

The orbital bandeau is the key architectural component of any craniofacial reconstruction especially in congenital deformities, and orbitocraniofacial surgery can be defined as the correction of complex traumatic or congenital deformities based on the orbit.

The cranial base is a "constructional template" for facial and orbital development, normal or abnormal, and most craniosynostosis, even if not syndromic, occurs with primary or secondary deformities of the cranial base and the orbit.

Knowledge of the anatomy, planning and a well-trained craniofacial team are the key factors in this surgery.

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Treatment of congenital malformations of the mandible

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Distraction osteogenesis (DO) has been one of the most innovative concepts in craniomaxillofacial syndromology and surgery through the last 25 years.

After more than a quarter of century of extensive use DO has today specific indications for congenital craniofacial and cleft deformities.

Technology has evolved from the first application of external devices to intraoral and hybrid or semi-buried techniques.

In congenital craniomaxillofacial anomalies distraction is indicated during growth. Mandibular distraction osteogenesis can be safely and effectively used to avoid or remove tracheostomy in neonates with severe airway obstruction caused by micrognathia in Pierre Robin Sequence.

For selected newborns, mandibular DO will allow for avoidance of a tracheostomy and improved oral feeding. A careful evaluation of the patient's airway and feeding must be performed and evaluated by a multidisciplinary Team approach.

In syndromic micrognathia early mandibular distraction seems to be an appropriate indication. Benefits are functional, morphological and aesthetic with consistent psychological and familiar positive effects.

An increased incidence in TMJ complication during distraction osteogenesis in neonates has been recently reported, especially in syndromic patients.

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Craniomaxillofacial trauma — changes in craniomaxillofacial trauma care from 1991 to 2016

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Objectives: The goal of this study was to analyse craniomaxillofacial trauma using a large computerised database and to assess the effect of the five main causes of accidents resulting in facial injury.
Methods: During a period of 10 years (1991–September 2016) 25,000 patients were admitted to the Department of Oral and Maxillofacial Surgery, University Hospital of Innsbruck with craniomaxillofacial trauma. Data of patients were prospectively recorded including cause of injury, age and gender, type of injury, injury mechanisms, location and frequency of soft tissue injuries, dentoalveolar trauma, facial bone fractures and concomitant injuries. Statistical analyses performed included descriptive analysis, Chi squared test, Fisher's exact test, and Mann–Whitney's *U* test. This was followed by logistic regression analyses for the three injury types to determine the impact of the five main causes on the type of injury at different ages in facial trauma patients.
Results and Conclusion: Five major categories/mechanisms of injury existed: in 38% of the cases it was activity of daily life, in 31% sports, 12% violence, in 12% traffic accidents, in 5% work accidents and in 2% other causes. A total of 37.5% had facial

bone fractures, patients (49.9%) suffered from dentoalveolar, and patients (62.5%) from soft tissue injuries. This study differentiates between injury mechanisms in craniomaxillofacial trauma and will provide insight into changes on injury patterns, cause of injury, age and gender, type of injury, injury mechanisms, location and frequency of soft tissue injuries, dentoalveolar trauma, facial bone fractures and concomitant injuries over a period of 25 years. The specially trained surgeons treating craniomaxillofacial trauma are the primary source of information for the public and legislators on implementing preventive measures for high-risk activities.

In facial trauma, older persons are prone to bone fractures and soft tissue injuries while younger persons are more susceptible to dentoalveolar trauma.

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Treatment of late complications in head and neck cancer survivors — trismus and chewing problems

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This presentation consists of four parts: a first part on the basic foundation of the talk, a second part on the consequences, sequelae and complications of irradiation, a third part on surgical patient treatment and care, and a fourth part on preventive strategies based on the scientific foundation.

First muscles such as masseter, temporal, medial und lateral pterygoid muscle support motion of the temporomandibular joint which is neglected in situations of radiation therapy which is usually an important antiinflammatory stimulus.

Second radiogenic mucositis, xerostomia, trismus, dysphagia, caries, and effects on jaw and tooth development contribute to malfunction or even loss of function of the stomatognathic system.

Third surgical treatment may necessitate microvascular reconstructive procedures to overcome bad healing conditions in irradiated tissue.

Fourth new research data reveal that in irradiated bone mesenchymal stem cells survive in their immunologic niche and growth factors may improve and even prevent tissue breakdown.

In summary, this presentation will provide insight into the treatment of late complications in head and neck cancer survivors especially with trismus and chewing problems.

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Advanced computer-assisted procedures in craniomaxillofacial surgery: where we came from and where are we going to?

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The aim of the presentation is to show the evolutionary process in using computer-assistance for reconstructive surgery in the field of craniomaxillofacial surgery. In the past the focus was on developing powerful computer systems to deal with image data, whereas nowadays we focus on integrated solutions to ease the use of computer assistance and make it applicable for the surgeon. Formerly, the first steps of computer assistance were taken towards reconstruction of the cranial vault. Nowadays, basically all areas (e.g. from orbital surgery to extension lines in implant dentistry) can be addressed and computer assistance allows for individual patient-specific solutions thus solving difficult cases precisely.

However, there is a clear distinction between "outside the OR" virtual modelling for preoperative planning and digital engineering and intraoperative use of computer-assistance by visualizing three-dimensional (3D)-data of the patient versus the digital blue print during surgery: The aim is to enhance operative knowledge or even to update it by using intraoperative navigation or intraoperative imaging. The third pillar of computer assistance is the postoperative quality control, where image fusion of pre-, intra- or postoperative 3D-data is performed to check the adequacy of the plan, surgery and clinical outcome. This is a completely new workflow thinking and use of 3D-data, apart from the limitation to diagnostics only.

In the end, it comes to the idea of fulfilling a common trunk for DICOM (digital imaging and communications in medicine) driven data workflow no matter of the anatomical region, language and pathology to further – and above diagnostics use of a Voxel-based dataset in clinical environment. Part of the common trunk is the implementation of either specifically formed biomaterials or quality controlling versus documentary purposes of navigation or image fusion of intraoperative required cone-beam up to – if needed – robotics. Twenty years of personal involvement in establishing these workflows and accomplishing of the digital common trunk – ideas are presented and demonstrated by cases of complex craniomaxillofacial surgery where also the chances, challenges and limitations of using these technologies are explained.

Computer-assistance does not allow skipping surgical skills or biological principles. However, it is a superb tool to use 3D Voxel-based datasets above diagnostics to the benefit of the patients and our specialty.

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Trigeminal microsurgery: from lingual sensitive recovery to corneal neurotisation

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Trigeminal nerve injuries can have different aetiologies and affect each portion. Iatrogenic lesions are common, the majority of which interest the third branch. Microsurgical strategies can be effective in treating trigeminal lesions at every level. Mandibular and lingual nerve lesions can occur as a consequence of odontoiatric, orthognathic or oncologic surgeries.[1] Lingual nerve lesions often produce considerable impairment and discomfort for the patient.

Trigeminal microsurgery may be used to treat mandibular nerve injuries as well as to restore lingual sensibility after lingual nerve damage. Several different techniques have been described.[2] Furthermore, the first trigeminal branch also can be interested by iatrogenic or non-iatrogenic lesions resulting in the loss of corneal sensibility and consequently in corneal damage. The affected cornea can be treated by microsurgical neurotisation using the first contralateral branches or the second homolateral one in order to re-establish corneal sensibility.

In conclusion trigeminal microsurgery offers a variety of surgical strategies that can be effective in different clinical situations interesting each branch of the trigeminal nerve.

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Posterior cranial vault reconstruction for sagittal and lambdoid suture craniosynostosis

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Craniosynostosis creates a three dimensional dysmorphology of the cranial vault as the result of arrested development perpendicular to the missing suture(s) and a compensatory overgrowth which occurs at the sutural areas that remain open. Sagittal suture craniosynostosis is the most common nonsyndromic form of craniosynostosis with a prevalence of 1 in 5000 births and creates a characteristic scaphocephalic deformity with bitemporal and biparietal narrowing and anterior-posterior elongation of the skull. Left untreated, single suture craniosynostosis may also lead to restricted intracranial volume and raised intracranial pressure with negative neurological consequences. Lambdoid suture craniosynostosis is uncommon with a prevalence of 1 in 150,000 births, but may pose a diagnostic challenge for surgeons differentiating synostotic conditions from deformational plagiocephaly.

The surgical techniques employed for posterior cranial vault expansion and reshaping for sagittal and lambdoid suture craniosynostosis will be presented with an overview of the author's approach. Conventional open techniques for release of the fused suture and reconstruction of the affected cranial anatomy will be emphasised. Considerations related to timing of surgery will be discussed. The diagnostic approach to children with posterior plagiocephaly due to surgical and nonsurgical aetiologies will be discussed.

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Transoral robotic surgery as an adjunct to obstructive sleep apnoea management

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This presentation will present new advances in the surgical treatment of obstructive sleep apnoea with the da Vinci Robot. Learning objectives will include the presentation and discussion of multiple alternative surgical treatments for patients with obstructive sleep apnoea. An overview of the anatomic areas affected and the instrumentation utilised with this treatment modality will be presented. Also detailed in this presentation will be an analysis of our preliminary experience using this technology, as well as our preferred surgical technique.

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Seven keys to a successful career in oral and maxillofacial surgery

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A successful career does not only depend on the technical skills of a particular surgeon. As a matter of fact the definition of what makes a good surgeon varies greatly depending whether the opinion comes from a patient, a surgeon, or other stakeholders of the health business.

In this presentation we will through some of the key factors that can contribute to a successful professional career in oral and maxillofacial surgery. They include among others, aspects related to personal branding, to the relation you establish with your partners and staff, to the efficiency of your processes (medical and non-medical), or the flexibility of your organisation.

We will stress the need of strategic thinking and planning. We will learn about the concepts of mission, vision or values, the role of analysing our own organisation, but also the competence we face, and finally the need to establish our goals as healthcare professionals devoted to oral and maxillofacial surgery. Then and only then, we will be able to establish our strategy to pursue our objectives.

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Morphofunctional palatoplasty: evidence based recommendations

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Background: Primary and secondary palatoplasty should aim to identify and correct the disturbed morphology to achieve adequate function of the soft and hard palatoplasty.
Objectives: To compare one- and two-stage primary palatoplasty. To also test the efficacy of a modified Furlow's repair with levator myoplasty to correct velopharyngeal incompetence (VPI).
Methods: A randomised clinical trial of 100 patients with complete cleft lip, alveolus, hard and soft palate and aged between 12 and 13 months were divided into two groups of 50 patients each to assess the efficacy of one versus two-stage palatoplasty done with optimal muscle dissection in the soft palate on speech and fistula formation. Both patient groups were compared to a control group of patients without any cleft defect. Speech was tested using nasometry and perceptual analysis while presence of fistula was tested using patient history of nasal regurgitation and local examination. A prospective cohort study of 55 consecutive patients with VPI were treated with a modified Furlow's procedure with levator myoplasty. All patients were tested for nasalance before and after the surgery using nasometry.
Findings: In the first study, two-stage palatoplasty had less nasalance while compared to patients who had one stage palatoplasty. The fistula rates in the two-stage group were more, though the difference was not significant. In the second study the nasalance was significantly lower in patients after the modified Furlow's procedure.
Conclusion: Two-stage palatoplasty is a better option for primary palatoplasty and the modified Furlow's procedure is an effective option for VPI repair.

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The outcome of patients suffering from oral squamous cell carcinoma treated under certified tumour board conditions

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Objectives: The aim of our study was to review the outcome of patients with oral squamous cell carcinoma (OSCC) treated according to the current diagnostic and treatment protocols ("Tumor Board Group" [TBG]) compared to patients diagnosed before the introduction of standardised and certified guidelines ("Conventional Group" [CG]). We also analysed the influence of prognostic factors on overall survival (OS), disease-free survival (DFS) and recurrence free survival (RFS) rates.
Methods: A total of 321 patients (TBG 95 patients and CG 226 patients) with histologically confirmed OSCC were included in our study. RFS, DFS and OS rates were analysed by Kaplan-Meier estimates. Cox regression was performed for multivariate analysis of prognostic factors. Results were statistically significant with a P value of <0.05.
Results: T, N, American Joint Committee on Cancer (AJCC) stage, age and therapy resulted to be independent risk factors for OS and DFS. We were not able to identify statistically significant prognostic factors for RFS apart from grading. 31.58% of patients from the TBG received postoperative adjuvant treatment compared to 74.78% within the CG. The OS rate was 79.63% at 30 months for patients from the TBG in comparison with 65.54% for patients from the CG.
Conclusion: The implementation of standardised guidelines including the establishment of the "Tumor Board Conference" results in a higher percentage of patients receiving surgery as only treatment and in better OS rates. To further support this positive trend, patients shall be followed longer and analysed in future. T, N and M as well as AJCC stage were identified as most important prognostic factors for OS and DFS in our study.

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Maxillofacial reconstruction by bone transport and multiple dental implants

C.A. Guerrero*, M. Gonzalez, R.R. Throndson

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Objective: To reconstruct the maxilla or the mandible using pedicled osteotomised segments for major continuity defects.
Methods: 10 patients were treated for maxillofacial continuity defects, ranged from 2 to 16 cm, as a result of tumour resection, gunshot wound or trauma. Utilising local osteotomies and bone transport, the bony segments maintained the soft tissue attachments and were mobilised and fixated in position to a reconstruction plate. For minor defects up to 4 cm local osteotomies and immediate fixation to a reconstructive plate were performed, combined with internal bone transport for major defects. Clinical analysis, photographs and radiographs (panoramic, lateral and P-A cephalic) were used to evaluate the bone continuity, facial aesthetics, occlusion and mandibular function.
Results: All patients were adequately reconstructed intraorally with radiographic evidence of bony continuity. No soft tissue dehiscence, infection or necrosis of the segments was observed after 2 years of follow up.
Conclusions: All reconstruction were successful, and full bony continuity was obtained, using pedicled osteotomised segments. Furthermore, the use of osseointegrated implants allowed functional dental rehabilitation anchorage.

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Multiple zygoma implants for severe maxillary atrophy

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Objectives: Demonstrate the feasibility to immediately load a hybrid prosthesis on multiple zygoma implants for severe maxillary atrophy without grafting.
Methods: 50 patients were treated with multiple zygoma implants (4, 5 or 6 fixtures) for immediate loading serving as anchorage for a hybrid denture (zirconia, metal-acrylic or metal porcelain prosthesis). We used transmucosal implants into the piriform rim to the infraorbital rim, body of the zygoma or/and tuberosity up to the pterygoid plates. The architectural zygoma implant positioning design was based on: quality and quantity of bone, opposite dentition, age of the patient, masticatory muscles power and type of skeletal malocclusion. 95% of the implants were extrasinus with lateral fat pad coverage when needed and the remaining 5% underwent sinus mucosa medial repositioning. All surgeries were performed under general anaesthesia.
Results: All patients were followed up to 10 years (average 5.6 years) the provisional teeth were installed immediately and final prosthesis was fabricated within 8 weeks postsurgery. Complications were related to surgery or prosthesis, one implant was exposed into the sinus and needed sinus treatment and eventually was removed (the prosthesis continued to work on 4 implants), and two implants got exposed laterally, requiring lateral fat pad coverage with success. The provisional teeth phase is fundamental to comply with the patient aesthetics desires and functional-occlusal requirements, through multiple and sequential changes.

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State of the art in intraoral distraction osteogenesis

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Objective: Demonstrate the possibility to develop new bone and soft tissues in a controlled and predictably manner to treat maxillofacial deficiencies. Avoiding the use of bone grafting, decreasing morbidity and costs.
Methods: 720 patients underwent intraoral distraction osteogenesis with miniaturised appliances to increase maxillofacial width and/or anteroposterior bone and surrounding soft tissues to correct severe skeletal deficiencies. The distraction devices were completely buried with extension activators or placed transmucosally, to avoid food and saliva contamination and obtain closed chamber for ideal bone formation. The variables included: amount of movement, age of the patient, quality and quantity of bone. Movements were 7 mm (mandibular widening) to 55 mm (bone transport after tumour resection). Strict distraction protocols were reinforced, selection of adequate surgical sites and avoiding complications are the key to success.
Results: Bone growth was controlled either by adequate planning or bony fragments repositioned after the activation phase and before consolidation, with the distractors one-end repositioning or rigid fixation. The distraction devices were removed after radio-opacity was analysed in the postoperative phase. The appli-

ances were comfortable to be maintained for longer consolidation periods.
Conclusions: Distraction osteogenesis is indicated in severe deformities for two-dimensional or three-dimensional corrections, avoiding bone grafting and long hospital stays reducing costs and morbidity.

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Perforator flap reconstruction

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Free flap reconstruction is the established gold standard for reconstruction of defects following oral and head and neck cancer ablation.

Donor site morbidity is a concern in some cases and more recently perforator flaps have become increasingly popular. Preoperative workup involves mapping out the surface vessels over the donor skin using a hand-held Doppler probe which helps identify the location of the perforator/s intraoperatively. Once identified, perforator dissection is performed back to the parent pedicle or until adequate vessel length is obtained to facilitate microvascular anastomosis. The advantages of these flaps are minimal donor site morbidity and provide more flexibility to reconstruction options. Some examples are anterolateral thigh perforator, anteromedial thigh perforator flaps, thoracodorsal artery perforator and medial sural artery perforator flaps amongst others.

Freestyle perforator flaps have also been described where the perforator vessel dissected may not be a known named vessel, and adds a further dimension. Reconstruction of complex head and neck defects pose a challenge and chimeric flaps have an important role in these cases. Chimeric flaps allow different combinations of skin/muscle/bone paddles to be dissected onto one parent pedicle thereby reducing the number of microvascular anastomoses required. This technique is proving to be invaluable for reconstruction of complex defects whilst reducing both operating time as well as donor site morbidity.

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Precise management of the lesions in the skull base under the guidance of computer-aided navigation

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Computer-aided navigation is a kind of special instruments, which are connected to the navigation system to touch an anatomical position on the patient. This position is simultaneously shown in the images taken from this patient. The surgeon can thus use the instrument to 'navigate' the images of the patient by moving the instrument. We used this technique to handle the lesion under the skull base, including orbit reconstruction, resection of skull base tumours, treatment of temporomandibular joint ankylosis, removal of foreign bodies, needle biopsy, placement of radiation seeds, etc. Our experience shows that navigation technique can provide precise preoperative surgical design and navigate surgical procedures according to the design, improving surgical accuracy and raising safety.

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Treatment of temporomandibular joint ankylosis with severe mandibular deficiency by Biomet temporomandibular joint prosthesis

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Background: Temporomandibular joint (TMJ) ankylosis is a refractory disease that is easy to recurrent.
Objectives: This study aimed to evaluate the effects of TMJ prostheses in the treatment of TMJ ankylosis in patients with severe mandibular deficiency.
Methods: Patients treated from 2013 to 2015 were reviewed. The computer-aided design/computer-aided manufacturing technique was used to guide bony mass removal and locate the TMJ prosthesis (Biomet, USA). Their facial profile, mouth opening and the results of computed tomography examination were evaluated.
Findings: 11 patients with 15 joints were included. In four patients with severe mandibular deficiencies, their mandibular ramus was elongated by TMJ prostheses combined with Le Fort I osteotomy guided by digital templates. Their mean chin advancement was 10.19 mm. Their SNB and ramus heights were also significantly improved after operation ($P < 0.05$). All prostheses were successfully installed and stabilised intraoperatively. There was no prosthesis loosening, breakage, or infection leading to removal. No ectopic bone formations were found around the artificial condyles, and no bone resorption was detected around the screws after a mean follow-up period of 21 months (8–31 months). Mouth opening was significantly improved from 5.5 mm preoperatively to 31.6 mm postoperatively.
Conclusion: TMJ prosthesis is a reliable treatment method for ankylosis, especially recurrent ankylosis. It can correct jaw bone deformities simultaneously with stable results.

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From traditional to perforated flaps in oral and maxillofacial surgery and head and neck reconstruction: principle, indication, imaging and clinical applications

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Free flaps transfer for oral maxillofacial and head neck reconstruction should not only eliminate the dead space, but also provide satisfactory contours and restore the original oral functions. In the past 30–40 years, conventional free flaps such as radial forearm flap, pectoralis major myocutaneous flaps, latissimus dorsi flaps, fibula flaps, etc., acted as horse work flaps in great efforts at reconstruction of soft and hard tissues. Over the past decades perforator flaps have gained the interest of the reconstructive surgeons as an ideal option for tissue transfer without sacrificing main artery and muscle in the donor site. The purpose of this study is to report on the principle, indication, imaging and clinical applications of ideal perforator flaps.

We used colour Doppler ultrasound, computed tomography angiography and magnetic resonance angiography techniques for accurately locating the perforators preoperatively. A series of perforator flaps, such as the medial sural artery perforators flap, superficial iliac circumflex perforators flap, deep inferior epigastric artery, internal mammary artery perforator, thoracoacromial artery perforator, deep circumflex iliac artery perforator and buccal artery perforators flap were performed on patients with different

oral and maxillofacial defects for personalized rehabilitation. As results, perforator flap is more hidden in donor site, less injury, and has more suitable thickness choices than some of traditional flaps. The postoperative facial morphology, swallowing and speech function is receivable and reasonable by the patients, which indicates that the perforator flaps represent the latest trends for the reconstructive surgeons.

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Paediatric jaw pathology: approaches to management

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The spectrum of pathology affecting the craniomaxillofacial skeleton in the young patient includes a range of benign, aggressive pathological entities that require resection with an adequate margin to reduce the risk of recurrence. Malignant craniofacial lesions in the paediatric patient differ from the adult in that they are usually sarcomas of hard and soft tissues, and are relatively rare.

Giant cell lesion and unusual lesions such as infantile mandibular fibromatosis and juvenile mandibular chronic osteomyelitis are disorders where the biological behaviour is not predictable and treatment may vary from conservative to ablative surgery. Similarly, the treatment of fibro-osseous lesions may include observation, contouring or resection.

Ameloblastomas and malignant tumours require resection with a margin. Unlike adult malignancy, multimodal therapy is required for sarcomas of the jaws in paediatric patients and reconstruction of the resultant defects must be planned for a full life-span.

Iliac non-vascularised grafts or rib may readily reconstruct "short-span" mandibular segmental resections. For larger maxillary and mandibular segments including tooth-bearing segments, free vascularised grafts provide the most reliable reconstruction (fibula/ilium).

Where possible, facial skin incisions are best minimised in young patients to avoid unnecessary aesthetic compromise from potentially poor scarring. Surgical access for resection can be often achieved intraorally with access to recipient vessels gained by limited incisions in a skin crease.

The "neo-alveolus" needs optimal orientation and sufficient prosthetic space for future implant-supported bridges. Hemimandibular reconstructions are often too laterally placed making rehabilitation difficult or impossible.

The purpose of this presentation is to review the spectrum of jaw lesions in the context of the paediatric population and to give our Unit's approach to management.

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Rhinoplasty for cleft nose deformity

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Rhinoplasty is one of the most commonly performed procedures in facial aesthetic surgery and has generated an enormous literature. The secondary cleft nasal deformity is often the most prominent feature of an individual with a cleft anomaly and its correction is widely regarded as one of the most challenging procedures in which to achieve consistently good results.

While some cleft surgeons recommend correction of the nasal tip during primary surgery, others prefer that nasal surgery be confined to the adolescent years when growth is almost complete. At this stage, key anatomical defects, such as displacement of the lateral crus of the alar cartilage are then stable and can be definitively repositioned and sculpted to a more normal position. An analysis of the deformity and an appreciation of the action of the muscular forces associated with the cleft explain the malposition of the tissues observed.

In unilateral cases, the septum deviates to the greater segment and there is lateral displacement of the lateral crus. Septal deflection may extend posteriorly in continuity with the vomerine septum and may result in complete posterior obstruction. The markedly deviated nasal septum is also often accompanied by a hypertrophied turbinate on the concave side and relative obstruction on the convex side due the close proximity of the adjacent contralateral turbinate.

The keystone for correcting a deviated nose and for providing sufficient support is the construction of a symmetrical robust septum. The bilateral cleft nasal deformity is more symmetrical but the nasal tip is drawn ventrally with a short columella. There is a lack of tip projection due to the depressed alar cartilages in addition to the flaring of the nasal alae that have a more horizontal orientation. In this presentation, the key features of the cleft nasal deformity and the approach to surgical management will be highlighted with case presentations.

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Reconstruction of the facial skeleton using virtual planning of free flaps

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Microvascular free flaps are nowadays the gold standard for the reconstruction of huge tissue defects in the head and neck. From November 2010 to December 2015 a total of 594 free flaps have been performed with the radial forearm and the fibula being the working horses. 7.2% of the flaps have been lost. If bone is also included in the transplant, the use of virtual planning tools is widely used today. However, the transfer of the virtual plan to the operating theatre can be solved in different ways.

This lecture demonstrates the use of individual computer-aided design/computer-aided manufacturing based guides for cutting and an individual plate for fixation. This workflow has been applied in 203 fibula flaps, 42 deep circumflex iliac artery flaps and 32 scapula flaps up to now. Accuracy of this workflow, overview about the literature and many example cases will be shown. Furthermore, the question when to reconstruct mandibular defects in cases with oral squamous cell carcinoma will be addressed. Our preliminary results of 21 patients with immediate reconstructions after mandibular resection and a minimum follow-up of 18 months have neither shown an increased rate of local recurrences nor a reduced overall survival rate.

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Minimally invasive orthognathic surgery

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Orthognathic surgery has been traditionally considered an aggressive group of techniques, with high morbidity in terms of length of procedures, blood loss, neurological and vascular risks, and time for patient recovery. Because of that patients perceive these procedures as highly invasive and tend to be reluctant to accept treatments.

In our lecture, we will present and discuss some of our strategies to reduce the impact orthognathic surgery has in our patients. Among them, our minimally invasive Le Fort I, minimally invasive condylectomy, and orthognathic procedures under local anaesthesia and sedation.

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Surgery first: on an adequate timing for orthognathic surgery

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Together with the introduction of new orthodontic techniques and minimally invasive surgery protocols, the emergence of modern patient prototypes has given way to novel timing schemes for the handling of dentomaxillofacial deformities. The aim of this lecture is to define, justify, and systematise the appropriate timing for orthognathic surgery. Six timing schemes are defined: 'surgery first', 'surgery early', 'surgery late', 'surgery last', 'surgery only', and 'surgery never'. The skilful management of dentomaxillofacial deformities requires a comprehensive analysis of patient-, orthodontist-, and surgeon-specific variables. Each timing approach has well-defined indications, treatment planning considerations, and orthodontic and surgical peculiarities.

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Aesthetic surgery under local anaesthesia

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Although aesthetic surgery had been in the curriculum of oral and maxillofacial surgery, the practice and development is not as prominent as other disciplines.

As it is a financially driven section there is direct competition from other disciplines. In order to succeed in the open market we need to be well trained, competent and find new avenues and techniques that could be used to the benefit of our specialty.

Aesthetic surgery under local anaesthetic is another such progress in addition to crossing the boundaries. We have demonstrated facelift and blepharoplasty as examples in promoting this concept in order to encourage trainees and young surgeons to encompass aspects of facial aesthetic surgery akin to dental implant in their practice, which is also somewhat financially driven.

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Orbital exenteration to be or not to be

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Paranasal sinus malignancies are rare. The success depends on local disease control. Historically, the maxillary tumours with orbital floor involvement resulted in orbital exenteration as part of the oncological resection. However, the paradigm has shifted in the past 25 years. There is evidence against exenteration due to the multiple variables it is difficult to make structured guidelines.

Tissue preservation, quality of life has become the current philosophy of oncological resection.

We have reviewed the literature and there is increasing support towards orbital preservation. We present our experience of not doing orbital exenteration when the floor and periorbita is involved. The specialised anatomy of the globe and orbit is discussed and we plan to offer a guideline for the management of the orbit in maxillary tumours, which is invading the orbital floor.

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Reconstruction of lip post-oncological resection

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Perioral malignancies are not rare. Various habits and environmental factors are the commonest aetiology. The perceived concept of lip malignancy rarely metastasise is not accurate any longer. Surgery remains the best possible chance of cure.

The intact, functional, perioral structure is important for sensation, speech, oral intake and mastication.

Different techniques have been published in the literature for reconstruction of the upper and lower lip defects post oncological resection. Smaller lesions are easy to manage. However, the larger lesions tend to result in microstomia after surgical correction. The majority of the published techniques with local flaps fail to address the microstomia problem in its entirety. The free flap reconstruction can, however, overcome these difficulties but aesthetically and functionally they fall short.

We have defined a technique with local flaps to reconstruct the lips without causing microstomia maintaining sensation and intact lip seal. This technique is described and the literature reviewed.

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Genetic alterations in salivary gland carcinomas: potential use as diagnostic and prognostic marker

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The salivary gland tumours are heterogeneous and diverse with variable prognosis, limitations of histopathology in the identification of patients with questionable diagnosis and aggressive disease can be overcome by developing a reliable biomarker; further, these biomarkers are futuristic in the development of targeted therapy. The recent research in molecular biology of salivary gland tumours identified fusion of specific genes in certain tumours, for example; the *MYB-NFIB* fusion are specific to adenoid cystic carcinoma, the *CRTC1/3-MAML2* fusion is specific to mucoepidermoid carcinoma, and the *ETV6-NTRK3* fusion to mammary

analogue secretory carcinoma (MASC). Moreover, the identification of these specific genes in salivary gland tumour leads to the recognition of new entities and reclassification of other salivary gland tumours.

We analysed the frequencies and clinicopathological features of salivary carcinomas using molecular analysis and could confirm multiple correlations. We studied the mucoepidermoid carcinomas and found that the tumours with *CRTC1/3-MAML2* fusion may be associated with favourable clinicopathological features. Further, in MASC an unknown (non-*NTRK*) gene appeared to fuse with *ETV6* (*ETV6*-X fusion) and the MASC-possessing *ETV6*-X fusion might show an invasive histology. These findings provide a novel insight into the oncogenesis, histopathology, diagnosis, treatment, and prognosis of salivary gland carcinomas.

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Midface trauma and reconstruction

D. Kademani

North Memorial and Hubert Humphrey Cancer Center, MN, United States

Midfacial reconstruction is one of the most complex areas of facial reconstruction. This lecture will review current contemporary methods for midface reconstruction for post ablative and traumatic defects using current technology.

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Novel strategies for management of early oral cancer and dysplasia

D. Kademani

North Memorial and Hubert Humphrey Cancer Center, MN, United States

Oral cancer continues to be a significant global health care issue. In the past 30 years there have been limited improvements in patient survival primarily due to over 50% of patients being diagnosed with advanced stage disease at presentation.

Currently effective screening tools and risk assessment of preneoplastic diseases are unreliable. This lecture will highlight the current data related to the management of early stage oral cancer and dysplasia and provide guidelines for treatment based on current available evidence.

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Head and neck surgery: integration of technology and reconstruction (three-dimensional planning, materials and reconstruction)

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Successful facial reconstruction aims to provide external wound coverage, creation of a stable oral cavity, bony restoration, resumption of oral diet, dental restoration and cosmesis. Most of those goals are achieved by conventional free flap reconstruction. Some of the most notable exceptions leading to repetitive surgical procedures include the reconstruction of the mid-face and the provision of "one-stop" dental rehabilitation with osseointegrated dental implants. This is because areas with complex three-dimensional (3D) anatomy pose indeed a substantial problem in conventional flap reconstruction. The latter is much better in providing linear delineation and volume replacement but not volume outline and configuration.

Despite significant advances in 3D material printing, the potential of 3D printing for patient specific implants and tissue reconstruction has not been fully exploited. One of the main challenges remains the use of 3D printed scaffolds with or without the additional use of biodegradable materials as foundations for prefabricated flaps. This leads to an improved outline configuration, which in conjunction with a more accurate surgical planning may improve the facial symmetry in "difficult" areas and may also improve the accurate representation of the reconstructed soft/bone tissue "envelope".

We present results of 3D printed scaffolds integrated with soft tissue flap reconstruction; we also present results of combined biodegradable materials with flap prefabrication in addressing issues such inner mucosal lining of the upper aerodigestive tract.

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Translation medicine in oral cancer detection and prevention

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Oral cancer (OC), mostly oral squamous cell carcinoma, is a very prevalent cancer worldwide. This cancer is also the fourth leading malignancy in the male population of Taiwan due to the abuse of areca (betel) chewing, tobacco smoking and alcohol drinking. Besides, there is a tendency that the incidence of OC continuously climbed up in the past decades, and OC is now the most prevalent malignancy in men below 40 years old in Taiwan.

The survival for OC patients around the world has remained unimproved in the past decades. About 50% patients die of disease during 5-year period. The local recurrence, metastases and resistance to conventional therapy are the major reasons for the treatment failure. OC is aetiologically linked to the exposure to chemical carcinogens, which renders field cancerisation and clonal expansion of neoplastic cells. The pathogenesis of OC takes a multi-step and multi-hit process. The understanding of impaired molecules involved in initiation, progression and metastasis will help to improve the prognosis of OC and to develop novel therapeutic regiments. The establishment of effective prevention, early diagnosis and interception of tumour development that could increase the survival are the main goal of the translation research in OC. I will use this presentation to introduce how we conduct this translation medicine research at the OC in Taipei Veterans General Hospital. This integrated teamwork will establish new diagnosis and therapeutic attempts.

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Augmentation of severe bony defects with intraoral bone grafts: biological approach and long-term results

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Autogenous bone graft is still the gold standard for the reconstruction of severe atrophy of the maxilla or the mandible. Two and three-dimensional bony defects need for the reconstruction special surgical procedures with autogenous bone grafts to assure at long-term an acceptable functional and esthetical result. Biomaterials

have here their limitation and are for such reconstruction until today not an alternative due to their poor regeneration potential.

Autogenous bone graft harvested from intraoral sites, especially the retromolar area of the mandible, and used following the split bone block (SBB) technique is offering many possibilities for intra operative facilities and stable long-term results. Splitting the thick cortical block to 2 or 3 thin blocks is augmenting the number of blocks allowing the reconstruction of larger atrophic crest and giving a better adaptation to the recipient site with individual determination of the width and the volume of the grafted area. Filling the space and gaps between the thin block and the remaining crest with particulate bone chips is reducing the time needed for revascularisation of the graft improving its vitality compared to the original thick block.

Many studies demonstrate that the reconstruction of horizontal and vertical atrophied crest with thin mandibular blocks in combination with particulate bone grafts, without any biomaterial or membrane, offer over years, through the high vitality of the grafted and regenerated bone, a stable periimplant bone level.

15 years results on more of 1300 grafting procedure for horizontal and vertical bone augmentation present a low complication rate and showed that changes of the volume of the grafted bone occurred up to one year after the grafting procedures and stays stable for more than 15 years. Limited bone resorptions were observed, especially when the bone block was grafted outside the bone contours, but without negative influence on the definitive treatment. Implants inserted in this grafted bone presented similar osseointegration as implants placed in non-grafted bone.

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Development of biodegradable future suture

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Silk suture material is mainly composed of silk fibroin, which is produced by silkworm *Bombyx mori*. Silk suture is regarded as non-resorbable material and it is slowly degraded by proteolysis when it is implanted into body. 4-Hexylresorcinol (4HR) is well known antiseptics.

In this study, the biodegradability of the 4HR incorporated silk suture was compared to those of untreated silk suture and polyglactin 910 suture which is commercially available resorbable suture. Silk fibroin disc contained 4HR showed anti-septic property and this property was maintained after autoclaving. Matrix metalloproteinase (MMP) can digest wide spectrum of protein including collagens. 4HR increased MMP-2, -3, and -9 expression in RAW264.7 cells. MMP-2, -3, and -9 could digest not only silk fibroin but also silk suture in *in vitro* experiments. The inhibitor of MMPs could prevent proteolysis of silk fibroin by MMPs. As a consequence, 4HR incorporated silk suture was rapidly biodegraded compared to untreated silk suture and with the similar rate to polyglactin 910 in the animal model. Expression of MMP-2, -3 and -9 was high in the 4HR incorporated silk suture implanted site at 12 weeks after implantation.

In conclusion, 4HR-treated silk suture showed similar level of bio-degradation to polyglactin 910 suture via higher expression of MMP-2, -3, and -9 in macrophage.

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Revised protocol for the management of medication-related osteonecrosis of the jaw

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Medication-related osteonecrosis of the jaw (MRONJ) has been reported in patients undergoing treatment with bisphosphonates for osteoporosis, and because of the 10-year half-life of bisphosphonates, there is a need for further studies of this extensive population.

This presentation provides revised protocol based on several case reports to show the contrast in treatment outcomes and morbidity in patients with MRONJ. The cases involved diagnostic imaging modalities commonly used in the practice of dentistry: panoramic radiography and computed tomography and bone scan.

This case reports demonstrate the usefulness of dental diagnostic imaging in the detection and management of MRONJ, corroborate the increasing number of reports regarding high levels of morbidity associated with various MRONJ treatments, and underscore the danger of performing invasive dental procedures for patients receiving bisphosphonate therapy.

This report provides information on the high levels of morbidity associated with various MRONJ treatments, and underscores the danger of performing even simple procedures, such as denture delivery for patients receiving bisphosphonate therapy. Once osteonecrosis of the mandible begins, it is nearly impossible to eradicate the condition. Exposed bone, the hallmark of MRONJ, will remain and may even progress to fracture. Therefore, prevention of infection and avoiding the need for surgery form the cornerstone of treatment. To reach the exact conclusion, long-term follow-up studies and systemic studies are needed.

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Recent advances in molecular-targeted therapy for oral cancer

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Although the surgery is standard therapy for oral cancer in many cases, advanced oral cancer is deadly and disfiguring disease for which better systemic therapy is enormously sought to improve the mortality and to avoid dysfunction and cosmetic disorder. Despite recent advances in multimodality therapies for the treatment of oral squamous cell carcinoma (OSCC), survival rates, functional outcomes and toxicities of therapy remain poor.

The development of targeted therapies potentially decreased toxicities and increased selectivity may represent significant improvement for the efficacy and also as treatment options. Targeted agents currently approved or under investigation for OSCC include epidermal growth factor receptor (EGFR) monoclonal antibodies, EGFR tyrosine kinase inhibitors, vascular endothelial growth factor receptor inhibitors and various inhibitors of other targets including immune-checkpoint.

In this talk, the recent advances in targeted therapy for OSCC will be presented, and also our clinical outcome of several targeted therapies using cetuximab and local therapy will be introduced.

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Alveolar cleft management: current status

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Alveolar cleft reconstruction has become an established surgical technique over the last few decades. In the past it was an overlooked and even a neglected area of concern in cleft cases.

As in many aspects of clefting disorders, alveolar cleft reconstructive approaches have also some diversity in the details in overall management protocol. Early or late repair with or without grafting may be selected however alveolar grafting is the most commonly used technique to deal with the defect but yet timing, grafting options, and finishing stage may reveal various opinions. The objectives of a successful management includes uniformity and continuity of the segments, three-dimensional and stable reconstruction as well as taking into consideration of soft tissue quality of the repaired area for optimal periodontal, orthodontic and rehabilitation in the long-term.

This presentation will discuss current information on primary and secondary management and details in regards to pitfalls and shortcomings to obtain most favourable outcome.

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Primary alveolar cleft management — current considerations

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Surgical repair of alveolar clefts constitute an integral part in the overall management of clefting disorders. Despite general requirements laid down for a successful outcome there are controversies essentially based on surgical timing.

Among main objectives to restore the alveolar bone continuity enabling dental eruption through disrupted segments is required. The factors that may be considered involves diversity of assessments and reconstruction options that largely dictates by craniofacial development, orofacial cleft anatomy, bone repair physiology, and detailed operative techniques.

Generally alveolar cleft repair strategies may fall into early or late management techniques. Early surgical management entails closure of the area with or without bone grafting in order to reconstruct the clefting disorder as early as possible. Late surgical management as a secondary repair varies between chronological ages and dentition stages. Primary alveolar cleft management though not widely practiced may obviate certain shortcomings related to late closures. On the other hand the approach itself has issues that need to be considered. The presentation will be based on personal clinical cases and recent literature related to primary alveolar cleft management.

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Spontaneous lung metastasis of human Merkel cell lines transplanted into severe combined immunodeficiency mice

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Background: Merkel cell carcinoma (MCCs) is a well-known aggressive tumour of the skin that frequently leads to early death due to its high propensity to metastasise. In the last years Merkel cell polyoma virus (MCPyV) has been detected in the majority of MCCs, however, no clinically important differences in the clinical course of MCC due to the presence of the MCPyV has been observed.
Methods: The two MCPyV positive human MCC cell lines, WaGa and MKL-1 were subcutaneously engrafted in severe combined immunodeficiency (SCID) mice. Circulating tumour cells (CTCs) in blood, bone marrow and lungs were quantified by Alu quantitative polymerase chain reaction (qPCR). Spontaneous lung metastases were also quantified by histology. In addition, several markers typical for MCCs were immunohistochemically detected in the xenograft model.
Results: In WaGa mice, mean survival was 62 days whereas mean survival was 108 days in MKL-1 mice. The lungs were also histologically examined for the number of lung metastases showing more metastases in the WaGa mice than in the MKL-1 mice corroborating the Alu qPCR data. Histologically 12.145 lung metastases were found and 68.813 tumour cells in the lung were detected by qPCR in WaGa mice. In MKL-1, 2.014 lung metastases were found histologically and 15.858 metastatic cells were detected by qPCR.
Conclusion: A high and a low spontaneous metastasis model for human MCCs in SCID mice were established whereby the high metastatic WaGa model was the biologically more aggressive one with a shorter survival than the lower metastatic MKL-1 model thus reflecting the clinical situation.

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Refined autogenous fat grafting as a de novo treatment of oral submucous fibrosis

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Background: Submucous fibrosis, is associated with the use of betel nut-slake lime preparations. This entity may be severe and produce a significant limitation of jaw opening. Approaches using injections of steroids, chymotrypsin, hyaluronidase or alcohol, and surgeries using mucosal or nonvascularised split-thickness skin grafts have not only been ineffective but have often worsened the condition with added scar tissue. Total excision with soft tissue myocutaneous or free microvascular flaps transposing viable elastic skin shows good result but with morbidity of the donor site.
Objectives: This is a retrospective study on the effect of autogenous fat grafting by using MAFT® Gun for fat injection, which comprises an important part of our protocol in treating oral submucous fibrosis.
Methods: Our Kaohsiung Medical University protocol includes coronoidotomies, injection of the fat grafting by using MAFT® gun (1/30–1/240 mL), stripping off the temporalis muscle and tendon from the ramus, mouth opening exercise, postoperative acupuncture.
Findings and Conclusion: All five patients were found with average increase in mouth opening, as 18 ± 4 mm at six-months follow-up. Visual analogue scale score of pain also significantly reduced significantly within few days following surgery. This graft technique also shows increased elasticity and hence with high affinity to the recipient sites. Increased elastin was found within the postoperative mucosa. This refined autogenous fat is very helpful in regaining the vermillion border as well as lip augmentation. This really shed a new light on the treatment of submucous fibrosis.

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Diagnosis and treatment of velopharyngeal dysfunction: effectiveness of speech aid prosthesis for treatment of velopharyngeal dysfunction

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Background: The impairment of velopharyngeal (VP) function can be attributed to structural causes, neurologic causes and speech mislearning.
Objectives: Even though there is sufficient soft tissue to close the VP port with normal anatomical structure, velopharyngeal function can be incompetence due to neuromuscular disorders: cerebral palsy, myotonic dystrophy, cerebral vascular accidents, etc. On the other hand, soft tissue deficiency for closing VP port, surgical removal or congenital loss of normal structure separating the nasal and oral cavity can lead to a state called VP insufficiency (VPI) and most common cause of this condition is cleft palate.
Methods: Diagnosis of VP dysfunction (VPD), identifying a critical cause of the dysfunction, can be carried out through physical and oral examination, perceptual speech assessment, instrumental assessment including nasometor, spectrogram, radiographic multiview videofluoroscopy and nasendoscopy. Treatment options of VPD include surgical and prosthetic interventions in combination with speech therapy. Surgical management is typically the first line of treatment for VPI. Various surgical techniques, such as pharyngeal flap surgery, sphincter pharyngoplasty and Furlow palatoplasty, posterior wall augmentation have been used. Prosthetic devices for VPD can be alternative treatment method when surgical approach is not considered. Widely used types of these devices, called speech aids, are palatal lift appliance and speech bulb.
Findings and Conclusion: Speech aids for treatment of various type of VPI could be the useful treatment option of VPI.

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Stability of craniofacial implants

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Background: It is clinically proven that implant stability plays an important role in the subsequent prosthodontics treatment, providing an insight into the outcome of implant therapy. Success of implant therapy depends on biomechanical factors data in most cases. Good implant stability reduces risk of failure. Implant stability measurement researches are mostly based on oral implants. In maxillofacial surgery for anchoring craniofacial epithesis extraoral (EO) implants are used. Thus, it is very important to investigate EO implants stability, as contemporary scientific literature is lacking of data concerning stability of implants in craniofacial region. A prospective study was taken to evaluate clinical stability of craniofacial implants by resonant frequency analysis in correlation with osseointegration during time, implants shape and localisation.
Methods: Microcomputed tomography method was used on cadaver model, to determine optimal localisation for implant placement, based on bone density. Clinical part included 20 patients with orbital, nasal and auricular defects. Total of 50 EO implants were placed — 38 disc implants and 12 screw-shape implants (control group). Stability which was measured by Ostell mentor® took place three times — immediate after implant placement, after three months and at least after six months.
Results: According to resonance frequency analysis (RFA) significant increase in implant stability values was noted between all three measurements with all implant types, except with triple disc implants between three and six months, and screw implants between zero and three months. In comparison between implant groups screw shape implants showed the best stability results and statistically significantly higher values than disc implants.
Conclusions: In all of the patients implant stability increased over time, which confirmed good osseointegration. After three months implants were stable enough for epithesis retention. Although EO screw implants showed higher implant stability quotient values than disc implants, disc-type implants can be safely loaded even if lower values of stability are measured. However, the results obtained facilitated us to consider usage of bicortical screw type implants for further investigations in craniofacial area. Measurement of implant stability using RFA is a modern, noninvasive and relatively precise technique, which provides both information about implant stability in the bone and reliable guidance in further course of implant therapy with craniofacial implants.

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Developments in training of United Kingdom oral and maxillofacial surgery surgeons — international impact?

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In the United Kingdom oral and maxillofacial surgery (OMFS) is a medical specialty and regulated by the General Medical Council (GMC).

The current training pathway is extremely arduous and costly, however the output is a fully trained OMFS surgeon able to practice in a wide range of OMFS. Completion of training is marked by the award of a certificate of completion of specialty training (CCT), which facilitates entry to the GMC specialist list.

Certain subspecialty areas are augmented with pre CCT fellowships–in head and neck oncology, cleft lip and palate surgery, cosmetic and reconstructive surgery and trauma and reconstruction. These fellowships are interdisciplinary and open to trainees from OMFS, plastics, and ear, nose and throat surgery.

Pre specialty training involves both medical and dental degrees and foundation years as well as core surgical training.

Progress through training is determined, in common with all surgical specialties, by the use of an agreed curriculum, outcomes tailored to each trainee and this is defined in a formal learning agreement for each year or attachment. This is documented on line via the Intercollegiate Surgical Curriculum Project, which primarily uses work base place assessments as learning tools and formative assessments.

Knowledge and higher ordered thinking are assessed via an intercollegiate examination taken in the final years of training.

This structure will be outlined with the new developments presented and its implications internationally will be discussed.

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Orthognathic surgery for patients with craniosynostosis

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Many patients with craniosynostosis do not need orthognathic surgery or if they do can be treated entirely conventionally. However, a significant proportion of cases have an associated facial deformity secondary to their skull abnormalities. In these cases, who are often syndromic, the abnormalities are often multilevel affecting the upper, mid and lower thirds of the face as well as often being asymmetric. In addition to the skeletal abnormalities the soft tissues are also often affected. All of these factors combined mean that comprehensive and staged correction requires significant planning. In addition, functional issues, particularly airway obstruction resulting in obstructive sleep apnoea and scleral exposure resulting in corneal injury may occur and necessitate urgent or early intervention.

The surgical management of these patients requires a wide and flexible repertoire of surgical interventions both for the soft tissues and the skeleton. Planning of these cases is more difficult and computerised algorithms are mostly inappropriate. The use of conventional cephalometrics is also difficult as the skull base and normal reference lines are often abnormal.

Conventional orthognathic surgery can be combined with orbital procedures, distraction histiogenesis and soft tissue procedures to achieve a satisfactory result. These principles will be illustrated by a series of cases.

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International multicentre collaboration on craniofacial malformations

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Within the field of paediatric congenital craniofacial deformities there is a lack of standardised outcome measurement in routine clinical practice, which hinders optimal monitoring and comparison of quality of care. Multiple international working groups in collaboration with International Consortium for Health Outcomes Measurement have developed minimal standardised sets of patient-cantered outcomes including patient-reported, clinician-reported, and administrative metrics for both cleft lip and palate and craniofacial microsomia.

Focusing on patient-reported outcomes provides a vital lens to evaluating and improving care processes. It is essential to convene a global, multi-stakeholder expert Working Group that includes patients. Sets to be developed in the next years are; congenital hand deformities, facial nerve palsy and craniosynostosis. In order to learn from each other and to actually improve care, these sets need to be implemented and used by teams globally and the data made available for benchmarking.

Globally numerous teams are currently in the process of implementing these sets within their clinical practice and all encounter similar challenges within this process. By implementing the sets we aim to enable global comparison of patient care outcomes, thus enabling learning from best practices to improve care.

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Charity cleft surgery in India — perspectives after 23 years

T. Kreusch

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In 1994 a project was started to introduce cleft lip and palate (CLP) surgery at a small Mission hospital in central India. The aim, besides surgery, was to train Indian colleagues and to inform patients and their relatives about the background of this malformation and treatment options.

Many doctors were trained but they left this rural place due to the simple living conditions for their families and basic schooling for their children. Surgery developed secondary to cleft surgery such as bone grafting, nose corrections and even orthognathic treatment as well as speech therapy.

After sponsors were found for these patients and as the medical superintendent himself became an enthusiastic cleft surgeon, the project is now surgically independent from our yearly CLP camps. More than 1600 patients have been treated so far during our yearly camps at an average age of 11.3 years.

Additional projects arose such as supporting the local schools to get better education for the doctors' children, building a nursing college to compensate for the lack of trained nursing staff, etc.

The friendships between team members and their Indian counterparts, unplanned but flourishing, will be the foundation for coming years.

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Conservative or operative approach to medication-related osteonecrosis of the jaw

T. Kreusch

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As a side effect of efficient therapy of bone metastases due to malignant tumours, osteonecrosis of the jaws has developed to be a severe problem in these patients.

While the American Association of Oral and Maxillofacial Surgeons recommends conservative treatment in most cases, we have quite a different regimen and we investigated the results in our 256 patients to date.

Our own classification has shown that from the first sign of free bone (Class 1) to heavily affected jaws with fractures and affected sinuses (Class 3), a continuous development from class 1 to class 3 can be seen.

Instead of rinsing and local medical treatment with antibiotics, we treat any visible medication-related osteonecrosis of the jawsurgically and resect the affected bone up to healthy margins. This can even lead to continuity resection and reconstruction with a reconstruction plate; in three patients we reconstructed the affected mandible with a free iliac crest bone graft.

So far 90% of the patients could be healed with one surgery, 7% required a second surgery, only in patients with very limited life expectancy and no pain did we remain on a conservative path. In all patients we prescribed a drug holiday of 8 weeks (2 weeks preoperatively, 6 weeks postoperatively).

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Recurrent mandibular dislocation: future prospects and trials for elderly patients

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The incidence of recurrent mandibular dislocation has increased in ageing societies, especially in Japan. Nonsurgical treatment using an elastic bandage or chin cap is indicated as initial treatment. However, these materials are difficult to use for long periods. Elastic bandages are easily lost and need to be replaced daily. Furthermore, they are difficult to use in older people with dementia. Chin caps press the chin and were originally used in orthodontic treatment to correct prognathism and malocclusion, but they can cause traumatic ulcer on the face if continuously used. To overcome these problems we have developed a new cap for mandibular dislocation.

Two common surgical methods are used to prevent recurrent and habitual mandibular dislocation when conservative treatments have failed. Procedures such as eminectomy can be used to reduce the articular eminence, or the eminence can be augmented with plates, bone or artificial materials.

Eminectomy is the first choice but it has limitations. The eminence is usually flat in older people, easily allowing excessive anterior movement of the condyles when mandibular dislocation occurs. In these cases, the eminence needs to be prominent enough to prevent dislocation. However, present surgical treatment options are not well suited to older patients. Bone grafting is too invasive and mini plates are easily fractured when used individually. We developed a stronger condyle stabilisation plate that is used with hydroxyapatite block to produce a prominent eminence. This surgery is less invasive and has stable outcomes.

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Implant-associated medication-related osteonecrosis of the jaw: pathophysiology and treatment

T.G. Kwon

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Medication-related osteonecrosis of the jaw (MRONJ) usually associated with a previous history of mucosal trauma such as extraction, denture irritation and so forth. Since the implant-related MRONJ remains the unfavourable alveolar bone defects and soft tissue loss, the treatment is quite challenging for practitioners. In our institute, dental implant comprised of the third most popular related factor in developing MRONJ ($n = 37/378$, 10% from 2009 to 2015). The current presentation analysed our experiences of the patients with the ONJ around dental implant following bisphosphonate (BP) administration and reviewed the treatment strategy of previous literatures and ours.

It is interesting that the growing number of patients is developing MRON not by the surgical trauma from implant surgery but by the well-positioned pre-existing implant itself. As we proposed in previous literatures, the implant-associated MRONJ would be classified as the three patterns; (1) complete necrosis of bone around the implant (frozen type), (2) extensive osteolysis around the implant with or without sequestra (osteolytic type), (3) sequestration of bone with implant maintaining direct implant-bone contact (En block sequestration type). In our results, the MRON patients with IV BP-treated cancer patients has more poor clinical outcome and frequent recurrence than that of oral BP-related ONJ. Moreover, IV BP-related ONJ patients prone to occur more multiple sites and showed more frozen type of the destruction pattern. Therefore, the strategy for the treatment for oral BP-related ONJ needs to be different from the IV BP-related ONJ with malignant tumour.

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Meningoencephaloceles-repair in cambodia — a simple, cost-effective and reliable technique for the third world

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Frontoethmoidal meningoencephaloceles (FEMEC) are congenital malformations with a high incidence in Southeast Asia and require craniofacial surgical treatment. We have developed a simple combined neurosurgical-craniomaxillofacial operation technique which allows for a complete treatment of MEC in a one-step procedure addressing in particular the naso-orbito-ethmoidal region.

Between 2004 and 2010 in two-week periods — one or two each year — we have operated more than 70 patients suffering from FEMEC at the Surgical Children Center Kien Khleang (SCC), Phnom Penh, Cambodia. 30 were females, 45 males, age ranged between 4.5 months and 23 years with a median of ten years. The surgical approach is outlined in detail with emphasis to the bony (T-shaped bone segment) and the soft tissue reconstruction of the naso-orbito-ethmoidal complex (transcaruncular suture to fix the medial canthal ligament). The results of the 6–12 months follow-up are presented confirming the reliability of this surgical technique and this approach under very basic conditions. We had four major complications which are addressed in detail. Local surgeons assisted all operations and in particular we taught one young Cambodian Children's Surgeon during a period of two years to perform this operation himself.

The costs were calculated at US$100 per patient and operation by the local organisation (SCC), and with another US$200 for the visiting surgeons (flight, living expenses). All were covered by the charity organisation "Doctors of the World". Instead of transferring these patients to a developed country for their operations, this is a highly cost-effective medicine.

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Three-dimensional analysis of airway anatomy in patients with mandibular anterior arch reconstruction

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Background: The U-shaped mandibular anterior arch is difficult to reconstruct anatomically. Furthermore, functional restoration is much harder to obtain because of attachment of a complex array of muscles, which are essential for the tongue movement, laryngeal elevation, airway, mastication, deglutination, verbal communication and cosmetic facial appearance.
Objectives: The purpose of this study was to analyse anatomic and functional results especially focused on the airway change in the anterior part of mandible reconstruction with fibular flap.
Methods: 49 patients of anterior arch reconstruction with pre- and postoperative computed tomography (CT) scans were included and parameters of airway were analysed. Three-dimensional computational fluid dynamic evaluation was performed especially

focused on the volume change of airway space, pressure and velocity in the expiration using CFD (Midas Co, Korea).
Findings and Conclusion: Facial height, chin point and hyoid bone position were similar to preoperation. Airway length (UI) was significantly increased after reconstruction. Mandibular width was increased after anterior mandibular arch reconstruction with fibular flap. This seems the reflection of over-correction for camouflage of the bone and soft tissue defect after tumour ablation. The retroglossal (RG), RG lateral dimension, RG-cross sectional area were significantly decreased in the postoperative CT ($P < 0.05$), which might be result of tongue and muscles attached points change. However, the postoperative airway volume was not significantly changed compared with preoperation.

There were no statistically significant differences in the minimal pressures and the maximal velocities during the expirations between the preoperative and the postoperative states, however, the hypopharynx showed increased pressure and velocity.

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Application of the use of recombinant human bone morphogenetic protein-2 in augmentation of alveolar defects for dental implants

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Replacement of missing teeth with dental implant nowadays is becoming more and more a standard treatment option for dental patient. However, due to different reasons, the implant site might not be optimal for implant placement.

The dental practitioners often need to perform bone augmentation to optimise the implant site. To achieve a predictable outcome in severely compromised site could be a challenge and require careful planning and different surgical skills.

Guided bone regeneration was a predicable mean to increase bone volume of implant sites. Although autogneous bone is still consider a gold standard for bone grafting procedure, various biological materials are available as an option for patients who do not want a second wound for bone harvest. Bone morphogenetic protein-2 (BMP-2) is now used in oral and maxillofacial surgery and orthopaedic surgery to for bone growth.

This presentation will discuss indications and contraindications of the application of BMP-2 in different clinical situations for dental implant patients.

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Evaluation and management of skull base tumours

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Objective: Skull base surgery is one of the most challenged surgery. Because of the complex anatomy in the cranial base, structure violation and functional lesion are difficult to evaluate. Safety surgical approach to resect the tumours and multidisciplinary comprehensive treatment to control malignancies are required. This study is to characterise our experience with the evaluation and surgical management of skull base lesions.
Methods: 86 patients who underwent resection of anterior and middle skull base tumours with craniofacial approach were review. There were 11 involving in anterior, 65 involving in middle, and 11involving in anterior and middle skull base. Examination of cranial nerves was performed to evaluate nerve involvement and structure violation. Computed tomography (CT) and magnetic resonance imaging scan was applied to observe the bony destruction and lesion position. Traditional open incision was assisted by intro-operative navigation. It is difficult to design a safe surgical approach to reach the lesion. Coronal incision with unilateral or bilateral frontal craniotomy approach was applied to expose anterior skull base malignancy. Weber-Ferguson incision with maxillary swinging approach provides directly exposure for middle skull base lesions. There were plenty approaches to explore anterior and middle skull base. After surgery, a CT scan was needed to see the tumour was completely removed or not. In the follow-up period, recurrence and survival were record. Postoperative complications, such as, cerebrospinal fluid (CSF) leak, diplopia, vision changes, intracranial infections were review.
Results: 86 cases of surgically resected anterior and middle skull base lesions were included over the 10-year period from 2006 through 2015. Two patients had a CSF leak postoperatively, one each from middle skull base surgery and combination surgery. Orbital complications include 8.1% of patients experiencing vision changes and 7.0% with diplopia. The average period of follow-up was 52.4 months. Locally recurrent or persistent disease was seen in 43.6% of patients
Conclusion: According to our study, choosing appropriate surgical approach could provide better lesion exposure structure protection quality of life improvement and complications reduction. Frontotemporal-orbitozygomatic combined approach is suitable for the malignancies involving anterior and middle skull base. Preoperative evaluation, especially the cranial nerves examination, was very important for surgical planning.

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Orthognatic surgery in temporomandibular joint patients: evaluation, diagnosis, when and why to operate the temporomandibular joint

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A big challenge for studying temporomandibular joint (TMJ) is the fact that it is a joint that belongs to a system (stomatognatha) with mechanical characteristics organised by a physiology rich in details. From this point of view, it is necessary to know all mechanics and their distribution of forces in order to understand how functional equilibrium can be obtained. The vision that must be given to the orthognathic surgery planning is balance of forces so that the best functional performance can be obtained. Understanding that the principle of motion resembles a class III lever. Where all the force generated in the movement will be directed to the TMJ (interpower force).

What we need to evaluate when we are planning is to understand the moment to living the patient's TMJ. Whether it is too symptomatic or not. Because any change in the skeleton of the face will generate a load on the TMJ and it should be reshaped. Of this form if there is already a functional change some procedure should be indicated. This can range from arthrocentesis to a prosthesis.

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Optimising orthognathic surgery — surgery first approach and facial aesthetics

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Orthognathic surgery has been done successfully for the last 50 years. The patients' needs and quality of life has always been the central focus of our patient care. However, changing culture and beliefs have created different demands; faster treatment and the desire for more aesthetically driven outcomes. With these developments, some of the conventional philosophy may be inadequate to produce the desired result. Therefore, oral and maxillofacial surgeons have to adapt and produce innovative ways to achieve the desired outcomes.

This lecture will discuss a different way of looking at the patient and the use of Surgery First Approach, innovative surgical technique combinations and simultaneous soft tissue procedures to provide the patients with satisfactory results.

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The key points for the good final result of cleft lip and palate patient

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The final results for cleft lip and palate patient should be good appearance, good speech, and good growth (maxilla). For approaching the aims, cleft lip and palate patients need to be treated from birth to adulthood. Even then not everyone can achieve the ideal result. Several points are indicated in this talk for how to gain good final results for cleft lip and palate patients according to the author's over 30-year experience.

(1) Doctor: including the insistence of doctor, principle of treatment plan, and based evidence. Most important point to be borne in mind is not to try new method until the evidence of long-term result is gained.
(2) Patients: including the insistence of patients, therapeutic compliance and demands. Keeping change doctor and setting treatment plan by patients themselves based on Internet website is main factor for failure.
(3) Societies: including foundation support, society acceptance and discrimination against.

A vast number of case samples are demonstrated in this talk and the schedule for treatment of cleft lip and palate special points in Peking University are indicated and discussed.

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Three-dimensional imaging in virtual surgery planning — patient-specific solution

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The past decade three-dimensional (3D) imaging evolved towards a valuable technique, which forms the base for patient-specific solutions. 3D imaging and 3D printing are used in a wide variety of clinical cases in oral and maxillofacial surgery and are implemented in daily clinical practice. In 2006 a 3D lab started as part of the maxillofacial department and has developed since 2006 into an important part of patient care at the Radboud University Medical Centre. This 3D lab is fully integrated into the clinic, the lab engineers, doctors and patients work closely together. This cooperation enabled us to make 3D technologies quickly and easily accessible for both doctor and patient. New 3D technologies, such as patient specific virtual surgery planning and 3D-printed anatomical models, help to improve the care and the treatment plan of patients, while taking their specific individual needs and wishes into consideration.

Since its foundation, the lab has been a great asset. Besides maxillofacial surgery, the 3D lab is involved in many other medical disciplines, in our own hospital and beyond. The integration of the 3D lab in the medical care process has a big impact on the 4 main stages of patient care: diagnostics, planning, treatment and evaluation. The past few years virtual reality and augmented reality evolved as a new and promising techniques. The Radboudumc 3D Lab has performed some early experiments using augmented reality in the operating theatre.

This presentation will illustrate clinical examples and will focus on the added value of 3D imaging, 3D printing and augmented reality.

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Temporomandibular disorders in primary fibromyalgia

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Background: Fibromyalgia (FM) is a syndrome characterised by chronic widespread pain at multiple tender points, joint stiffness, systemic symptoms (e.g. mood disorders, fatigue, cognitive dysfunction, insomnia), without a well-defined underlying organic disease. FM is the second most common rheumatologic disorder, with peak prevalence 30–60 years and with a female:male ratio of 10:1. The link between FM and temporomandibular disorders (TMD) was first assessed in 1988 by Eriksson et al. Other authors showed a prevalence of TMD in FM from 67 to 94%.
Objectives: Evaluation of signs and symptoms of TMD in patients with primary FM by evaluating a correspondence between subjective symptoms of temporomandibular joint (TMJ) involvement, TMD clinical diagnosis and TMJ ultrasonographic (US) features, then comparing the clinical with the US data.
Methods: A joint maxillofacial/rheumatologic outpatient clinic was set up at the University Hospital of Ferrara, with the aim to diagnose TMD in rheumatologic patients and provide an appropriate therapy. A double-blind study was carried on patients with primary FM and a control group; they were evaluated by a maxillofacial surgeon for TMJ and rheumatologist for TMJ US evaluation, then data were compared.
Findings: In most of FM patients TMD were present regarding muscular disorders. All FM patients showed US variations, mostly degenerative.
Conclusion: In FM patients TMJ US can support clinical examination for early diagnosis of articular changes due to muscle disorders in order to establish a proper treatment. The US findings suggest the TMJ overload due to muscle disorder as a cause of degenerative articular variations.

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Mandibular reconstruction: our experience with the use of computer-aided design/computer-aided manufacturing technology

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Mandibular reconstruction after oncological resection presents a challenge in maxillofacial surgery. Currently, microvascular free-flap reconstruction using bone transfer is the best choice and computer-aided design/computer-aided manufacturing (CAD/CAM) can be used to plan reconstructive surgery, optimising aesthetic outcomes and functional rehabilitation.

Since 2011, we performed in Sant'Orsola-Malpighi Hospital of Bologna, Head and Neck Department, over 50 CAD/CAM-based mandibular reconstruction procedures using vascularised composite free flap transfers.

Every procedure follows a specific algorithm, which begins with the acquisition of a high-resolution computed tomography scan of craniofacial region and of the lower leg or ankle as a donor site. Then a three-dimensional virtual model of the maxillofacial skeleton is created.

A reconstructive bony plate is designed using the original external cortical bone as a template reproducing the ideal mandibular contour and ensuring the native morphology of the reconstructed mandible. Direct-metal laser-sintering yields a patient-specific plate devoid of errors introduced during manual modelling.

Finally the straight fibular flap is contoured to resemble a neomandible using a surgical cutting guide that is virtually planned to guide surgery on the fibular fragment, also optimising the orientation of future implant insertion for an implant-supported oral prostheses (CAD/CAM prosthetically guided maxillofacial surgery).

The virtual planning of a guide for mandibular segment repositioning/osteotomies and a reconstructive plate manufactured using direct metal laser sintering technology facilitated restoration of mandibular function and native mandibular contour when using microvascular free flaps.

Besides, for complex reconstruction, when more fibular angulated reconstructive segments are required to repair a mandibular defect, the CAD/CAM approach is the most useful procedure and this reconstruction protocol offers several benefits.

Summarising, from our experience, CAD/CAM reconstructive technique appears to be a valid method to accurately restore the preoperative morphological situation of the native mandible, giving the surgeon advantages compared with conventional procedures in terms of better functional and aesthetic results, more procedural control, reduced surgical time and reduced number of complications.

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Double degree in oral and maxillofacial surgery — is it necessary?

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Nowadays, Oral and Maxillofacial Surgery (OMFS) is a consolidated specialty all over the world. The spectrum of competences varies from every continent. So, in America, Asia, Africa and Oceania it is focused in orthognathic surgery, traumatology, clefts and oral surgery. On the other hand, Europe, with up to 50 countries, includes cancer and reconstructive surgery, craniofacial, skull base and implantology. Therefore, training in those disciplines should come from the medical side more than from the dentistry. However, even in Europe, no unified criteria have been proposed and there are three ways to enter OMFS training: "Mediterranean countries" (France, Italy, Portugal, Spain and Austria) from the medical side, "Central Europe countries" (Germany, Netherlands, United Kingdom, Ireland, Belgium and some eastern countries") from the double degree, and finally some "Scandinavian countries" (Sweden, Iceland and Denmark) from dental side. Anyway, more than the title, what is really necessary is to have the basic dental or medical knowledge to practice OMFS. Unification of titles throughout the world is desirable but not a must and double or dual degree should be advisable in case training is done at the same time, avoiding excessively long training programmes.

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UVA Clinic Face Architects five steps for virtual surgical orthognathic planning; a routine protocol for functional and aesthetic outcomes

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The "5-Step" virtual surgical orthognathic planning (VSOP) protocol, has been developed by UVA Clinic Face Architects based on a daily clinical workflow. We describe a workup protocol for VSOP in an office-base concept using 5 steps. The first step consists of a cone-beam computed tomography (CBCT) scan of the patient with the alignment of fiducial markers and an appropriate calibration of the images that endorses a better surgical planning and surgical prediction. Understanding that one of the major challenge for the clinician is to incorporate three-dimensional (3D) imaging and virtual planning the second step consists in standardising the different two-dimensional virtual plannings allowing to integrate the "3D virtual treatment planning" in an efficient and non-time-consuming way. The third step is to approve the VSOP, this information is merged with the skeletal components of the CBCT providing appropriate elements for surgical planning and fabrication of an intermediate splint by computer-aided design/computer-aided manufacturing technology. The fourth step allows us to receive the surgical splints with a technique that eliminates the need for an additional dental model scan. This technique forces us to perform a mandible-first sequence. The fifth step consists in performing the surgery. This protocol provides great operative insight allowing us to improve our planning and our intraoperative efficiency. The 5-Step UVA Clinic Face Architects VSOP can be integrated in a daily clinical workflow with an efficient way providing tremendous preoperative insight anticipating bony interferences, osteotomy orientation and an idea of the condylar position.

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Distraction osteogenesis for the cleft patient — a 25-year perspective

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Distraction osteogenesis (DO) has proven to be a valuable tool in the correction of cleft/craniofacial deformities. DO has the advantage of not only creating bone and soft tissue, the slow application of force overtime allows for the expansion of scarred tissue, a hindrance classically associated with the multiply operated cleft patient. As with any surgical technique, its introduction led to the application of DO to a multiplicity of parameters to address the clinical challenges associated with the cleft lip, cleft palate deformity. Distraction can be utilised to advance and close a large alveolar osseous defect, palatal distraction utilised to correct velopharyngeal insufficiency, bone borne DO devices used to correct transverse and A-P arch form discrepancies yet, a significant contribution of DO has been for the correction of midface hypoplasia.

From the use of a facemask, a facemask assisted with internal devices, miniature submerged DO devises, intraoral/transoral DO devices, the use of a rigid external distraction device (RED) has proven to be a mainstay for the correction of severe maxillary hypoplasia of the cleft deformity. Since the introduction of the RED device, the acceptance of this technique has been worldwide as evidenced by the both the international and multidisciplinary nature of the scientific articles published on this topic. As the RED technique allows for easy adjustments during active DO, the possibilities to expand the hard and soft tissues are impressive. The application of guided surgery and three-dimensional imaging bring this technique forward.

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Enhanced recovery after surgery for oral and maxillofacial surgery

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Enhanced recovery after surgery (ERAS) protocols have been developed for many surgical specialties, yet not formally for oral and maxillofacial surgery.[1] ERAS are based on best practices in an effort to enhance patient recovery. These patient centric protocols use multimodal perioperative care pathways to improve patient outcomes. First established in 2001 by Professor Ken Fearon, of the University of Edinburgh, United Kingdom and Professor Olle Ljungqvist, of the Karolinska Insitutet, Sweden, who sought to develop universal clinical standards for perioperative patient care. This followed on the work by Professor Henrik Kehlet, of the University of Copenhagen, Denmark, who advocated and promoted the understanding of the management of the surgical stress response, leading to the understanding of fast-track surgery, and thus to ERAS.[2–5]

Complete oral rehabilitation utilising 4–6 dental implants in the maxilla and mandible with concomitant osteoplasty and placement of a fixed full arch restoration is recognized as a consequential surgery. Although this surgical technique has been well established and long-term clinical results found to be excellent, the immediate perioperative course for this surgery can be difficult for patients and thus a good model for the development of an ERAS to optimise patient recovery. A pilot ERAS was initiated including standardised preoperative patient and family counselling, optimisation of nutrition, a standardised preoperative anxiolytic, multimodal pain therapy focused on narcotic reduction, use of a slow release local analgesia (Exparel, Pacira, Parsippany, NJ) and DNA pharmacogenetics/pharmacogenomics testing (Gene Align, Pinpoint Clinical PGX Testing Lab, Dallas, TX) in order to promote and enhance patient recovery. Patient acceptance was found to be nearly 100%, with improved outcomes and a smoother postoperative course, yet implementation was slow. ERAS are an important component to improving clinical outcomes, enhancing a patient's return to daily function and are indicated for all aspects of oral and maxillofacial surgery in a team approach based on best practices.

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Globalisation: the evolution of orthognathic norms

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It has been over 60 years since the popularisation of the surgical techniques of orthognathic surgery. In parallel to the advancement of the orthognathic surgical technique was the analysis. Based on angular and linear measurements, classic cephalometric analysis were difficult to translate to the surgical setting such that in 1978, the Burstone analysis was developed.[1] This COGS (cephalometrics for orthognathic surgery) analysis was based on linear, millimetre measurements such that data gleaned from acetate tracings and mounted models could be married with clinical and aesthetic data and applied directly during surgery to achieve accuracy and clinical success. However, normative values for the Burstone linear measurements were initially based on a small patient population originating in Connecticut, USA.

With the advent of computer imaging software, surgical prediction planning has become streamlined, allowing for the analysis and calculation of a large variety of surgical outcomes. Dolphin software, introduced in 1989 allowed for the superimposition of prediction tracings, radiographs and clinical photographs. Technology has advanced to now include three-dimensional (3D) visualisation of structures, functional analysis of the planned surgery and virtual surgical planning. This direct visualisation not only led to better clinical understanding and patient communication, it advanced the specialty in the recognition that the normative values and algorithms should be based on data sets derived from an ethnically based universality of normative data. The ethnic, phenotypic variation of faces cannot be minimised when planning orthognathic surgery.

Genetic variations drive the facial appearance. The ease of DNA analysis can allow the clinician to add an additional aspect to treatment planning. Including not only analysis for physiologic and functional parameters, yet also familial/genetic data to achieve long-term physiologic and surgical success.

This paper will review the history of cephalometrics and its limited normative values; challenge whether planning (two-dimensional or 3D) should be performed based on normative or beautiful numerical analysis; and call together a community of clinical and technical personnel to establish the next generation of COGS.

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Minimally invasive salivary gland therapy

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In the past decade there has been a revolution in the treatment of benign salivary gland disease. Despite that fact that in most countries salivary gland adenectomy is the treatment of choice for the management of salivary gland obstruction, ranulae and benign tumours, this is no longer necessary.

A description of modern minimally invasive management technique will be provided. This will involve intra- and extracorporeal lithotripsy and salivary endoscopy. The results of endoscope-assisted surgical removal of over 200 submandibular and 100 parotid glands stones will be presented. New minimally invasive techniques for the management of salivary ranulae with be discussed and the results over 1000 cases of extra capsular dissection of parotid tumours will be presented.

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Management of temporomandibular joint-related progressive facial asymmetries

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Progressive facial asymmetries often present many challenges for clinicians. Achieving predictable functional and aesthetic results in patients with facial asymmetries with orthognathic surgery requires accurately diagnosing the aetiology responsible for the dentofacial deformity. The role of the temporomandibular joint (TMJ) in the development of progressive facial asymmetries cannot be overemphasised; examples include joint conditions like condylar hyperplasia and osteochondroma, both of which cause mandibular overgrowth beyond the usual timeline for cessation of lower jaw growth. This presentation will provide an overview of the most common TMJ-related facial deformities and focus on contemporary principles used in the surgical management of these complex patients.

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Surgically-assisted orthodontic therapy: an office-based alternative for rapid correction of malocclusions

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Duration and cost of the treatment still remain the biggest challenges for the orthodontic field in the current era. Typical orthodontic treatment ranges from 1 to 2 years, which requires continuous compliance and expense from the patient's perspective for a considerable period of time. Although, a relatively new technique, selective alveolar decortication (SAD) has the potential to provide a solid platform for improvement in the efficiency and effectiveness of current-day orthodontic therapy.

Besides increasing the scope of orthodontic treatment, it hastens the results of conventional nonsurgical orthodontic therapy and has the potential to correct certain specific malocclusions with minimally invasive, office-based surgery. This presentation details experiences of over 100 patients with this technique and aims to familiarise the audience with the biophysiology, surgical considerations, indications, contraindications, and limitations of SAD.

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Face transplant: long-term outcomes

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Background: Over 38 face transplantations have been performed worldwide since 2005.
Objectives: The aim of this study was to give an update of the long-term outcomes of a series of patients operated in our department between 2007 and 2011.
Methods: Outcomes of 7 face allotransplant recipients were reported on average 6 years after transplantation. All hospitalisations except for planned revision surgeries and immunosuppressive follow-up therapy were reported as serious adverse events (SAE). Patient health-related quality of life (HRQoL) was assessed quantitatively using the Short Form-36 (SF-36) health questionnaire.
Findings: In all patients still alive after a long follow-up, the transplants were functional. Of the 7 patients, 2 died: one, 63 days' post-transplantation due to transplant destruction with concomitant pseudomonas infection and the second by suicide after battling depression. SAE were related to infection within the first month, acute rejection from 1 day to 7 years' post-transplantation, and to side effects of immunosuppressive therapy. Recurrent rejection episodes justified maintenance therapy with high-dose steroids in all patients at the last follow-up visit, yet no patient developed diabetes. Three patients developed hypertension and a treatment was needed in one patient. In all patients, a significant reduction in glomerular filtration rate was noted. All recipients and their families well accepted their transplant. Improvements in social integration and HRQoL were highly variable among patients and depended on baseline levels and psychiatric comorbidities.
Conclusion: These long-term outcomes highlight the significant pre-existing psychiatric conditions on the risk/benefit ratio of facial transplantation.

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Quality of Dutch integrated head and neck cancer care

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Objectives: Oncologic care is very complex, and delivery of integrated care with optimal alignment and collaboration of several disciplines is crucial. Insight into the quality of delivered integrated care shows were current care needs improvement. The aim was to measure the quality of integrated oncologic care, specifically for head and neck cancer (HNC) patients, using evidence based quality indicators. In addition, we tested the validity of the registered data.
Method: Data of nearly 1500 patients in nine Dutch hospitals was collected to calculate evidence based quality indicator scores regarding process, structure and outcomes for patients with head and neck cancer. Results were controlled for case mix. In addition, data of self-registration by the participating hospitals was compared with data collected by the Dutch Comprehensive Cancer Organization for validation.
Results: Current practice assessment produced high scores on several integrated care indicators, for example the percentage of patients discussed in multidisciplinary team meeting before start of the treatment (89.2%). However, there is room for improvement on indicators directed towards lead-time and treatment according to protocols. In general, indicator scores varied widely between hospitals.
Conclusion: This Dutch Head & Neck Audit shows that the quality of integrated care for patients with head and neck cancer in the Netherlands is already high on some aspects, but differed between hospitals with room for improvement too. This audit system can be an example for other oncologic diseases where integrated care is necessary to improve their transparency of multi disciplinary care.

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Feedback preferences of patients, professionals and health insurers in integrated head and neck cancer care

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Objectives: Audit and feedback on professional practice and healthcare are the most often used interventions to change behaviour and improve quality of healthcare. However, limited information is available regarding preferred feedback for patients, professionals and health insurers in head and neck oncology. We aim to investigate the (differences in) preferences of receiving feedback between stakeholders in the Dutch Head and Neck Audit.
Methods: A total of 37 patients, medical specialists, allied health professionals and health insurers were individually interviewed using semi-structured interviews. Questions focused on: 'Why', 'Of what', and 'How' do you prefer feedback on professional practice and healthcare outcomes? Interviews were transcribed verbatim and qualitatively analysed.
Results: All stakeholders mentioned that feedback can improve healthcare by creating awareness, by enabling reflection on yourself and to peers or colleagues, and by benchmarking to others. Patients prefer feedback on professional practice that matches their healthcare pathway whereas medical specialists and health insurers are mainly interested in healthcare outcomes. All stakeholders mostly prefer a 'bar graph' or a 'pie chart' for patient reported outcomes and experiences, and a Kaplan Meier graph for survival curves with a frequency of 1–4 times a year. Finally, patients and health professionals are cautious about transparency of audit data.
Conclusions: This study shows how feedback preferences differ between stakeholders. Therefore, tailored reports are recommended. Using this information, effects of audit and feedback can be improved by adapting the feedback format and contents to preferences of stakeholders.

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Trigeminal nerve repair — update 2017

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Background: Lingual and inferior alveolar nerve injuries occur commonly following third molar surgery, orthognathic surgery, maxillofacial trauma, and implant placement, and result in significant patient morbidity. Nerve injuries are diagnosed and classified based upon the likelihood of an injured nerve to recover spontaneously. Patient evaluation includes a standard set of objective and subjective neurosensory tests. Both nonsurgical and microsurgical treatment options are available.
Objectives: In an effort to increase awareness and access to care, new technology, microsurgical techniques, and materials availability (e.g. nerve allograft) have improved our ability to manage these injuries most appropriately, and have also expanded the applications of microneurosurgery resulting in excellent success rates.
Methods: A review of a case series and as well as a contemporary literature review was performed to determine the current methodology used in the diagnosis and assessment of nerve injuries as well as microneurosurgical techniques and success rates.
Findings: The results show an increase in indications as well as improved success rates of microneurosurgical repair of trigeminal nerve injuries performed immediately, or in a delayed fashion, over previously published success rates.
Conclusions: The field of microneurosurgery continues to evolve, and as surgeons become familiar with the diagnosis and management of nerve-injured patients, clinicians are better able to guide appropriate therapy for these difficult clinical problems.

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Minimal invasive implant surgery

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Minimal invasive techniques spread to all areas of medicine.

There are two main techniques that will be presented in our lecture:

(1) Microendoscopic techniques to assist in dental implantology, mainly for endoscopic sinus lift, preparation site surgery and for navigation surgery. The endoscopic implantology open a new horizon for accurate procedures and help the practitioner for better understanding and better success rate with minimal morbidity.
(2) Another method that we will present in our lecture is unique implant, which we design for augmentation procedures. High demand for minimally invasive procedures led us to invent

the implant for a one-stage transcrestal augmentation of the sinus and implant placement. This dynamic implant valve approach (DIVA) consists of an implant with an inner sealing screw, which facilitates and expedites the closed sinus lift procedure. This system was tested in vitro, and later its feasibility was tested in a large animal model (swine), the testing revealed that the DIVA can be successfully used for augmentation procedures, especially of the maxillary sinus, as well as for intra- or postoperative delivery of therapeutic agents, and in combination with dental endoscope for direct vision during the procedure. In 357 cases (94.5%), the implantation was totally successful both from objective cone-beam computed tomography clinical and subjective patients' viewpoints.

Another innovative option with the new implant system is the opportunity to treat maxillary sinusitis via the implant channel.

Our experience during the past five years using these new techniques, indications, advantages and disadvantages will be presented in details.

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Sialoendoscopy: latest in salivary gland endoscopy surgery

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During 1990s and 2000s, it was established that sialendoscopy is a reliable and safe technique for the diagnosis and treatment of salivary gland disorders in adults as well as in children. It appeared to be an effective treatment of sialolithiasis, strictures, chronic recurrent parotitis, juvenile recurrent parotitis, traumatic injuries to the parotid duct, and other inflammatory disorders of salivary glands. It was postulated that sialendoscopic minimally invasive technique might be a welcome innovation helping to avoid radical surgical treatment of salivary gland diseases both in parotid and in submandibular glands.

In the lecture we will review the latest developments in the field of salivary gland endoscopy using microendoscopic equipment and techniques, combined endoscopic and endoscopic assistant techniques and external lithotripsy. Our experience using these techniques on 3062 patients during two decades will be discussed. We will present our method of treatment of strictures and other inflammatory conditions of the major salivary glands.

We will present our imaging methods before the endoscopic intervention our results with the various techniques and complications encountered during our procedures.

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Management of no neck in oral squamous cell carcinoma — to dissect or not

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Squamous cell carcinoma (SCC) of the oral cavity has poor prognosis that has only marginally improved despite medical, surgical and other adjuvant therapies in the past 50 years. Recurrence at the primary subsite and metastases to regional lymphatics in the neck halves the survival rate.

Treatment of oral SCC follows a well-established protocol of surgery with or without adjuvant therapy depending on stage of the disease. Surgery involves resection of the primary tumour with a margin of 1–1.5 cm and removal of the regional lymphovascular tissues in the neck.

Addressing the neck in the absence of clinical or radiological evidence of disease seems ambiguous. A clinically negative neck (CN0 neck) with micro metastases is refereed to as occult neck disease and will progress into a full blown N+ in a matter of months effecting the prognosis.

The rate of occult metastases ranges from 20 to 45% depending on site of primary disease in the oral cavity. Several factors including tumour thickness and anaplasia dictate the risk of metastases as well. The necessity to operate on CN0 neck is a decision weighing risks against benefits. Multiple factors are taken into consideration in the decision-making.

Evidence-based analysis on the surgical management of CN0 neck is presented. With evolving surgical techniques minimising morbidity in neck dissection and absence of definitive predictors of neck metastases, elective neck dissection seems to be the best available option in improving both disease-free survival and overall survival.

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Critical evaluation of advances in bony reconstruction with vascularised free flaps

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The use of vascularised free bone grafts for jaw reconstruction has been established more than 30 years ago and can be considered a standard of care. Among others intraoral anastomoses, the prefabrication of flaps and the use of patient specific guides and implants are advances that are discussed more and more in the literature.

The number of indications for intraoral anastomoses is low. However, they help avoiding extraoral scars in children who require reconstructive procedures and, therefore, widen the indications for microvascular reconstruction in the paediatric patient population.

Flap prefabrication with dental implants and mucosal lining significantly reduces the time without a prosthesis in the patients. However, failure of a flap makes the prefabrication procedure worthless and increases the financial loss compared to a failed conventional flap.

Patient specific resection guides and implants seem to lead to a higher precision as far as the result of the reconstruction is concerned. However, there is no clear proof in the current literature that this increased precision has a clinical relevance. In addition, there are conflicting results concerning the reduction of operating time. Definitely, the computer-assisted planning procedures have an important training effect for those who are still about gaining experience in the field.

To date, it seems that the current advances microvascular free flap reconstruction have limited indications, but are able to improve some specific aspects of the treatment outcome. Definitely, the adoption of computer-assisted techniques does have relevant training effects.

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Intraoral distraction osteogenesis: problems, obstacles and complications to overcome

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Currently distraction osteogenesis has proven itself to be one of the alternative treatments for the bone tissue regeneration and simultaneous soft tissue regeneration. The gradual changes of the distraction segments provide the better stability of the regenerative tissue reflect in good stable final occlusion. Nevertheless, among the success cases in clinical used of the distraction technique some obstacles were faced. These probably caused by the insufficient efficacy of the single vector intraoral distractor, which although is a patient-friendly device but restrict in pattern of bone segments movement. These included unplanned vector of movement, limitation caused by the patient conditions, unsatisfied final occlusion and complicated distraction vector and forces in difficult cases.

The various methods have been proposed to overcome the encounter problems and obstacles with the acceptable result of the facial aesthetic and final occlusion to enable the usability of intraoral distractors in the complex dentofacial deformities patients.

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Management of the neck in salivary cancer

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Management of the neck in salivary cancer is complex as the ability for regional metastases to occur is dependent not only on the tumour stage but the histopathologic diagnosis. Salivary tumours display a diverse behaviour varying from low grade to high-grade disease so that surgical management of the neck is more individualised for these cancers than for squamous cell carcinomas.

In addition to the above factors neck disease will vary with site, and tumours in major glands such as the parotid will behave differently to minor salivary gland tumours. In recent studies a more proactive approach to the N0 neck has been advocated for earlier stage primary tumours in the parotid even those without high-grade pathology.

This presentation will address the more common malignant salivary gland tumours and will highlight the approach to both major and minor salivary gland neoplasms.

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The diverse spectrum of malignancy in ameloblastoma

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Ameloblastoma remains a controversial tumour. Although it is usually classified as a benign aggressive tumour some authorities have argued that all ameloblastomas are low-grade locally malignant tumours. The World Health Organization classification of malignant ameloblastomas recognises three distinct histopathologic types, benign metastasising, ameloblastic carcinoma and malignancy arising in a benign ameloblastoma. Interestingly these correspond to the three types of malignant change seen in benign pleomorphic adenoma.

Because of their rarity there are few established treatment protocols and management of true malignant ameloblastoma remains empiric. This presentation will review some of the current concepts regarding this fascinating neoplasm, and our own experience with these cases at the University of Maryland.

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Airway examination and manipulation in obstructive sleep apnoea

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The dynamics of the upper airway is a complex anatomical and physiological interaction, which is better understood following the use of three-dimensional scanning techniques. More recently acoustic reflection has been utilised as a tool which is non invasive reproducible and dynamic. Acoustic rhinometry together with reflection pharygometry can produce a representation of the cross-sectional area of the pharyngeal airway. Various anatomical landmarks can be demonstrated on a pharygogram.

The upper airway is a complex structure encompassing phonation, respiration and swallowing. In the human the upper airway is a floppy tube lacking bony support. In the middle it is prone to collapse in certain circumstances resulting in apnoeic episodes and obstructive sleep apnoea (OSA). The anatomic and physiological factors at play in the upper airway will be discussed, including gennioglossus tone, pharyngeal dilator activity and chemoreceptor drive.

Based on the pathophysiology of OSA and resultant morbidity and mortality, a summary of the range of mechanical and physiological procedures will be listed and discussed. This will include hypoglossal nerve stimulation. Together with this information a more targeted approach to intervention can be proposed. The surgical manipulation of the airway can therefore be developed.

A literature review comparing results of palatal procedures with orthognathic procedures will be presented including the authors published results.[1]

Reference

1 Islam, S., Uwadiae, N., & Ormiston, I. (2014). Ortognathic surgery in the management of obstructive sleep apnoea: experience from a maxillofacial unit in the United Kingdom. *Br J Oral Maxillofac Surg*, *52*, 496–500.

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Implants in craniofacial experience

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Reconstruction of complex facial defects often involving the eyes, ears and nose are challenging. Prosthetic rehabilitation of these defects with the use of titanium implants to aid retention has transformed the reconstruction of these defects.

Bony reconstruction of oral and facial defects after cancer has improved the cosmetic appearance of patients but dental implant retained prosthesis have vastly improved the quality of life of patients.

The effect of radiotherapy is conflicting.

We report on our 10-year experience of both intra and extraoral implants and the effects of radiotherapy.

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Pharyngeal reconstruction

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Reconstruction of the pharyngolaryngectomy defect is difficult due to poor surrounding tissues whose vascularity is often complicated by the effects of radiotherapy.

Many modes of reconstruction have been recommended and we will present one of the largest jejunal series in the world and our experience with the anterolateral thigh will also be discussed.

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Jaw reconstruction assisted by computer techniques

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Mandibular and maxillary defects resulted from tumour resection and trauma may cause severe functional and cosmetic deformities. The vascularised fibula and deep circumflex iliac artery (DCIA) flap are already widely used in maxillofacial reconstruction.

The success of jaw reconstruction generally depends on the surgeons' experience, and although acceptable results are achieved in many patients, some degree of patient dissatisfaction does occur because the conventional surgical approach lacks an objective design process. Computer-aided design/computer-aided manufacturing techniques, such as virtual planning, rapid prototyping, reverse engineering and surgical navigation, can be used to improve the process. The experience at Peking University is introduced.

The three-dimensional position of the fibula flap in computer-assisted group is significantly more accurate and ideal than the traditional group. The average difference between the real postoperative position and virtual planning of the fibula in the computer-assisted group was less than 5 mm. Application of computer techniques can significantly improve the clinical outcome of maxillary and mandibular defect reconstruction with free fibula and DCIA flap.

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Contemporary management of advanced gingivobuccal and tongue carcinomas: perspective from the subcontinent

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Oral cancer accounts for the majority of head and neck cancers in the Indian subcontinent that can be attributed to the use of tobacco both in the chewable and smoked forms.

The magnitude of the problem can be perceived from: (1) lack of education, awareness and thus advanced stage of presentation, (2) economic implications of treatment and paucity of trained personnel and competent institutions to address the problem and (3) differing and variable philosophies of thought about treatment principles.

Advanced buccal mucosa carcinoma and tongue carcinomas are considered moderately advanced disease based on current staging principles.

Though guidelines are ambiguous about respectability, this has contributed to a surging interest in the use of neoadjuvant chemotherapy for the management of these patients. The rationale underlying this is debatable. However its widespread use often delays definitive "curative" intent surgical modalities of treatment. Very often most of these patients are relegated to palliative intent treatment.

The management of advanced carcinomas of the gingivobuccal and tongue has two endpoints: oncologic and functional outcome.

To decide which modality namely surgical versus nonsurgical is superior one needs to assess both these endpoints as these would provide best levels of evidence in deciding the superiority of one over the other. Tumour differentiation, nodal involvement, extracapsular spread and perineural invasion are significant prognostic determinants of outcome. Functional endpoints primarily relate to airway, speech and oral intake.

This symposium would focus on current scientific evidence, our experience and future pathways in the management of advance oral carcinomas of these two subsets.

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Investigating the neck in oral squamous cell carcinoma

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The assessment of the neck in oral squamous cell carcinoma (OSCC) is critical for staging and it precedes further management, it also predicts disease specific survival, and recurrence is the hallmark of a malignant phenotype.

Investigation by imaging and tissue diagnosis are both crucial to further management.

This presentation review various evidence-based modalities in current clinical practice along with an algorithmic approach to the assessment of the neck.

The various imaging modalities are computed tomography (CT), magnetic resonance imaging (MRI) and positron emission tomography (PET) CT. Tissue diagnosis is commonly obtained by ultrasound-guided (USG) fine-needle aspiration cytology (FNAC). Sentinel lymph node biopsy (SLNB) and categorised biomarkers and gene expression profiles are the newer tools in the armamentarium.

USG FNAC has a specificity approaching nearly 100% for the evaluation of nodal disease. Drawbacks are its operator sensitivity and expertise required for nodes less than 5 mm.

With CT or MRI between 40 and 60% of all occult metastasis can be detected.

PET CT has an advantage of combining anatomical and functional imaging, however false positives due to physiologic uptake and inflammation are high. Its drawbacks are for metastatic deposits less than 5 mm and low sensitivity in the N0 neck ranging from 25 to 78%. It has a role in the recurrent and salvage settings.

SLNB for early T1 and T2 lesions is a promising tool as it avoids the morbidity due to a neck dissection. With negative predictive value (NPV) from the 2 major trials ranging between 88 and 98% it is a very promising tool. Combined with frozen section it has a NPV of 83%.

Cancer stem cells have been implicated in tumourigenesis and chemoresistance. Methylation markers such as Wnt-1 induced secreted protein 1 (WISP1) and programmed cell death ligand

1 (PD-L1) expression in primary and circulating tumour cells are predictors of nodal metastasis. However both SLNB and biomarkers are still experimental tools.

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Reducing invasiveness and maintaining predictability in implant surgery

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When a tooth is lost, there is horizontal remodelling of the alveolar bone in almost all cases. Depending on the patient's biotype and cause of tooth loss, such remodelling can be larger or smaller. Thus, in the short-, medium- or long-term we have to deal with an alveolar ridge that has residual width and height smaller than the ideal.

Usually, staged bone grafts are the method of choice to rehabilitate these patients. However, these are more invasive and more traumatic techniques, increasing time and cost of treatment.

New evidence is emerging, bringing safe indications for reduced diameter implants, and for short- and ultra-short implants (6–4 mm long), with excellent long-term tissue stability. Soon, we will consider the use of so-called "special implants" in areas where there is good bone width, in order to preserve the remaining bone, perform faster and less invasive surgery, and maintain long-term safety in all treatment options with implant-supported restorations.

Our presentation will discuss how the combination of digital planning with newer implant materials and designs, predictable results can be obtained with less invasive surgeries.

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Choices of bone management for multiple dental implants placement

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Multiple dental implants placement, especially in full mouth rehabilitation cases, might be encountered with different bone situations even in just only single patient and brought to the need of different surgical procedures for proper management of bone. Thorough meticulous treatment planning is very important and must be closely discussed with your prosthodontic colleagues and patients. Many surgical techniques can be harvested for suitable choices of treatment such as bone block grafting, ridge splitting, sinus lifting, immediate implant placement, socket preservation, guided bone regeneration, short implant, temporary mini implant, bone ring technique, titanium mesh tray, etc. Occasionally, major surgeries including microvascular surgery and orthognathic surgery may be needed for reconstruction and discrepant correction of the jaws prior implant placement.

A systematic review by Milinkovic and Cordaro could not extract clear indication for each augmentation technique,[1] still leaving the clinician the ultimate responsibility for the final choice. However, some surgical techniques and also implant systems may give more advantages by providing variety of effective and ingenious treatment options. Some procedures will be shared and discussed together with example cases. Nevertheless, compromised treatment options will probably be needed for consideration especially in the cases such as facial deformities, tumour and reconstruction, financial problem, etc. In conclusion, team-approach in treatment planning is very important for proper selection of bone management options especially in complicated multiple dental implants placement.

Reference

1 Milinkovic, I., & Cordaro, L. (2014). Are there specific indications for the different alveolar bone augmentation procedures for implant placement? A systematic review. *Int J Oral Maxillofac Surg*, *43*, 606–625.

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Surgical pathology of salivary gland swelling

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Salivary glands are always challenging area even for more experienced oral and maxillofacial surgeon, radiologist and pathologist. Surgical pathology of salivary glands mostly engage major salivary glands, influenced by specific local pathology but also by systemic disease. In the majority clinically affected parotid glands, isolated swellings are from neoplastic origin. The submandibular gland is more frequently involved by sialolith's obstruction and inflammation. However, there are apparent diseases of salivary glands of non-tumour origin, with very similar clinical expression but quite different clinical course, where recurrent swelling is the principal symptom. Quandaries arise with the maxim that discrete salivary gland swellings are likely to be neoplastic and managed with sialoadenectomy. Therefore the diagnosis of obscure recurrent forms of sialopathy is essential to avoid preventable operation principally for the major salivary glands. Current trend of management is with an emphasis for less invasive techniques and increased preservation of salivary glands and adjacent structures.

Evaluation was created through own experience with randomised study where salivary glands with evident glandular swelling were examined and treated. Routine diagnostic algorithm for salivary glands was performed, including clinical examination, imaging investigations with ultrasonography, computed tomography (CT) and magnetic resonance imaging (MRI). Fine-needle aspiration cytology was compulsory for the entire study. Determination of immunohistochemical profiles was occasionally accomplished.

Final diagnoses included salivary inflammations in 40%, lymphoepithelial lesions in 18%, non-tumour diseases (sialadenosis, sialolithiasis, cyst, etc.) in 21% and in 36% were salivary gland neoplasm's. In comprehensive statistical evaluation compared were the appraisals of separate diagnostics in surgically treated recurrent swellings with mass lesion where referring values were operative and histological findings. Imaging diagnostics (CT and MRI) were with maximal significance about localisation were compared first with ultrasonography and sialoendoscopy. Sialochemical analyses were confirmed to be effective in detecting changes in organic components of saliva in disease states. At last the analysis of efficiency of conservative treatment disclose that in non-tumour salivary gland diseases in 70% conservative treatment leads to remission or recovery and in 30% operative treatment was inevitable because of permanent destruction of salivary gland parenchyma. Modalities in the contemporary surgical treatment starting with strictures or drooling, sialoliths extraction, sialoadenectomy, over oropharyngeal radical excisions, parotid surgery and reconstructions, including approaches for parotid trauma and salivary fistulas are extensively revealed. Special attention is

estimated about human immunodeficiency virus associated salivary gland disease and exclusivities in diagnostics.

Conclusions are emphasising that the assessment for this kind of surgical pathology depends greatly on decisive clinical judgement, emphasising that the diagnosis is one of importance. Exact diagnostic work-up, with imaging radiology refinements, is approved as a great proficiency in the most clinical presentation of obscure salivary gland swellings, correspondingly obtaining adequate treatment decision with most favourable effectiveness on quality of life.

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Current concepts in management of salivary gland malignancy

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There is little debate with regard to surgical management of salivary gland tumours as there is an overall consensus about managing these tumours surgically. However, there is much debate about the indications for neck dissection and role of any adjuvant treatment. This talk will summarise the current evidence and concepts in the management of neck and also the role of any adjuvant treatment.

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Innovative techniques in maxillofacial reconstruction

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Over the last few years, there has been a vast expanse in available technology to aid maxillofacial reconstruction. The intent is to minimise surgical operating time, more accurate and symmetrical bony reconstruction with the ultimate goal of providing a good dental rehabilitation and therefore a good quality of life. This talk will explore the Birmingham way of maxillofacial reconstruction, with tips on surgical technique and our use of technology in a very cost effective way.

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Role of platelet-rich fibrin in bone graft and soft tissue surgery

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Various materials and techniques have been developed to facilitate hard and soft tissue healing process. Platelet concentrates have been recognised for promoting soft tissue healing and fostering bone regeneration due to the consisting various growing factors. Platelet-rich fibrin (PRF), the second generation of platelet concentrate, becomes popularised because of its simplified preparation technique and promising outcome.

PRF products including PRF gel, a membrane, and liquid PRF are used clinically to accelerate soft and hard tissue healing. PRF as a biomaterial has the property of strong mesh structure and the continuous release of growth factors from activated platelets. The application of PRF has been extended widely, for instance: sinus lift grafting, soft tissue surgery and socket preservation.

This presentation covers basic researches concerning characteristics of PRF and its growth factors, and clinical application of PRF gel in socket preservation, or in a form of membrane as a biological dressing in vestibuloplasty, or as an adjunct to grafting material such as bone block graft and alveolar bone graft in alveolar cleft. Graft volume change and dimensional change of the graft will be presented. Research and examples of some cases are to be demonstrated.

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Facial contour surgery: implants versus osteotomies

F.A. Quereshy

OMS Case Western Reserve University, School of Dental Medicine, University Case Medical Center, Cleveland, OH, United States

Demand for cosmetic facial surgery has increased over the last 20 years among consumer patients. Oral and maxillofacial training programmes are now including facial cosmetic surgery procedures and principles in their curriculum and scope of training. Oral and maxillofacial surgeons are well equipped to treating the needs and concerns of the aesthetic patient.

The focus of this surgical clinic will be on facial cosmetic procedures specifically in the area of facial augmentation. The use of traditional bony surgery to augment the facial skeleton will be discussed, including genioplasty and midfacial advancement procedures. As a topic of debate, additionally, facial augmentation with the use of alloplastic materials will be presented and rationales for usage with clinical examples will follow.

Oral and maxillofacial surgeons who desire to incorporate these types of facial enhancement procedures in their practice must have an understanding of the materials and methods available to deliver the desired result. The ability to offer a wide range of treatment options for the patient seeking facial augmentation demands a knowledge of the various surgical skills and products available to perform these procedures.

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Facial sculpting with liposuction

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The focus of this surgical talk will be to describe the various facial liposculpturing techniques utilising traditional suction assisted liposuction. In depth facial anatomy, principles of patient selection, surgical armamentarium, as well as numerous clinical examples will be illustrated. Postoperative protocols including handling of various complications will be addressed.

Oral and maxillofacial surgeons who desire to incorporate these types of facial enhancement procedures in their practice must have an understanding of the materials and methods available to deliver the desired result. The ability to offer a wide range of treatment options for the patient seeking facial lipocontouring demands knowledge of the various surgical skills and products available to perform these procedures.

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Upper facial rejuvenation: brow and blepharoplasty

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Upper facial rejuvenation requires a thorough understanding of anatomical facial upper facial subunit. Patients that desire correction of the facial region may be offered surgical and nonsurgical options. The focus of this presentation will be directed at specific brow lifting and blepharoplasty techniques.

Surgical approaches, pearls and pitfalls will be presented. Postoperative protocols including handling of various complications will be shared. In depth facial anatomy, principles of patient selection, surgical armamentarium, as well as numerous clinical examples will be illustrated.

Oral and maxillofacial surgeons who desire to incorporate these types of facial enhancement procedures in their practice must have an understanding of the materials and methods available to deliver the desired result. The ability to offer a wide range of treatment options for the patient seeking upper facial rejuvenation demand a knowledge of the various surgical skills and products available to perform these procedures.

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Management of maxillary cleft deficiency using external and internal distraction devices — long-term results

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Background: Correction of the hypoplastic maxilla secondary to cleft patients is a great challenge due to significant vertical and horizontal deficiency and difficulty in mobilising the hypoplastic maxilla as a result of scarring from previous operations. In addition there is a great tendency for relapse.
Objective: Present our experience using internal and external distraction devices in maxillary cleft deficiency.
Methods: Maxillary distraction was performed using rigid external distraction devices (RED) or internal distraction devices (IDD). Long-term follow up of five years will be presented.
Findings: The RED system offers greater distraction length, better control on the vector of lengthening and is easily removed. However, it is uncomfortable for the patients. When wearing for several months, the device is exposed to external trauma forces and there is a risk of parietal bone penetration. IDD are efficient in advancement of the deficient maxilla, are safer to wear for long periods of time, they do not create social discomfort and therefore permit longer retention periods which may contribute to better stability than external devices. Their major disadvantage is the need of a second operation for device removal.
Conclusions: The hypoplastic maxilla in cleft patients is associated with moderate to severe retrusion, and is better treated by distraction osteogenesis then by conventional orthognathic surgery. The internal devices should be considered first even when taking into account the major disadvantage of a second operation for device removal.

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Management of obstructive sleep apnoea by distraction osteogenesis

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Background: Obstructive sleep apnoea (OSA) in paediatric population is often associated with congenital craniofacial malformations associated with a hypoplastic mandible and decreased pharyngeal airway. Part of the patients arrive with respiratory distress and the other part arrive following tracheostomy. In adult patients who are usually nonsyndromatic, OSA symptoms are developed with ageing and are worse in obese.
Objectives: Compare the treatment outcomes of OSA, using external or internal distraction devices for mandibular lengthening in paediatric patients. In nonsyndromatic adults we present outcomes of using maxillomandibular advancement (MMA).
Methods: The paediatric patients were treated by mandibular distraction using external or internal distraction devices. Nonsyndromatic adult patients were treated by MMA.
Findings: An increase in mandibular body length and pharyngeal airway was obtained in all patients. The advantages and disadvantages of each method will be presented. In adults, MMA gives satisfactory results in eliminating OSA symptoms.
Conclusions: Mandibular distraction osteogenesis results in marked increased airway. Internal devices are more comfortable to the child, efficient, predictable and thus should be considered as the first choice. The external device permits greater distraction length. It should be used when it is impossible to place internal devices or when there is a need for greater distraction length. The external devices may be used, but the drawback of child discomfort and risk of pin loosening which may need replacement or shortening of the retention period, should be taken into account.

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Vascular lesions: the university of Malaya experience

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Vascular lesion within the mouth, face and jaws had pose an unsolved challenge to the oral and maxillofacial surgeons due to possible risk of excessive blood loss during surgical intervention and also frequent recurrence of the lesion. The vascular lesions that occur commonly within orofacial region includes includes arteriovenous malformation, cavernous haemangioma and vascular tumour. The author describes the diagnosis and various treatment options for the variety of vascular lesions. The rational and justification of each treatment option were discussed in detail. The need for prior embolisation in relation to the type of lesion was also emphasised. The merit and disadvantage of each treatment options were discussed over a range reported cases. The complications that may arise from these lesions are also mentioned.

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Graftless versus grafting options for implant based full arch rehabilitation in severe maxillary and mandibular atrophy

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Full arch dental rehabilitation in patients with severe maxillary atrophy is addressed by using zygomatic implants, extra-long root form implants placed in an angled position by transsinus approach or pterygoid implants. Guided surgery using surgical stents is also being increasingly used. Bone grafts have become exceedingly rare in the maxilla.

Patients with severe mandibular atrophy can be rehabilitated with inferior dental nerve repositioning, tilted implant placement or by onlay bone grafting. Although the need for bone grafting has become significantly less in the mandible with improvements in implant design and biomechanics, there is still a need for onlay bone grafts in certain specific conditions.

The above conditions will be discussed with relevant clinical documentation and follow up over several years. The current literature supported protocols will also be discussed.

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Advances and innovations in computer-assisted microvascular reconstruction after ablative surgery

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In this study, selective laser melted patient-specific functional implant (PSFI) were used in combination with fibula free flap for mandible reconstruction. The shape and length of the PSFI, the shaping of fibula graft and angulation, length of the screws were virtually planned before the surgery. Information, such as resection margin and screw lengths, was coded on the implant. Cutting guides are not necessary at the resection site.

22 patients were reconstructed with PSFI. Size of the defect, pre- and postoperative intercondylar distance, ischaemia time, time consumed to shape the fibula graft and complications were recorded.

All patients were reconstructed as planned. Depending on the extension of the defect, the fibula grafts were shaped into different shapes, averagely 41.6 ± 4.9 min was used. The mean difference of pre- and postoperational condyle distances was 1.2 ± 1.4 mm. Postoperative complications such as wound healing disturbance and plate exposure occurred in eight patients. All PSFI remains within reconstruction sites, eight of them are reconstructed now with dental implants.

Mandibular reconstruction with PSFI offers benefits in comparison with the standard procedure. Further trials should be conducted to confirm the mechanical property of selective laser melted implants.

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Three-dimensional planning and computer-assisted surgery in craniofacial reconstruction

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Background: Inadequate reconstruction of the facial skeleton after trauma is often associated with complications like incomplete correction of enophthalmos, diplopia, hypoglobus and changes in facial geometry. Surgical intervention is often necessary to correct function and aesthetics and to avoid long-term complications.

Especially the severity of an orbital trauma is dependent on the size of a defect, the number of orbital walls involved, the localisation of the defect and any technical difficulties during surgical repair. Patient-specific reconstruction is an option to address this.

The benefit of computer-assisted planning and computer-assisted surgery in craniofacial reconstruction has been documented over the last decade. These systems offer a safe and reliable surgical procedure. As a result, the handling of these systems is largely experimental and navigational assisted treatment of facial trauma is not routinely used.

Objective: This masterclass presents a novel solution for computer-assisted planning to design customised implants with predefined useful guidance, which optimally adapt to the needs and the anatomical conditions of the patient.

Methods: To demonstrate this novel approach, we show an example of surgical planning and treatment of some patients with a traumatic mandible and midface fracture including the orbit. Based on preoperative computed tomography data, virtual models of the unaffected bony part were automatically generated using an atlas-based segmentation using three-dimensional (3D) planning software, iPlan 3.0.5, (Brainlab®, Feldkirchen, Germany). 3D mesh was virtually designed using Geomagic-Freeform® Plus (3D Systems, Morrisville, NC, USA). The virtual 3D implant was produced via additive manufacturing (selective laser melting) by KLS-Martin® (Tuttlingen, Germany).

Results: Successful preoperative planning, import of image data suitable for navigation and intraoperative precise infrared-based navigation was obtained for all patients without any complications. The registration of patient data at the navigation system using screws as fiducial markers delivered a navigation accuracy. The novel method of use of PSI showed good postoperative result.

Conclusion: Regarding the advantages of computer-assisted surgery, this technique will play a major part in craniofacial reconstructive surgery and will address widespread general methodological solutions that are of great interest in multidisciplinary traumatological treatment.

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How to manage outpatient orthognathic surgery; protocols developed after 25 years and more than 6000 cases

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For the past 25 years, surgeons and anaesthesiologists at the "Unidad de Cirugia Maxilofacial Jorge Ravelo" in Caracas, Venezuela developed new and reliable surgical and anaesthesia protocols. More than 5000 orthognathic outpatient surgeries, including single and bimaxillary procedures, have been successfully accomplished with reproducible suitable results. All surgical procedures were performed in our surgical ambulatory care centre. Patients were discharged the same day, within three to six hours after being extubated.

This presentation is an overview of the surgical and anaesthesia protocols used to reduce complications, increase functional and aesthetic results, technique variations for maxillary and mandibular surgical procedures, postoperative period,

and management of possible complications in ambulatory centres.

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Assessment and management of nerve injuries

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Trigeminal nerve injuries are preventable in the main, and result in patients suffering from chronic life long neuropathic pain, with ensuing functional and psychological complications. A holistic approach in assessing patients with trigeminal nerve injuries, underpins successful management. Strategies for effective assessment include first taking a thorough history involving; enabling the patient to tell their story from their perspective, pain history (SOCRATES), functional disability and psychological impact.

Clinical inspection should include sensory assessment of V1-3 (including Blink reflex) and cervical nerve 2 and 3. Mechanosensory function is the main stay of sensory assessment, additional tests may include; pulp vitality testing, thermo sensory testing and taste assessment.

Management of trigeminal nerve injuries due to specific mechanisms require urgent surgical exploration or removal of endo overfill or implant is required. For patients with chronic nerve injuries, surgery is rarely indicated and treatment is predicated upon pain management, improving function where possible and addressing psychological issues requires expertise and a multidisciplinary team. Psychological and medical interventions, both topical and systemic, have roles in treating most patients.

This short presentation will provide an overview of the assessment and management of trigeminal nerve injuries.

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Mandibular third molar guidelines: an international perspective

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When recommendations are made, with regard optimising the quality of patient care, evidence-based medicine should be applied and disseminated. Unfortunately despite undertaking dental extractions so frequently there is an embarrassing paucity of clinical evidence relating to this practice. In addition, our regulators provide numerous standards — do they use terminology consistently? Do the words 'must' and 'should' be synonymous or mean always and ideally? It transpires that our regulatory bodies use these terms differently.

Guidelines can be a very useful support of optimal evidence based practice for clinicians and patients in clinical decision-making where the evidence may exist. They are mainly used o promote optimal patient care but may be used politically for cost-effectiveness stipulating setting for the surgery for example or the selection of anaesthesia.

In 1979, the National Institutes of Health in the United States of America issued their guidelines on the management of third molars, partly as a result of critique by medical insurance companies, that third molars where being removed unnecessarily without any evidence-based clinical indication, resulting in high morbidity and cost. The National Institute of Clinical Excellence (NICE) introduced a technical assessment guidance (not guidelines) relating to TMS in 2000, discouraging the prophylactic removal of mandibular wisdom teeth (mandibular third molars [M3Ms]). However, there is growing evidence that this may not be in the best interest of the patient resulting in delay of inevitable surgery with additional damage to the adjacent second molars and resultant patient harm. In 1991, the American Association of Oral and Maxillofacial Surgeons (AAOMS) introduced their guide and parameters of care document and later, in 2012, a consultation workshop undertaken in Washington which included representation from the United Kingdom (Professor Tara Renton) and Finland (Professor Irja Venta), which was published in 2014 as AAOMS White paper for management of third molars.

More recently AAOMS have revisited their M3M guidelines in the light of significant criticisms by the American Society of Public Health resulting in the introduction of active surveillance for patients with M3Ms without indications for surgery. The AAOMS paper, which is endorsed by British Association of Oral and Maxillofacial Surgeons, states that;

> Predicated on the best evidence-based data, third molar teeth that are associated with disease, or are at high risk of developing disease, should be surgically managed. In the absence of disease or significant risk of disease, active clinical and radiographic surveillance is indicated. This statement clearly recognises that while not all third molars require surgical management, given the documented high incidence of problems associated with third molars over time, all patients should be evaluated by someone experienced and expert in third molar management.

In reality the evidence base for M3M surgery is sparse and does not provide robust justification for existing Guidelines hence the variation and conflicting recommendations.

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Unusual lower third molar positions and with positions in close proximity to the nerve

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Surgical treatment in unusual third molar positions. The widespread use of imaging techniques prior to third molar surgery has enabled professionals to have a better idea of what they will encounter during actual surgery. However the proximity of the nerve from the third molar is difficult to assess. During this presentation, I will show examples of both unusual, difficult to approach third molar presentations and lesions to the nerve during surgery.

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Orthognathic surgery in the obstructive sleep apnoea patient

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Up to date the gold standard for treatment of obstructive sleep apnoea syndrome (OSAS) is the use of noninvasive mechanical ventilation (either C Pap, B Pap or auto-set). In 1990 Riley, Powell

and Guilleminault compared the use of nasal C Pap with maxillomandibular advancement, showing no difference between both treatments for all respiratory variables.

According to evidence-based information, the two most successful treatments for OSAS patients are maxillomandibular advancement and the use of noninvasive mechanical ventilation.

In the pas 20 years plenty of information and knowledge has been accumulated, however many questions still remain regarding epidemiology, diagnosis and treatment.

This presentation will focus on evolution of surgical treatment (maxillomandibular advancement) in OSAS patients in the past 20 years, in patients attending a sleep unit. Important issues like three-dimensional assessment, outcome of patients, and treatment in non-dentofacial deformities patients and those with different types of facial anomalies will be discussed.

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Three-dimensional planning in craniomaxillofacial surgery

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Background: Three-dimensional (3D) planning in oral and maxillofacial surgery has become a standard in the planning of several pathologies such as dental implants, preprosthetic surgery or orthognathic surgery. Fabrication of custom made cutting and positioning guides allows exporting the virtual surgery to the operating room and increases the precision and results.
Methods: We present our experience in the treatment of craniofacial deformities with 3D planning such as craniosynostosis, osteogenic distraction (in severe maxillary hypoplasias, hemifacial microsomia and Pierre Robin sequence neonates), premaxilla osteotomies, rhinoplasty or syndromic diseases.

Different software was used to plan the cases depending on the surgery (Nobel Clinician, Kodak 3DS, Simplant O&O or Dolphin 3D).

The treatment protocol will be exposed step-by-step from the virtual planning, the design and printing of the cutting and positioning guides and the outcomes of the surgeries.
Results: 3D planning increases the preoperative planning time and needs a learning curve but reduces the surgical time and allows predicting possible difficulties and complications.
Conclusions: 3D planning is a technology that has arrived to stay due to its multiple advantages and it is the present in craniomaxillofacial surgery. The only drawback is the cost of the procedure that will be reduced in the future.

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Fronto-orbital advancement for coronal and metopic suture craniosynostosis

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Cranial sutures represent unique articulations between plates of membranous bone that allow for normal brain growth and expansion during infancy. Craniosynostosis, the absence of one or more of the cranial vault sutures, restricts normal growth with potential neurologic consequences. When the coronal or metopic suture regions are affected, the lack of growth along the fused suture and a compensatory overgrowth through the remaining open sutural regions creates a complex three-dimensional deformity involving the cranial vault, skull base, and orbital structures.

The contemporary surgical management of craniosynostosis is directed at releasing the fused sutural regions, and dismantling and reconstructing the dysmorphic skeletal components in order to normalise their architecture. Fronto-orbital advancement and anterior cranial vault reshaping remains the mainstay of surgical treatment when the anterior cranial vault sutures are involved.

A detailed review of the reconstructive approaches used to treat coronal and metopic suture craniosynostosis will be presented with an emphasis on intraoperative techniques and perioperative management using clinical examples. Surgical outcomes involving over 100 consecutive patients will be critically presented and reviewed. The specific role of computer-assisted surgical planning, templates, and indications for surgery is included. Presurgical evaluations and the timing of surgical intervention will add context to the course's surgical discussions.

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New possibilities in preimplantologic bone augmentation by three-dimensional technologies

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Oral rehabilitation with dental implants nowadays seems to be a clinical routine technique. But still there are lots of patients who cannot be treated by simple implant insertion but need further surgical procedures to guarantee a sufficient dental rehabilitation like bone or soft tissue augmentation. To avoid large surgical approaches, innovative biomedical technologies can be used more and more. As one of the future technologies of the 21st century the symbiosis of material sciences, biologicals and computer technology will revolutionise reconstructive dentistry. The large economic growth in this field is attributed to the use of image-guided technologies. Especially regarding the process of excess of age in the western world, especially in compromised patients with medical risk factors the physiological healing process is disturbed, alloplastic augmentation with bone substitutes still offers problems and can show insufficient results.

Based on 15 years of clinical and experimental experience it shall be shown that future problem solutions in augmentation with bone substitutes will be based on a successful inter-linkage of different areas: for this, (1) bionic biomaterials imitating natural morphology and biomechanical qualities have to be developed; (2) these materials have to be combined with biological-active factors to support and stimulate the human biosystem by osteoinductive proteins or autologous stem cells coming for instance from bone marrow aspirate; and (3) by image-based bone analysis and computer-aided augmentation techniques the micro- and macrostructure of scaffolds have to be calculated in respect to computer-aided tissue-engineering. Altogether, this can be completely related to the sense of a new system-biological approach in bony augmentation.

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Paradigm change in cleft therapy — from surgery to a functionally orientated team approach

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Medical treatment is nowadays substantially based on physical parameters like unhindered "operability" of the single individual. There is no space for biopsychosocial and other individual-related factors that also have an influence on the treatment result. Especially for patients with cleft lip and palate, this is of high evidence. Most of the physical deficits of so handicapped patients have a strong influence on the life of the individual and the families. Over all the stages of the different operations with the concomitant fears, a network of severe problems emerges which influences the whole live. And this takes place especially in a human community where a clean, immaculate and aesthetically appealing appearance is of highest value.

Even if the process of the medical treatment is optimal, the burden during childhood leaves clear marks. Often the psychosocial relationships in between the family members and to the outside world are heavily incriminated. These burdens can influence the whole biography of the affected person sustainably. The presented discussion will set nearer these existential aspects of human beings and will clarify that biopsychosocial factors have to be accepted generally and equally especially compared with the classical and conservative medical treatment planning. Therefore, one future goal should be to bring back aspects of humanity to medicine.

The presented lecture will show by evident examples that just for the surgery of the cleft patient's face, the success will be decisively based not only on the achieved superficial aesthetics but also on the psychological function, which is hidden behind and beyond the face.

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Rehabilitation after tumour surgery — the impact of swallowing

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Head and neck cancer patients are at high risk of getting an oropharyngeal dysphagia following surgical therapy. Early identification of oropharyngeal dysphagia can improve outcomes and decrease economic burden. The presented results on the one hand aims to examine the validity of a water screening test with progressing volumes in postsurgical head and neck cancer patients for the early identification. On the other hand, the impact of the used surgical reconstruction concept after ablative tumour surgery should be proven. Swallowing diagnostics concerning the danger of oropharyngeal dysphagia were performed by using a water screening test combined with further instrumental diagnostics: aspiration and limitations in oral intake was investigated by fibreoptic endoscopic evaluation of swallowing by the technique of Susan Langmore called FEES.

Oropharyngeal dysphagia was postoperatively detected by FEES in 65%, with aspiration in 49%, silent in 21% and limitations in oral intake in 56%. Despite a good sensitivity (aspiration = 100%; limitations in oral intake = 97.8%) the presented water-screening test did not satisfactorily predict both these reference criteria due to low positive likelihood ratio (aspiration = 2.6; limitations in oral intake = 3.1). However, it was an accurate tool for the early identification of ODG (sensitivity = 96.2; positive likelihood ratio = 5.4) in postsurgical head and neck cancer patients. On the other hand, our results show a clear demand for functional reconstruction after surgical tumour ablation. As main important factors to reduce incidence of postoperative oropharyngeal dysphagia, immediate reconstruction of a (partially) resected mandible and the reconstruction or preservation of the tip of the tongue were shown.

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Efficiency in indication and outcome between two different speech-supporting surgical techniques — velopharyngoplasty and levatorplasty

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Background: Despite significant improvements in functional speech rehabilitation of patients with cleft palate during the past decades, speech-supporting surgery belongs to the standard repertoire of secondary cleft surgery. However, there are few objective comparisons between the various surgical techniques regarding indication, predictability of the functional speech outcome and the real outcome.
Methods: From 2006 to 2011, speech-assisted surgery was performed in 40 patients with velopharyngeal insufficiency. These patients had the following diagnoses: 17 unilateral total cleft lip and palate, 10 isolated cleft palate and 13 syndromal submucosal clefts with 22q11 deletion syndrome. Indication and selection of the surgical technique were performed by logopedic-perceptive examination and imaging diagnostics (nasopharyngoscopy, videofluoroscopy) depending on mobility of the lateral pharyngeal walls (velopharyngoplasty [VPP] $n = 17$, levatorplasty $n = 13$). Of these 40 patients, 30 patients could be examined at least one year after operation. Out of the 10 non-examined patients six could be contacted and were satisfied, but could not take part in the survey because of time problems and two have moved overseas, so that the negative selection was only two patients (5%). All investigated patients underwent a clinical examination with standardized evaluation of speech function (GOS.SP.ASS according to Sell et al., 1994), a nasopharyngoscopy, a videofluoroscopy and a real-time MRI during speech.
Results: In all 30 patients, a significant postoperative improvement of speech could be achieved, with no difference in the extent of improvement regarding the diagnosis (complete cleft lip and palate versus palatal cleft, nonsyndromic versus syndromic cleft) or selected surgical technique (VPP versus LVP). However, it was highly significant that LVP significantly improved the velar mobility compared to VPP. In 10 patients (33.3%), the postoperative result was so good that no further logopedic treatment was necessary. In another 10 patients (33.3%) there was still speech therapy performed but was going to be completed. The last third of the patient was improved, but still in treatment. In three of these patients (10%) after VPP, a secondary correction of the velopharyngeal flap was recommended for further optimisation and in seven patients (23.3%) it was recommended to perform additionally the other speech-assisted surgery. Only in one patient (3.3%) the velopharyngeal insufficiency could not be improved satisfyingly.

Conclusion: The presented study shows that exact and interdisciplinary preoperative diagnostics are necessary for an exact analysis of the velopharyngeal problem, for setting up the correct indication and for the selection of the right surgical technique. In this way, a very good improvement could be achieved in almost all cases and even a normalisation of velopharyngeal function in two thirds of the patients. Interestingly, the velopharyngeal problem was found to be so complex in nearly a quarter of the patients that the indication had to be made for a combination of two different speech-assisted surgical techniques.

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Modern management of obstructive sleep apnoea: beyond maxillomandibular advancement

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I. Brief review of obstructive sleep apnoea (OSA) diagnosis and presurgical evaluation
II. Evidence based discussion regarding anatomically targeted surgical treatment of OSA
III. Case presentations and discussion of multiple surgical modalities to treat OSA

- Included, but not limited to:

- Maxillomandibular advancement
- Mandibular repositioning devices
- Transoral robotic surgery (TORS) for base of tongue reduction (BOTr)
- Modified uvulopalataopharyngoplasty
- Hypoglossal nerve stimulator implants

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Orbital reconstruction in skull base surgery

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Contemporary surgical management the orbital rims and walls when treating skull base tumours include standard craniofacial techniques (orbitotomies/orbitectomies) together with three-dimensional orbital reconstruction (usually with autogenous bone grafts and/or titanium mesh) and standard skull base reconstructive methods by using either local flaps or microvascular free flaps.

Kronlein fist described a lateral orbitotomy in 1900. Klopp (1954) first published a series of anterior craniofacial resection. But is was after modern craniofacial surgery development by Tessier, Jackson, Sekhar and Janecka (among others) that oncological skull base surgery was established as a safe and standardised head and neck surgery discipline.

Osteotomies may include one (e.g. supraorbital) or various orbital rims (e.g. orbitozygomatic osteotomy) that can be mobilised and repositioned with adequate fixation, usually with titanium microplates and screws. Orbital orbitotomies are used for the most popular surgical approaches to the anterior cranial fossa: extended subfrontal and subcranial approaches.

Most usual orbital defects include the orbital floor/medial wall (sinonasal malignancies), orbital roof/lateral wall (sphenoid wing meningiomas).

Three-dimensional orbital reconstruction needs to fulfil the highest accuracy when the orbital contents is preserved, to assure adequate globe positioning and function thus avoiding postoperative enophthalmos and assuring stereoscopic vision.

Autogenous bone grafts are usually preferred for rim reconstruction (when resected) and titanium mesh for the walls. Repositioned and fixed bone segments as well as titanium mesh have to be covered with vascularised tissue: galeal-pericranial, temporoparietalis fascial and temporalis muscle flaps are the workhorses for anterior skull base and orbital reconstruction, both for isolating the dura from the upper airway and for revascularisation of bone grafts/orbitotomies. Free flaps are usually needed in patients with previous operations and/or radiation therapy.

Meticulous preoperative planning including multi-slice computed tomography scan and magnetic resonance imaging are standard for the resection and subsequent reconstruction plans. Computer based planning software available allows a better three-dimensional resection and reconstructive planning, as well as intraoperative quality control by using a navigation system (e.g. I-plan/Brainlab^{R}).

When orbital exenteration is needed, orbital cavity is usually obliterated with a soft tissue flap, in association with rim-only reconstruction.

When extensive resection includes orbital exenteration together with maxillectomy, a free flap is indicated. Anterolateral thigh is our common choice for significant volume defects, radial forearm is very helpful for surface defects without large volume needs, latissimus dorsi when associated large scalp defects. Small cranial vault defects are usually reconstructed with titanium mesh; large calvarial defects better using computer-aided design/computer-aided manufacturing polymer cranioplasty implants.

The author illustrates these principles with a series of cases from his more than 25 years of practice in the field.

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Surgical management of posttraumatic enophthalmos

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First mention to posttraumatic enophthalmos is a paper from Smetius de Leda (1575), professor at Heidelberg, mentioned by La Grange, French doctor at his textbook (1904). Untreated orbital wall fractures ended up with this clinical condition consisting of a 'sunken eye' due to posterior and sometimes inferior globe displacement (enophthalmos/hypophthalmos-hypoglobus).

Orbital fractures imply both functional (e.g. diplopia) and aesthetic issues, being posttraumatic enophthalmos the most common aesthetic sequelae (also presenting some functional implications in cases with either inferior displacement of the eyeball (hypophthalmos) or severe posterior axial displacement).

The contributions of Korneef[1] describing the complex anatomy of the connective tissue system supporting the orbital contents (eye, muscles, ligaments, fat) have given a better perspective of the mechanism of production of mechanical posttraumatic diplopia.

Publications from Manson et al were key to understand that the main factor producing posttraumatic enophthalmos is orbital volume enlargement secondary to orbital rim enlargement (e.g. untreated orbitozygomatic fracture with lateral and inferior displacement), orbital wall defect associated with orbital contents herniation (e.g. blow-out fracture) or associations of both.[2–4]

Schubert first described an approximated 1 cc/1 mm relation in between orbital volume enlargement and posttraumatic

enophthalmos.[5] This has been extensively confirmed in various subsequent publications correlating CT scan volumetric assessment with clinical findings.[6]

Meticulous clinical evaluation of the patient including complete ophthalmological assessment, enopthalmometry, and strabismus evaluation (including a Hess chart) is needed. Medical records of previous surgeries including approaches, surgical procedures, materials implanted, are collected. Careful static and dynamic soft tissue evaluation (eyelids, cheek) is performed.

Standard imaging evaluation includes multi-slice CT scan. DICOM data are processed in an adequate software platform for detailed analysis of the orbital walls and orbital contents, measurements and volume estimations, to provide the surgeon with a detailed orbital 3-D anatomy status. Advanced planning with specific software for intraoperative navigation (e.g. i-plan, Brainlab Co) allows highly precise surgical planning with tools such as autosegmentation, mirroring, volume rendering, etc.

Contemporary surgical techniques include transconjunctival approach, orbitozygomatic osteotomy (if needed, as described by Kawamoto) with rim repositioning and fixation together with intraorbital reconstruction.[7] Prefabricated titanium mesh is the preferred material of the author (AOCMF Surgery www.aosurgeryreference.org).

Intraorbital volume enlargement with costal cartilage (as described by Ortiz Monasterio in 1987) is sometimes useful to correct residual mild to moderate axial enophthalmos.[8]

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Computer-assisted oral and maxillofacial surgery — what has become clinical routine after 20 years

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Computer-assisted preoperative planning, intraoperative navigation and intraoperative imaging for a long period of time have not been practiced as part of the surgical routine in the field of oral and craniomaxillofacial surgery. Advances in imaging techniques pre- and intraoperatively and associated technologies have led within the past 20 years to improve preoperative and intraoperative guidance for the surgeon. Virtual resections and reconstructions in midface and skull base tumours, complex trauma and craniofacial malformations as much as orthognathic surgery and guided dental implantology have become clinical routine in our patients care. Intraoperative navigation is done using frameless stereotaxy combined with intraoperative imaging techniques. Intraoperative guidance by navigational surgery or computer-aided design/computer-aided manufacturing templates is used. New software developments for automatic bone segmentation of standard computed tomography (CT) data sets dramatically reduce the time period for preoperative planning in virtual facial reconstruction. The resulting virtual model is used for intraoperative navigation, guiding the reconstructive procedure to the desired result and controlled by intraoperative CT scanning.

Computer-assisted preoperative planning and surgery techniques have improved operators' confidence in maxillofacial surgery. Anatomical structures can be identified intraoperatively and pre-planned reconstructions can be realised. Especially image fusion of pre- and intraoperative data sets enables detailed evaluation of postsurgical outcomes already inside the operation theatre, especially when stereolithographic models can be produced at a very low cost level they should be considered as a operation time saving factor when they are used to pre-bend the plates and measuring the screw length preoperatively in primary and secondary reconstructions. Using this technique all kinds of modifications of the shape of the plates can be virtually or mechanically preformed to allow patient specific prefabrication for primary and secondary reconstructions of the mandible and midface independent from the type of reconstruction (e.g. vascularised bone graft, free bone graft, alloplast) and splintless (waverless maxillary positioning and guided mentoplasty in orthognathic surgery. Also the installation of fixtures for prosthetic reconstruction in maxillofacial surgery patients is performed on the base of three-dimensional–toothborn devices used for intraoperative controlling of insertion of dental implants. Virtual insertion of implants, with different diameters and length with or without previous bony reconstruction of the maxilla and mandible was performed in our department in over 3000 patients. In this presentation routine use of computer-assisted maxillofacial surgery is presented in facial trauma, orthognathic surgery, tumour treatment and oral implantology.

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Use of extended septal graft and columellar strut during rhinoplasty in patients with bimaxillary osteotomies

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Asian patients who undergo bimaxillary osteotomies often require maxillary advancement or impaction, with mandibular setbacks. Clockwise rotation of the maxillomandibular complex also results in increased advancement of the anterior nasal spine and maxillary bone at the paranasal region. The combination of these vectors of maxillary movement and a short upturn Asian nose often results in further shortening of the nasal tip with increased cephalic rotation. This often results in unwanted nasal changes such as increased nostrils show, accentuation of the shallow dorsum, and increased alar widening.

For these patients, simultaneous rhinoplasty can be carried out and a combination of extended septal graft and columellar strut often allows de-rotation of the nasal tip while increasing the nasal tip height. This often helps to correct undesirable nasal effects of the maxillary movements. Dorsal augmentation and onlay grafts are often performed to improve the nasal aesthetics.

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Surgical management of oral epithelial dysplasia and intraepithelial neoplasia

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Background: Oral epithelial dysplasia (OED) is one of several potentially malignant disorders (PMDs) usually classified into two groups: precancerous lesions, benign lesions with morphologically altered tissue and a risk of malignant transformation; and precancerous conditions associated with a greater risk of other precancerous lesions or development of oral squamous cell carcinoma (OSCC). Generally, mild and moderate dysplasias are defined as oral epithelial dysplasia (OED), while severe dysplasia is defined as oral intraepithelial neoplasia (OIN). Because there is no clear definitive distinction between OED and OIN, surgical management of PMDs remains controversial.
Objective: This study was designed to evaluate the ability of human papilloma virus (HPV), p16, and nucleus accumbens-associated protein 1 (NAC1) immunohistochemistry to distinguish between OED, OIN, and OSCC to determine surgical indications for PMDs.
Methods: Subjects were 150 patients (41 with OED, 30 with OIN, and 67 with OSCC and normal oral epithelium taken from 12 healthy participants. Labelling indices (LIs) of HPV16, 18, p16, and NAC1 were examined using paraffin-embedded specimens.
Findings: No trend for HPV16 status or LIs was seen in all cases. All OED and OIN specimens were p16 positive; 93.8% of OED/OIN cases were p16 negative, age <60 years, and HPV18 positive; 60.0% of OED/OIN were p16 negative, age >60 years, and HPV18 negative. Although there was no distinction between OED and OIN, the NAC1 LI cut-off value, which discriminated between OED and OSCC, was 50%.
Conclusion: Particular attention should be paid to the surgical management of OED and OIN.

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Tissue engineering — pros and cons

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Tissue engineering has been used for several years in limited cases of tissue regeneration. It is a fascinating way to produce living 'spare parts' for patients who have lost an important tissue or part of it. However, safety aspects need to be studied carefully.

In regenerative medicine, which a branch of translational medicine, the aim in general is to replace degenerated or damaged tissues by combining stem cells, biomaterials and physiochemical factors, such as growth factors. Therefore, all these factors need to be safe as such and as a combination to produce safe spare parts for patients in need.

In maxillofacial area, only few studies have been published on this topic. At the time, at least tissue engineered oral mucosa and bone in the craniomaxillofacial skeleton have been used in clinical settings. They are demanding to manufacture and very expensive at the moment as the process is very labour-intensive.

The main risks in tissue engineering are tumourigenity, graft rejection, immunogenity and cell migration. The aim of our research group is to understand the risks, how to minimise them and, especially, how to predict and prevent them. In this presentation current status of craniomaxillofacial tissue engineering will be shown, with a few glimpses to the history and a few prospects to the future.

The current results of our group will be presented as well.

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Oral rehabilitation of severe atrophic ridges and defected jaws with implants

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Resorption of the residual maxillomandibular edentulous ridge is a continuous process. In severe atrophic ridges especially those who have defected jaws resulted from trauma or tumours resection and jaw reconstruction, it is extremely difficult to construct any satisfactory prostheses for patients to gain back their oral function and facial contour without implants leading to patients' poor quality of life. However implant treatment for severe atrophic ridges and defected jaws is also a very complicated procedure, which needs multiple surgeries for the correction to gain enough bone and oral soft tissue for implant placement. Factors need to be considered such as patients' health status, amount of available bone, number of implants needed, total length of treatment, cost and etc. The implant treatment that is simple, less traumatic and at an affordable cost will lead to higher patient's acceptance and success. The presentation will demonstrate the surgical technique of implant surgery in the severe atrophic ridges and defected jaws for implant support prosthesis.

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Outcomes of mandibular distraction for the management of infants and children with micrognathia and upper airway obstruction

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Background: Infants and children with craniofacial anomalies often present with upper airway obstruction (UAO) due to micrognathia.
Objectives: This study describes the outcome of the management of neonatal, infant and young children who have undergone mandibular distraction for the management of severe UAO.
Methods: A retrospective review of 73 patients who underwent mandibular distraction osteogenesis (MDO) between 2000 and 2012, was undertaken and included airway status, feeding, postoperative course including time of intubation, medical conditions, weight and any complications.
Findings: 42 were syndromic and 31 were nonsyndromic. The mean age of distraction was 2.0 months (nonsyndromic) and 3.3 months (syndromic). Initial management with nasopharyngeal tubes (NPT) was performed in 69% whereas 18% had non-

invasive therapy and 9 syndromic patients had tracheotomies. Post-distraction, none of the NPT/continuous positive airway pressure-dependent patients required any further airway support. Of the tracheostomy dependent group, 56% were successfully decannulated within one year. Most patients required supplemented feeding prior to MDO, 77% were oral feeding by the end of the first year. The majority of tracheotomy patients were still percutaneous endoscopic gastrostomy fed. The average growth of patients followed within one centile of their birth projected trajectories but 10% of syndromic patients had a low birth weight. Two patients died at home: during tracheotomy tube change and following aspiration and respiratory arrest.

Conclusion: MDO is an effective technique for managing severe UAO in selected infants and young children. Differences in the outcomes of the syndromic and nonsyndromic patients were demonstrated. In some syndromic patients management with tracheostomy is still indicated.

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Aesthetic consideration in orthognathic surgery

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Orthognathic surgery mainly focuses on the surgical correction of dentomaxillofacial deformity and rehabilitation of normal dental occlusion. But surgeons still have to face challenges of some unsatisfactory outcomes after conventional orthognathic surgery for patients with unordinary dentomaxillofacial deformities like hemifacial microsomia, severe jaw deformities secondary to temporomandibular joint ankylosis, asymmetric hemimandibular hyperplasia and so on. The ability to predictably move and alter the dentofacial skeleton to improve occlusion, function, and aesthetics is remarkable.

This presentation is to demonstrate some of the more commonly performed aesthetic surgical procedures to achieve a value-added improvement of final outcome of orthognathic surgery. These procedures can be safely and predictably be performed simultaneously with orthognathic surgery using the advanced three-dimensional virtual planning and SurgiGuide or navigation guidance or under a combination of endoscopic assistance.

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Indications for and outcomes of open temporomandibular joint surgery

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Open surgery of the temporomandibular joint (TMJ) has been advised against in the vast majority of cases over the last 20 years to such an extent that many surgeons now avoid dealing with these patients and refer purely for pain management. There remains a cohort of patients who would benefit from open surgery if arthroscopy has failed.

The aim of this presentation is to discuss:

- what the algorithm for surgical management of the TMJ is currently considered to be
- how arthroscopy can guide in this management
- what intraarticular procedures are appropriate
- the outcomes of open surgery when arthroscopy has failed
- what to do when open surgery fails.

Surgery to the TMJ should not be undertaken lightly. An appropriate period of conservative management and therapeutic arthroscopy should usually have been unsuccessful. Surgery to the joint itself should address the pathology and should not aim to treat noises. The surgeon should have a full armamentarium of techniques and not just use a one procedure fits all approach. Using this methodology the author has a medium term success rate of 78% following failed arthroscopy (success rate of 86%). In those where this fails to improve symptoms the only alternative is alloplastic joint replacement, which is also a particularly successful procedure in the right hands with 90% reduction in pain, improvements in opening and a near normal diet.

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Management of inflammatory arthropathies of the temporomandibular joint

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Inflammatory arthropathies of the temporomandibular joint (TMJ) include rheumatoid arthritis, psoriatic arthritis and ankylosing spondylitis. Just because a patient has one of these underlying diagnoses does not mean they have that disease of the TMJ when they present with TMJ symptoms. Also occasionally the TMJ may be the primary presentation of the disease and therefore the surgeon needs to have a working understanding of the current diagnosis and management of the inflammatory arthropathies.

This lecture will aim to provide the surgeon with an understanding of the routine management of inflammatory arthropathy of the TMJ the pitfalls in management in relation to the generalised disease process a guide to the diagnosis of inflammatory arthropathy the expected outcomes of arthroscopy, open surgery and joint replacement.

Primary management of inflammatory arthropathy of the TMJ is the same as for initial management of TMD – conservative with rest, nonsteroidal anti-inflammatory drugs and a bite splint. In addition rheumatological medical management should be considered as should the generalised disease process. Risks of cervical instability, airway limitation and respiratory problems along with the drugs used to manage the condition (steroids and immunosuppressants) need to be considered.

Arthrocentesis and arthroscopy are preferable to steroid injection as they do not cause cartilage damage. Open surgery is of limited usefulness and in the end stages of either joint collapse or ankylosis, joint replacement provides an excellent management with better outcomes than hip or knee replacement.

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The place for navigation guided surgery in maxillofacial practice

K. Sneddon

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This talk will explore the use of navigation-guided surgery in maxillofacial surgery. It will outline the principles and application of navigation-guided surgery and highlight our experience of its use. We will look at the place for navigation-guided surgery and the implications of the ever-increasing use of three-dimensional modelling and computer-aided design/computer-aided manufacturing manufacture on the need for navigational guidance.

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The utility of computer-aided design/computer-aided manufacturing implants in maxillofacial reconstruction

K. Sneddon

Queen Victoria Hospital, East Grinstead, United Kingdom

The use availability of three-dimensional imaging and computer-aided design/computer-aided manufacturing design and manufacture has exploded in recent years. I will outline some of the applications for maxillofacial surgery both in terms of the planning and execution of orthognathic and oncological surgery. I will also explore those areas of reconstruction where the provision of custom made patient specific implants have bee utilised to provide an option or adjunct to conventional treatment regimens.

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Graftless sinus augmentation and growth factors, clinical results and biological perspective

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The compartment around implants under the sinus mucosal lining in the sinus floor can either be filled with various scaffolds or left to be filled with blood clot from surrounding bleeding after sinus lifting procedure. Two studies have been performed to evaluate bone formation the lifted maxillary sinus Schneiderian membrane (MSSM).

The first study involves graftless sinus lifting procedure with simultaneous placement of dental implants while the second study involves sinus lifting but grafted with buccal fat pad (BFP) and concentrated growth factors (CGFs). In the first study, eighteen consecutive patients underwent 30 graftless sinus lifting procedures using the lateral window approach, with 72 dental implants. Clinical and radiological follow-up was conducted throughout six-month healing period. Biopsies of 30 cases were taken and analysed during the second-stage surgery. Fifteen biopsies were taken from the newly formed bone near the basal floor and the others from the newly formed bone near the elevated membrane. New bone consolidation in the maxillary sinus was radiologically and histologically apparent after six months of sinus augmentation, providing an average 6.14 ± 1.34 mm of bone-gain. Based on histological analysis and histomorphometric data, the consolidated bone in the augmented sinus utilising two-place biopsy samples have demonstrated $56.7\% \pm 11.9\%$ to $59.9\% \pm 13.4\%$ vital bone tissue. Out of the 72 implants placed, only 4 failed, indicating a 95% overall implant survival rate.

In the second study, six consecutive patients underwent 10 sinus-lifting procedures, 24 dental implants. The compartment around the implants under the sinus mucosal lining in the sinus floor was filled with autologous adipose tissue from BFP and CGFs. Clinical and radiological follow up were conducted through healing period, all cases, samples were taken for biopsy during the second stage surgery. New bone consolidation in the maxillary sinus was radiologically and histologically observed within an average of 7.2 months after the sinus augmentation. According to the histomorphometric data, $62.8\% \pm 13.1\%$ vital bone formation was observed. Out of the 24 implants placed, only 1 failed, indicating a 95% overall implant survival rate.

These studies, based on their respective size of case series, strongly indicate that the autologous blood clot and the BFP/CGFs constitute osteogenic graft material to which osteoprogenitors can migrate, differentiate, and regenerate bone.

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How to make operative temporomandibular joint arthroscopy simple. The operative single cannula arthroscopy technique

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Galilee Medical Center, Israel

Since the introduction of arthroscopy the management of temporomandibular joint (TMJ) disorders has been significantly improved. The traditional advanced arthroscopy technique includes the creation of three ports in order to enable visualisation, operation and arthrocentesis.

An alternative to this technique is the operative single-cannula arthroscopy (OSCA) technique. It is an advanced TMJ arthroscopy technique which requires only a single cannula, through which a one-piece instrument containing a visualisation canal, irrigation canal and a working canal is inserted. Using OSCA, it is possible to perform 'one-track arthrocentesis', standard arthrocentesis under diagnostic visualisation and it is possible to introduce hand or mechanical instruments or Holmium:YAG laser to perform visually guided surgery.

We will present our experience, strategy, protocol and results in this new technique.

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Severe gunshot maxillofacial trauma, when and where to start?

S. Srouji

Galilee Medical Center, Israel

Disruption of soft and/or hard tissues stemming from ballistic injury can dauntingly distort facial features. Such facial deformity obliterates the normal anatomic planes and introduces a unique and challenging dilemma even for the most experienced specialists in facial trauma. The ongoing war in Syria have provided the oral and maxillofacial surgeon unique challenges in reconstructing and restoring function to the wounded people with complex facial injuries. Israel through the UN has been treating wounded Syrians since 2013. More than 1500 patients were brought to Israel; where some of the wounded arrived after initial treatment in Syria and over 1000 patients were referred to Galilee Medical Center (GMC).

Since March 2013, surgeons of the oral and maxillofacial department at the GMC have treated more than 70 Syrian injured

patients aged between 9 and 40 years. Most of the wounded had multiple traumas with direct damages from high velocity weapons and were classified as severe head and neck injuries. Their transfer from the battlefield to GMC took 6–24 h where some patients were admitted with a tracheotomy or coniotomy from the battlefield. Wounded patients had no military protection such helmet or bulletproof vest upon their arrival to GMC.

We will present here our experience, strategy and protocol, as a level I trauma centre, in treating severe gunshot injury to the maxillofacial area caused by high-velocity weapons.

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Geometric correction technique in the management of craniosynostosis deformities

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Craniosynostosis is defined as a premature fusion of the cranial vault suture or sutures, which often occurs during foetal development. Cranial sutures represent a form of articulation between plates of membranous bone by a thin layer of fibrous tissue. Various surgical techniques have been described in the literature for correction of craniofacial deformities caused by craniosynostosis.

The literature lacks a simple and reproducible technique that can be applied to the wide range of craniosynostosis deformities to achieve predictable and reproducible aesthetic results. The geometric correction technique entails calvarial reconstruction and re-contouring of supra orbital rim to conform to predetermined measurements that determine the landmark points of craniofacial skeleton.

The advantage of geometric correction method is that it is a universally reproducible principle that can be utilised across various synostotic deformities, enables the surgeon to achieve normal bifrontal width, geometric symmetry of the frontal prominences and frontal slope as well as avoidance of postoperative temporal hollowing. The geometric correction method provides good aesthetic outcome in craniosynostosis deformities.

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Bony reconstruction of the jaws using octacalcium phosphate and collagen composite

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Octacalcium phosphate (OCP) has been suggested to be a precursor of biological apatite crystal in bone and tooth. Osteoconductivity or biodegradation of synthetic OCP was found by our previous studies. We have demonstrated that synthetic OCP facilitates bone regeneration in vitro and in vivo. OCP and collagen composite (OCP/collagen) enhances bone regeneration more than OCP itself in vivo. OCP has higher solubility than beta tricalcium phosphate or hydroxyapatite. It has been shown that OCP/collagen facilitates bone regeneration in comparison with OCP itself in critical-sized bone defect of rat calvaria.

The osteoconductivity of OCP/collagen has been demonstrated also in critical-sized bone defect of dog. From these results, the following things became clear that: (1) OCP/collagen could cause effective bone regeneration without any factors, (2) bone regeneration of OCP/collagen was better than that of other bone substitute materials, (3) OCP/collagen was good absorbability and expected physiological bone remodeling, and (4) because of its good handling, it was easy to use. Recently, we used OCP/collagen in human bone defect as first clinical trial. After enucleation of the jaw cysts, teeth extraction, or sinus floor elevation, implantation of OCP/collagen in the bone defect was performed. Normal healing and bone formation by OCP/collagen at the bone defect were observed. Our studies demonstrated that OCP/collagen could use bone reconstruction of a variety of jaw defects by enhancing bone regeneration and could serve as an excellent bone substitute material for oral and maxillofacial surgeries.

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Autologous fat in temporomandibular joint surgery: why, when, how?

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Various autologous materials have been used in temporomandibular joint (TMJ) surgery. Autologous abdominal fat is a relatively inexpensive, safe and readily available procedure for the maxillofacial region. Autologous free fat grafts avoid fibrosis as effective haemostatic agent and space filler that prevents the accumulation of blood and serum. Otherwise scar or heterotopic bone formation occurs.

Autogenous fat graft placement has been used in such applications as TMJ ankylosis, disc anchor, following removal of failed alloplastic prosthesis and after total prosthetic TMJ reconstruction.

Although many studies have revealed that autologous fat graft has positive clinical effects on TMJ, it is not effective as an interpositional material following discectomy, because small fat grafts do not survive. The other problem is shrinkage of the fat. That's why single large autologous fat placement is an effective procedure especially after the removal of failed alloplastic TMJ prosthesis.

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A new technique of Le Fort I interpositional grafting for dental implants

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Le Fort I interpositional grafting is one of the powerful classical techniques in preprosthetic surgery according to Bell 1977 and other authors. However, the ongoing bone height resorption was a disadvantage of jaw augmentations in that era in combination with full dentures. After introduction of dental implants, this technique mostly passed out of mind and onlay bone grafts were given more attention. However these have even more a tendency to resorb also when combined with dental implants. Some authors have successfully used Le Fort I interposition of iliac bone block grants and have observed little resorption, however patients and the referring dentists are usually afraid of getting large amounts of iliac bone material harvested and prefer easier techniques like sinus lifting with bone substitute materials. Nevertheless, Le Fort I interpositional grafting offers many advantages over simple sinus lifting: There is bone augmentation over the entire tooth arch and the movement of the maxilla reverses the centripetal direction of maxillary jaw atrophy. The crest can easily be adjusted to form a nice smile line enabling easy prosthetic work with crown bridgework emerging out of the natural gingiva. Thus, the technique is ideal

also for lower grades of atrophy in younger patients (Cawood class IV) with the aim of avoiding a removable denture and enabling natural aesthetics.

The question was: how to make Le Fort I interpositional grafting more patient friendly by replacing a large proportion of iliac graft volume by bone substitute material? This is possible by not cutting through the sinus mucosa but creating a secluded space for the grafts. The operation starts with a bilateral sinus and nasal floor lift keeping the cranial mucosal lining intact. After that the maxilla is down fractured and fixed in an ideal prosthetic position with plates. Either with reduced 3 cm skin incision or with trephines small strips of iliac bone are used to create a frame over the down fractured maxilla and to bridge the Le Fort I gap with strips of autologous bone. All empty spaces (about 90% of the augmentation volume) are now stuffed with bone substitute (BioOss) which was mixed with autologous milled bone chips in a ratio 25/75%. After 4 months dental implants are placed and after an additional 3 months the prostheses are delivered.

89 patients have been treated this way and were included in a prospective observational study with up to 11 years observation time, sometimes also using an additional sandwich graft in the mandible. The ten-year dental implant survival was 97%, the implant success rate 88.3%. A mean bone gain of 9.14 mm, a mean initial resorption between augmentation and prosthodontic loading of 2.05 mm, and a mean of 1.22 mm long-term bone resorption after prosthodontic loading was observed over a mean observation time of 3.3 years. The method appears to be more reliable and more patient friendly compared to onlay grafting.

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Predicting outcome following oral potentially malignant disorder surgery: a 590 patient cohort study

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Background: Clinically recognisable potentially malignant disorders (PMD) precede lethally invasive oral squamous cell carcinoma (OSCC), but the natural history of PMD is poorly understood and the ability to predict clinical behaviour and malignant transformation (MT) risk remain elusive.
Objective: To determine reliable clinicopathological predictors of clinical outcome for PMD patients.
Method: A cohort of 590 patients presenting for CO_2 laser surgery (excision or ablation) in oral and maxillofacial surgery in North-East England between 1996 and 2014 was studied. Inclusion criteria required new, untreated PMD lesions confirmed on incision biopsy as dysplastic, with post-laser follow-up and defined clinical outcome data documented to a census date of 31 December 2014.
Findings: PMD patients were followed for a mean of 7.3 years postsurgery. Laser rendered 75% disease free, primarily younger patients with 'low-grade' dysplasia, whilst 9% exhibited persistent disease and were older with features of proliferative verrucous leukoplakia (PVL). In 12%, unexpected SCC was both identified and treated on laser excision, whilst a further 4.8% underwent MT during follow-up. Factors predictive of persistent PMD included clinical appearance ($P < 0.0001$), histopathology ($P = 0.013$) and laser ablation rather than excision ($P < 0.0001$) whilst MT was more likely in erythroleukoplakias ($P < 0.0001$) and floor of mouth/ventrolateral tongue sites ($P = 0.0003$).
Conclusions: CO_2 laser surgery provides definitive PMD diagnosis and management. Long-term patient cohort studies facilitate analysis and stratification of clinical outcome data. The usefulness of observable clinicopathological features in predicting PMD outcome require further validation in future prospective, multicentre randomised controlled trials.

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Medication induced osteonecrosis of the jaws — a local regional hospital experience

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Medication induced osteonecrosis of the jaws (MRONJ) is recognised as a significant complication in a subset of patients receiving bisphosphonates, anti-resorptive (denosumab) and antiangiogenic therapies. This complication can cause a significant adverse effect on the quality of life for affected patients. The clinical presentation of MRONJ in a group of patients in a local regional hospital is reviewed. The progress and results of conservative management of this patient group is reviewed.

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Evolution of planning mandibular reconstructions with free flaps: 15-year experience in three different institutions

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Background: Microvascular reconstruction of the mandible, introduced in the 1980s, has become routinary practice following post-oncologic resections and/or complex traumas. Since the pioneering description of mandibular reconstruction with a fibula flap by Hidalgo,[1] we have assisted to a steep and progressive evolution and refinement of the techniques to obtain increasingly more satisfactory and reliable results.[1,2] One the most dramatic improvement observed over the past two decades has been the evolution of the preoperative planning, aimed to facilitate the shaping of bone flaps for obtaining more predictable and reproducible outcomes.[3,4] Different methods to define the graft osteotomies required to match dimension and shape of the mandibular defect have been proposed: from empiric shaping of the flap at side table during surgery, to linear measurement on preoperative visual treatment objectives (VTO), to the recently introduced digital planning by computer-aided design/computer-aided manufacturing procedures based on patient's imaging (computed tomography [CT]/magnetic resonance)[5]; the latter procedure even allows for the creation of dedicated tools (cutting guides, pre-bended/custom made plates, acrylic splints) to translate the virtual modelling to the operating table.
Methods: Presenting the individual experience on microvascular reconstruction of the mandible with fibula and iliac crest flaps over the past 15 years, focusing the attention on the evolution of preoperative planning. The reconstructions were done after segmental mandibulectomies for both benign and malignant tumours and have been performed in three different institutions: University of Rome La Sapienza, Hong Kong University (HKU), and New York University (NYU). Three different strategies of planning, ranging from the manual VTO at the University of Rome, to cast modelling at HKU, to digital planning used at NYU were compared with regard to outcomes, rough costs and

operative-time length. Three parameters were evaluated: deviation of the postoperative bone segment position compared to the preoperative planning expressed in mm (Δ); overall rough costs of preoperative planning, and average operative time length (OR). The discrepancy between the planned tridimensional graft position and the actual bone location was measured by superimposing the postoperative CT scan with the virtual plan when available, otherwise was judged on the basis of recognisable landmarks (such as the condylar position or the mandibular angle) on postoperative images. The costs of non-digital planning were estimated by adding the costs of materials and procedures (three-dimensional printing, resin, and alginate) to the honorary of competency involved in the planning.

Results: The accuracy of the postoperative result in relation to the planning method showed a $\Delta = 7.2$ mm (SD 1.6 mm) for manual drawing; $\Delta = 2$ mm (0.6) for cast modelling, and $\Delta = 1.5$ mm for digital planning. The overall rough costs ranged $5000–7000 for digital modelling, depending on the use of pre-bended or customised milled reconstruction plate, $1500–2000 for cast modelling and were inconspicuous for the manual drawing planning method. The average OR was 447 min, 540 min, and 387 min for manual drawing, model cast, and digital planning respectively.

Conclusion: The review of 15 years of mandibular reconstruction using fibula and iliac crest free flaps showed the evolution of planning-techniques, highlighting the differences between different periods and Institutions. Despite the intrinsic difficulty in drawing a solid conclusion by comparing different times and work environments, what emerged is that it is possible to achieve predictable and satisfactory results with different strategies of planning. The modern use of computer-aided planning, by software manipulation of the patient imaging, grants extreme accuracy with reduced planning-time, but it is most expensive. The other planning techniques described were less accurate and required longer planning time, but were more cost effective and did not require high technology tools. Regarding the operative time, despite the theoretical advantage given by the use of cutting guides and custom-made hardware, their use did not correlate with a reduction of time of surgery; the operative time seemed rather be influenced by the experience of operators and the harmonic and well-coordinated team-work between resection and reconstructive teams.

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Hybrid maxillomandibular fixation: initial cost analysis

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Background: The application of maxillomandibular fixation (MMF) is central to the management of mandibular fractures. MMF can either be achieved utilising a teeth borne system or a bone borne system. Hybrid MMF is a newer bone borne system that anchors an arch bar, utilising screws, into the alveolar process.
Objectives: To present initial data on operating room time versus operating room costs in regards to the use of hybrid MMF.
Methods: A retrospective case study was conducted over a three-year period at Jacobi Medical Center. Patients with mandible fractures that were treated with open reduction internal fixation (ORIF), were divided into two cohorts, depending on whether they had Erich arch bars (EAB) or hybrid MMF (HYB) placed. There were 48 patients in the EAB cohort and 52 in the HYB. Patients were excluded if they did not have the same appliance on each arch.
Findings: When comparing the operating room time in the treatment of mandible fractures, the average surgical time was 211 min in the EAB cohort and 132 min in the HYB cohort, a decrease in 79 min. At Jacobi Medical Center, each 10-min unit of time in the operating room, cost $391, so a decrease in 79 min of operating room time resulted in a decrease in cost of $3128. The cost of each hybrid arch bar at Jacobi Medical Center is $220, with 6 screws placed in each arch at a cost of $100/screw. The total cost of the placement of two hybrid arch bars and 12 screws was $1640. The sum cost saving was $1488.
Conclusions: Utilising a hybrid MMF system in the management of mandibular fractures undergoing ORIF decreased the operating room time by 37.4%. This decrease in operating room time, even when factoring in the cost of the hardware, decreased the overall cost of the surgery.

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Skeletal surgery for craniofacial microsomia

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Craniofacial microsomia (CFM) is a facial clefting condition affecting both the soft and hard tissues of the face and it is the second most frequently encountered facial clefting condition (1 in 50,000 live births). The condition is very variable and is usually unilateral but bilateral expression can also be seen. The classification of CFM is usually based on the degree of mandibular malformation which is not related to the degree of ear malformation or soft tissue hypoplasia.

The algorithm of construction proposed by Converse remains unchanged today other than the potential for early mandibular distraction for correction of airway issues. Although some advocate distraction osteogenesis as a substitute for early skeletal surgery, there is no evidence to suggest the superiority of this approach and in light of the lack of control, scarring, etc. there are potentially disadvantages to this approach.

Once the patient has operable bone stock, conventional orthognathic surgery predictably can be accomplished with little morbidity and less dependency on patient and parent compliance compared to distraction techniques. Maxillary and mandibular osteotomies and bone grafting for augmentation as well as

interpositional purposes are used. Combined orthodontic and surgical repair produces optimum results.

Soft tissue augmentation with injectable fat is very useful for complimenting the result.

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Skeletal surgery for craniosynostosis

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Craniosynostosis (premature fusion of the cranial sutures) can be present as an isolated condition or it can occur as a component of a syndrome. The syndromically involved children with cranial base malformations have the most facial disfigurement and it is this group that benefits from multiple operations performed on the face and head prior to complete maturation.

For many children with nonsyndromic craniosynostosis a single operation to release the suture and construct a normal forehead and skull is all that is necessary. For children with syndromic involvement especially the craniofacial dysostosis conditions multiple facial operations are typical in addition to the cranial suture release procedure because of the abnormal facial configuration and growth disturbance.

This session will focus on the craniofacial dysostosis patients requiring later facial surgery after the initial cranial release procedures. Hypertelorism correction or frontofacial advancement is usually delayed until 7–10 years and correction is based on orbital and forehead position, not occlusion. Nearing maturation and in conjunction with orthodontic care midface advancement at Le Fort III and/or I level can help improve facial balance and projection as well as improve occlusion.

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The ulnar forearm free flap

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Background: The radial forearm free flap (RFFF) is frequently used for the reconstruction of soft-tissue defects in the head and neck area. The flap has thin and pliable skin, the vessels are of adequate length and diameter, and the flap is easy to harvest with high success rates. However, the ulnar forearm free flap (UFFF) has several advantages, which make it an interesting alternative to the RFFF.
Methods: Several retrospective studies and one cadaver study were conducted.
Findings: Success rates of the UFFF exceeded 98%. Pressure perception, cold perception and strength of the donor-hand were better following the harvest of the UFFF compared to the RFFF. Acceptance of the donor scars was easier for the patients following the harvest of the UFFF compared to the RFFF because of excellent take of the skin graft on the ulnar side and the unnoticeable position on the forearm. The ulnar aspect of the forearm is often less hairy than the radial aspect. This is important as hair growth in the oral cavity or oropharynx may be inconvenient. In the cadaver study, the ulnar artery showed more perforators than the radial artery in the area close to the wrist. After injection of dye, the ulnar artery stained 77% of the skin surface area of the forearm, showing the UFFF to be more suitable than the RFFF for the restoration of large defects.
Conclusion: The UFFF is a suitable alternative to the RFFF for the reconstruction of soft-tissue defects in the head and neck area.

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Complications in maxillomandibular advances for the management of obstructive sleep apnoea

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While the surgical techniques for the management of obstructive sleep apnoea and dentoskeletal deformities may be similar, these two populations often do not share the same patient characteristics. Obstructive sleep apnoea patients tend to be older with more dental compromises and medical comorbidities. As a result, higher rates of both intraoperative and postoperative complications occur when compared to the dentoskeletal deformity patient.

The purpose of this lecture is to analyse the current body of literature pertaining to both the common and unusual complications inherent to maxillomandibular advances in the obstructive sleep apnoea patient and illustrate these complications with clinical cases.

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Stock versus custom temporomandibular joint prosthesis

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The development of acquired temporomandibular joint (TMJ) defects is attributable to a multitude of different conditions including TMJ ankylosis, ablation of benign or malignant pathology, loss of the condyle due to trauma, degenerative or inflammatory disorders, infection, idiopathic resorption, and previously failed reconstructive efforts. The reconstruction of these defects represents a unique challenge as the TMJ plays a vital role in numerous jaw functions such as mastication, deglutition, and phonation.

Historically alloplastic TMJ reconstruction has been surrounded by controversy. For the past 25 years, however, the use of these devices has become safer with more predictable outcomes. Currently, the market offers two distinct types of devices: stock and custom-made prostheses. Although these prostheses appear similar, subtle differences exist in their clinical indications, limitations, and their surgical techniques.

The aim of this lecture is to examine these differences and highlight them with clinical examples.

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Treatment of the neck in oral cavity cancer — let the evidence guide

B. Ward

University of Michigan Hospital, United States

High levels of evidence for surgical treatments are often lacking leaving surgeons to base treatment decisions on the best available evidence. Recommendations to treat the neck and extent of treatment remain important clinical questions in oral cavity cancer.

This presentation will review emerging and established evidence for elective and therapeutic neck dissection and discuss clinical decision-making for individual patients based on the data available. The topics of pre-test probability, sensitivity and specificity will be covered in the context of diagnostic and surgical adjuncts for recommending neck dissection considering tumour specific characteristics including tumour location, size, and patterns of invasion as well as patient factors including age and medical comorbidities. The presentation will support the concept that personalised surgical decisions amalgamate all available information for recommendations that are both evidence based and patient specific.

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Treatment recommendations for the neck in the clinically node positive neck oral cavity cancer patient

B. Ward

University of Michigan Hospital, United States

Optimal treatment of the clinically node positive neck (cN+) in oral cavity cancer continues to be debated. Comprehensive versus selective neck dissection in a variety of forms have been advocated. This presentation will discuss current available evidence available to guide clinicians in this important decision.

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The frontiers in modern oral and maxillofacial surgery: hopes and limitations with regards to tissue engineering

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Cancer surgery in the head and neck region often leads to significant and disfiguring defects. Subsequent tissue repair remains a challenge for the surgeon. Cancer survivors may suffer from aesthetic and functional impairment that result in a reduced quality of life. However, latest stem cell and tissue engineering techniques may offer the potential to grow body parts anew. There is hope that this may even allow to grow entire organ replacements with the patient's own cells in the future, thus making the complicated search for organ donors redundant.

This talk will outline pioneering strategies for complex tissue regeneration and repair in oral and maxillofacial surgery. Current techniques and the goals for future use of adult stem cells and computer assisted 'perfect fit' organ design will be outlined. Furthermore the hurdles to translate novel techniques from bench to bedside and the limitations for cell applications in clinical practice will be explained.

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Meeting the challenges of multidisciplinary head and neck cancer care

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Head and neck cancer presents a challenge for management throughout the world, with more than 550,000 cases and 300,000 deaths per annum, not including thyroid cancer. There are a broad range of pathological types including squamous cell carcinoma, salivary gland carcinoma and a variety of sarcomas. Many clinical disciplines with differing education and training are managing these patients, including surgeons and physicians.

It is widely accepted including within Australia, that head and neck cancer patients are best managed in multidisciplinary (MD) clinics by appropriately trained and credentialed practitioners.

The MD Team (MDT) includes surgeons, oral and maxillofacial, otolaryngology, head and neck, plastic and reconstructive, and general as regular participants, neuro and thoracic surgeons participate in selected cases. Physicians, radiation and medical oncologists, radiologists, pathologists and nuclear medicine are required. The full range of specialist dentists, allied health practitioners and nurses are essential team members.

The MD Meeting, prior to commencing treatment, should review individual patients with appropriate clinical information. A consensus approach to management is generally achieved, acknowledging the responsible clinician for each patient.

The MDT is also responsible for clinical teaching and training at both undergraduate and postgraduate levels.

Research in all aspects of head and neck cancer, clinical, translational and laboratory is encouraged and supported by the MDT

There are many challenges to MD care in head and neck cancer, including inter-professional rivalry, a commitment to quality care, research and training by team members. Institutional commitment, resources and funding must be achieved for success and improved patient outcome.

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Reconstructive concepts for tumours invading the facial skin

K.D. Wolff

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If tumours of the head and neck involve the facial skin, strategies of reconstruction must follow the aim of achieving the best possible aesthetic result. Other than in the oral cavity where the use of free tissue transfer has become a standard procedure, method of the first choice is the use of local flaps under consideration of the aesthetic units and relaxed skin tension lines of the face. Whereas this principle can be applied in many cases of small or medium sized skin cancers, advanced tumours with deep infiltration of the surrounding tissues must often be treated using free tissue transfer. In challenging cases, combinations with additional local flaps or epitheses are necessary. In the lecture, a schematic procedure of reconstructive steps and a choice of the most useful free flaps are presented. Moreover, basic considerations about the indication for surgery and its limitations are discussed.

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Technical developments in maxillofacial reconstruction

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Since more than three decades, microvascular tissue transfer is a proven procedure, but challenges still remain. An increasing number of patients present with comorbidities, in old age or with an irradiated and vessel depleted neck. Advances of intra- and perioperative patient care as well as methods like vascular loops, reverse

flow anastomoses, and carrier flaps were developed to expand the scope of reconstructive possibilities.

During the past years, technical innovations like individual cutting devices for bony reconstructions have been developed, and methods of teaching flap raising using pulsatile perfused cadavers have been established to perfectly mimic the clinical situation. Monitoring systems can help to detect perfusion problems of the flap before clinical signs of congestion appear. Moreover, the new field of perforator flaps further improves the quality of reconstruction and minimises donor site morbidities. Finally, an extracorporeal perfusion device has been introduced, possibly making free flap transplantation feasible without microvascular anastomoses in patients with missing, severely destroyed or heavily arteriosclerotic neck vessels.

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Orthognathic surgery relapse: can you blame it on the temporomandibular joints?

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Orthognathic surgery outcomes are not always stable and can result in relapse. Can surgical relapse be blamed on the temporomandibular joints (TMJs)? Postsurgical relapse resulting in jaw and occlusal malalignment are commonly associated with TMJ pathology accompanied by other associated conditions such as pain, headaches, earaches, tinnitus, vertigo, sleep apnoea, etc. Most TMJ conditions and pathologies can be placed into specific diagnostic categories that can aid in determining the nature and progression of the TMJ pathology and identify the necessary treatment to achieve highly predictable results. Diagnostic records, including MRI, provide information for diagnosis and treatment planning. Based on the diagnosis, specific treatment protocols may include TMJ surgery, orthognathic surgery and other adjunctive procedures to obtain the best results.

The most common TMJ conditions causing occlusal instability, dysfunction, and pain include: displaced discs, osteoarthritis, adolescent internal condylar resorption, reactive arthritis, congenital deformities, condylar hyperplasia, iatrogenic injuries, trauma, ankylosis, connective tissue/autoimmune diseases, and end-stage pathology.

This presentation will discuss these common TMJ conditions that cause skeletal and occlusal instability and pain; the specific surgical treatment protocols to address the TMJ pathology and correct other associated jaw problems (i.e. malocclusion, jaw malalignment, jaw dysfunction, sleep apnoea, pain, etc.); and clinical studies to validate these protocols.

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Long-term outcome of robin sequence

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The airway management of children with Robin sequence is controversial. We conducted a retrospective cohort study of 59 children (<1 year old) with Robin sequence managed between 2000 and 2010. Robin sequence was defined as the presence of mandibular hypoplasia and clinical signs of airway obstruction. Data were collected on demographic characteristics, the presence of a syndrome, the perinatal period, and the management of airway and nutritional problems.

Eighteen children (31%) needed respiratory support because of severe respiratory distress, and a sleep study found obstructive apnoea's in another eight children who had been managed by prone positioning and/or monitoring. In the isolated group significantly fewer children needed respiratory support compared to the non-isolated group. After the age of one year, 10% of the Robin sequence cohort was still in need of treatment for obstructive symptoms. Almost half (47%) needed temporary nutritional support.

The prevalence of respiratory distress in children with Robin sequence is high. In most children, treatment with prone positioning was sufficient to relieve the airway obstruction. Successful treatment with prone positioning was significantly more often seen in children with an isolated Robin sequence. About one-third of all Robin sequence children needed respiratory support in the neonatal and/or infant period. However, in childhood, only 10% of the total Robin sequence cohort was still dependent on respiratory support. In this presentation the controversies with regard to airway management will be discussed.

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Use of three-dimensional planning and patient specific guides and implants: the Singapore experience

R. Wong

National University of Singapore, Singapore

Use of three-dimensional planning and additive manufacturing to manufacture patient specific guides is not new to oral and maxillofacial surgery. Most of the reports in the literature pertains to its use in orthognathic surgery and reconstructive surgery where accuracy is much more important. Other advantages include timesaving in the operating room, creation of guides to avoid vital anatomic structures and fashioning of patient specific implants/osteosynthesis plates. Implementation of changes in technology is daunting to the clinician in terms of knowledge and cost. Some of these challenges are not only institution specific but also country specific. This talk will cover the usage and implementation of these newer technologies in the context of a small country and the challenges faced.

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Effectively planning an orthognathic surgery using computer-aided surgical simulation

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The success of orthognathic surgery depends not only on the surgical techniques, but also on an accurate surgical plan. The adoption of computer-aided surgical simulation (CASS) has created a paradigm shift in surgical planning. However, planning an orthognathic operation using CASS differs fundamentally from planning using traditional methods. With this in mind, the Surgical Planning Laboratory of Houston Methodist Research Institute has developed a CASS protocol designed specifically for orthognathic surgery.

The purpose of this presentation is to present an algorithm using virtual tools for effectively planning a double-jaw orthognathic

surgery. This presentation will serve as an operation manual for surgeons wanting to incorporate CASS into their clinical practice.

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Temporomandibular joint disc reposition and condylar regeneration with orthodontic treatment

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Objectives: To evaluate the influence of functional orthodontic treatment on the temporomandibular joints (TMJ) condylar regeneration after surgical disc reposition by quantitative assessment of the condylar morphological features on magnetic resonance imaging (MRI) and comparison between groups with/without anterior repositioning appliance (ARA).
Methods: This study is a controlled longitudinal study. Consecutive juvenile anterior disc displacement (JADD) cases undergone arthroscopic disc reposition with no history of TMJ infection, injuries to the jaws, or congenital, developmental and systematic disorders that may affect the craniofacial growth were collected. Patients' age at both first visit (preoperation) and revisit (6–12 month postoperation) was recorded. Pictures of MRI were selected to measure the shape of the condyle (condylar height and condylar width). Differences between pre- and postoperation were evaluated, and comparison in the increase of condylar volume between ARA group and follow-up group was made. Meanwhile, effect of different kinds of ARA, including anterior repositioning splint (ARS), twin-block appliance (TB) and Herbst appliance, on condylar regeneration was compared.
Results: Condylar regeneration was found in most cases after disc reposition, whereas in the ARA group nearly all cases represented new bone growing and remodelling condylar head to various extents. Significant more active new bone growing was found in the ARA group compared to the follow-up group according to metric evaluation of condylar volume: more increases in condylar height and anteroposterior width were noticed. Moreover, cases that underwent Herbst appliance treatment demonstrate more condylar regeneration, while not much difference was found between ARS group and TB group.
Conclusions: The results showed that after repositioning therapy, JADD patients gained a chance to regenerate. Proper guidance to such compensatory potentials with functional appliance could enhance such favourable change. Furthermore, this phenomenon could be utilised to improve patients' occlusion and profile.

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Impact of digital technology on clinical practices — perspectives form oral and maxillofacial surgery

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Digital medical technologies or computer aided medical procedures refer to imaging, three-dimensional (3D) reconstruction, virtual design, 3D printing, navigation guided surgery and robotic assisted surgery techniques. These techniques are integrated into conventional surgical procedures to create new clinical protocols that are known as 'digital surgical techniques'. Conventional health care is characterised by subjective experiences, while digital medical technologies bring quantifiable information, transferable data, repeatable methods and predictable outcomes into clinical practices. Digital surgical techniques facilitate surgical care by improving outcomes and reducing risks through integration of modern technologies with clinical experiences.

Digital techniques are becoming increasingly popular in trauma surgery, orthopaedics, neurosurgery, plastic and reconstructive surgery, imaging and anatomic sciences. Robotic assisted surgery is also evolving and being applied in general surgery, cardiovascular surgery and orthopaedic surgery. Rapid development of digital medical technologies is changing healthcare and clinical practices. It is therefore important for all clinicians to purposefully adapt to these technologies and improve their clinical outcomes.

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Free Papers – Oral Presentations

Cleft and Craniofacial Anomalies

Age contributions to airway dimension changes in females

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Background: It is essential that as three-dimensional imaging modalities advance we establish normative values for reference and diagnostic purposes.
Objectives: To define the normal measures of the adult male and adult female airway in both two-dimensions (2D) and three-dimensions (3D) utilising CBC and to define the differences in the two modalities. Also to evaluate gender and age as a contributor in airway dimension changes leading to a difference in normative value.
Methods: 772 cone-beam computed tomography (CBCT) scans (539 females and 233 males) were collected from a private oral and maxillofacial radiology practice in Sacramento, CA. All CBCT scans were loaded in DICOM format into Dolphin for 2D and 3D airway analysis. Custom cephalometric analysis, including skeletal and airway measures, was completed on all scans.
Findings: Measures of the airway in 2D were significantly different between males and females in each age range. In addition, females demonstrated significant narrowing of the airway with increasing age. There were significant differences between males and females on most 3D measures. With both genders the location of the minimum cross-sectional area moved superiorly with increasing age. In addition, total airway volume decreased with increasing age in females.
Conclusion: It has been proven that there are gender differences in regard to airway dimensions, but this is the largest cohort demonstrating statistically significant airway dimension differences with respect to age in females. The trend seen in females is a decrease in volume with increasing age.

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Advantage of combining technique of V–Y pushback and Z-plasty in palatoplasty — a case report

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Background: Many methods of cleft palate repair have been described. Two effective methods are commonly used for repair of soft palate clefts: the V–Y pushback and the double opposing Z-plasty; each has advantages and disadvantages.
Objectives: The aim of this study was to combine between the V-Y pushback technique and the Z-plasty technique regarding effectiveness in palatal reconstruction and improvement of velopharyngeal closure in cases of cleft soft palate.
Methods: In this patient, in order to push the soft palate back farther, a single and full-thickness Z-plasty, designed on the soft palate across the defect, was applied to V–Y pushback procedure. The two flaps were then transposed and closed by interrupted suturing of three layers of the palate in proper order, from nasal mucosa, levator muscle to oral mucosa.
Findings: The functional goals for repair of a cleft palate are to facilitate normal speech and hearing without significantly affecting the facial growth of the child. However, two important points should be considered for assessing the success of palatoplasty — the quality of speech and the incidence of oronasal fistula.
Conclusion: With combine these two technique, we can reaches the goal of palatoplasty significantly.

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The application of four-dimensional imaging for the diagnosis and management of orofacial deformities

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Background: The capturing of three-dimensional (3D) facial morphology in a sequence (four-dimensional [4D] imaging) becomes available. The method is based on passive

stereophotogrammetry — it records 60 3D images of the face/second. Facial expression that takes 3 seconds, generates 180 3D images. Landmarks are automatically tracked throughout the sequence of the images.
Objectives: Evaluate the reproducibility of the dynamics of facial expressions and the clinical applications of 4D imaging for the analysis of facial muscle movements in asymmetric mandibular deformities, facial paralysis and following cleft repair.
Methods: The method was validated by capturing facial expressions of 32 non-patient volunteers, 20 cases of unilateral facial paralysis, 20 unilateral cleft lip and palate (UCLP) patients and 23 orthognathic cases. Four facial expressions were captured. The reproducibility of facial movements was evaluated, the asymmetry of facial expressions was measured in each group of cases and the improvements of the symmetry of facial muscle movements following orthognathic surgery were assessed.
Results: The accuracy of the automatic tracking of facial landmarks was within 0.55 mm maximum smile was the most reproducible expression in non-patient volunteers and the least reproducible in facial paralysis. The orthognathic correction of facial asymmetry improved the balance of facial muscle movements. The method identified residual distortion of facial expressions following the surgical repair of UCLP.
Conclusions: 4D facial imaging is a reliable method for recording facial expressions; the method facilitates the analysis of facial muscle movements and a useful tool for outcome measures of the surgical correction of orofacial deformities.

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The clinical application of bone morphogenetic protein for reconstruction of alveolar cleft

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Background: Autogenous bone graft is the gold standard for the reconstruction of alveolar cleft; however, harvesting the graft is associated with well-documented morbidities.[1] Bone morphogenetic proteins (BMPs) proved successful in inducing bone formation in preclinical model and in limited clinical investigations.
Objectives: Assess the clinical feasibility and the success rate of reconstructing the alveolar defect using recombinant human BMP-7 (rhBMP-7).
Methods: This phase II clinical trial was carried out on 11 consecutive cases, 3.5 mg of rhBMP-7 (Osigraft OP1) on a type I collagen carrier was applied for the reconstruction of alveolar cleft in children of an average age of 10 years. In addition to the clinical evaluation, radiographic assessment was carried out to evaluate bone formation and evaluate the eruption of the impacted teeth. Patients were followed up for an average of seven years.
Findings: Postoperative complications were minimal, none of the cases developed infection that required further intervention. The stay in the hospital was limited to one day. Normal trabecular bony pattern was detected, 90% of the cases scored grade I on the Kindelan four-point scale. Teeth erupted through the newly formed bone. No bone formation was noted outside the alveolar defect.
Conclusion: rhBMP-7 was radiographically and clinically successful in regenerating bone at the alveolar cleft site. This shortened the operating time, facilitated recovery and eliminated the morbidities associated with autogenous bone graft.

Reference

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Structural and actual distraction discrepancy following monobloc distraction in syndromic craniosynostosis

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Background: Monobloc distraction osteogenesis (DO) can be indicated as an alternative surgery in severe syndromic craniosynostosis as it allows superior segmental advancement as compared to conventional technique.
Objectives: The aim of our study is to assess the discrepancy between the total distraction amount achieved from the distractor device and the actual segmental movements amongst five paediatric patients (aged eight months to six years) with Crouzon syndrome.
Methods: All patients were identified to have functional issues namely increased intracranial pressure, inability for eyelid closure due to severe exorbitism and obstructive sleep apnoea secondary to narrow nasopharyngeal airway thus indicating surgical procedure of monobloc DO. Pre- and postsurgical computed tomography (CT) scan data and three-dimensional (3D) biomodel for each patient were obtained. Pre- and postsurgical clinical and functional outcomes were also documented. Measurement of anatomical and reference points from five sets of pre- and postsurgical 3D biomodel and CT images were performed and analysed statistically.
Findings: Based on Wilcoxon Signed Rank Test, significant discrepancies (P 0.05). Favourable results in all clinical and functional outcomes were demonstrated in four out of five patients.
Conclusion: Monobloc DO provides reliable alternative in addressing important functional issues presented in severe syndromic craniosynostosis patients but our study demonstrated that discrepancy of actual structural and device advancement should be anticipated thus needing overcorrection for consideration.

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Individualised surgical management of unilateral cleft lip repair

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Many different techniques were employed for unilateral cleft lip repair since the 1800s; even some classical techniques were developed. However, most techniques could not always get good outcomes in all types of cleft lips because of the application limit. In order to get stable surgical outcomes of unilateral cleft lip, we developed three individualised surgical techniques for microform

cleft lip, incomplete cleft lip and complete cleft lip according to the cleft characters of different unilateral cleft lip separately. The new techniques were developed by summarising technical advantage of different treatments for cleft lip. By the new techniques, it will be easy to ensure sufficient downward rotation of the high points of the Cupid's bow on the cleft edges, especially about the nasal reconstruction.

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Unwanted unaesthetic results of the fronto-orbital advancement for nonsyndromic craniosynostosis and how we avoid them

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Background: Fronto-orbital advancement is the standard procedure for expanding the anterior cranial fossa and contouring the upper face in infants with coronal or metopic synostosis. Many unwanted unaesthetic results can occur and the correction of them is problematic since it subjects the child to a second procedure.
Objectives: The purpose of this communication is to describe the most common unaesthetic results regarding the fronto-orbital advancement and to present how we try to avoid them in our department.
Methods: We focus our treatment protocol in five "key-points" such as hair incision, frontonasal angle, the management of temporal depression, lateral canthopexy and planning of the osteotomies not taking into account the cranial sutures.
Conclusions: The fronto-orbital advancement and cranial reshape is a well-known technique to approach several types of craniosynostosis. One of the primary objectives is to achieve a good cosmetic result and for that we think that is essential to address this little details or "key-points" so we can avoid second procedures.

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Wnt7a augments levator veli palatini muscle: a promising biotherapy for cleft palate patients

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Background: Levator veli palatini muscle deficiency exists in cleft palate patients. Procedures of platoplasty are constantly improved, but a portion of patients remain velopharyngeal insufficiency. Augmentation of levator veli palatini muscle via biotherapy can hopefully enhance velopharyngeal function. Wnt7a has been proved to boost somite-derived muscle regeneration, while its effect on branchiomeric muscle requires further verification.
Objectives: This study was designed to investigate whether Wnt7a can promote levator veli palatini muscle regeneration.
Methods: Morphological and molecular comparison was made between tibia anterior muscle (somite-derived muscle) and levator veli palatine muscle (branchiomeric muscle) of Sprague-Dawley rats on basal conditions and after Wnt7a administration respectively, using immunohistochemistry and molecular biotechnology.
Findings: Comparing to tibia anterior muscle, levator veli palatine muscle has a higher content of satellite cells, a lower content of proliferative cells and distinct composition of slow/fast fiber type. After Wnt7a administration, levator veli palatini muscle exhibits an increase in minimal Feret's diameter, satellite cell proportion and a switch from fast to slow fibers, which is consistent with tibia anterior muscle. Wnt7a boosts expression of Frizzled7, Vangl2, and pAkt, the key components of planar cell polarity and Akt/mTOR pathway, in tibia anterior muscle yet not that of levator veli palatini muscle.
Conclusion: Wnt7a is able to augment levator veli palatini muscle. It is promising to be clinically applicable in craniofacial muscle regeneration.

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The Arrhinias: proboscis lateralis. Literature review and surgical update

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Background: Paul Tessier classified the Arrhinias in three types of malformations: total Arrhinias, hemi-Arrhinias, often called hemi-nasal ageneses, and proboscis lateralis (PL).[1] All arrhinias involve some other anomalies: agenesis of the nasal bone, telecanthus (often in contrast to hypotelorbitism), obstruction of the naso-lacrimal passage, ectasia of the lacrimal sac, sometimes with erosion of the inferomedial angle of the orbit. Also, it is possible to have hypopneumatisation of the maxillary sinus, a flattening of the frontonasal process, obliteration of the cribriform plate, dysplasia in the root of the eyebrows, frequent micropthalmia, colobomas of the iris, and nystagmus.[1,2]
Methods: The authors present a rare case of PL. The patient was one-year-old with right PL, associated with a slight degree of telecanthus, right nasal fossa disembriogenesis, no air passage, and with other kidney anomalies. In the past year the patient had undergone two surgeries. In the first, the proboscis was ventrally deepithelialised and repositioned near the normal left nostril. In the second, a conchal cartilage was harvested, modelled and positioned inside the caudal part of the reshaped proboscis and on the nasal tip. 12 months after the last operation, the nose has an acceptable shape. More surgeries are scheduled in the future for creating an air passage in the missing right nasal fossa.
Results and Conclusions: The treatment of arrhinias is still a debated issue. In this lecture we present a rare case of PL and proposes a Tessiers' modified strategy for treatment.

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Treatment considerations for hypertelorism correction in unique craniofacial clefts

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Background: Orbital hypertelorism is defined as an increased distance between both the medial and lateral aspects of the orbits and is a condition associated with a number of congenital midline anomalies, including surgically challenging midline cleft anomalies. The extent and location of facial widening dictates which procedure is performed: box osteotomies versus facial bipartition.
Objectives: The objective of this presentation is to elucidate the key clinical findings and optimal surgical protocol for children with hypertelorism secondary to unique craniofacial clefts.
Methods: Two brothers with similar albeit unique craniofacial cleft deformities and hypertelorism were surgically treated by the aforementioned authors at the Ark-La-Tex Craniofacial and Cleft Center. Presurgical treatment planning involved analysis of contrast computed tomography with three-dimensional (3D) reconstruction with 1 mm cuts, construction of 3D stereolithographic models, ophthalmology exam, genetics evaluation and orthodontic assessment. Factors including degree of hypertelorism, presence of dystopia, width and projection of nasal dorsum, presence of maxillary constriction, and finding of soft tissue excess or blemishes were used to direct surgical treatment planning.
Findings: Although myriad points of analysis were used, of the preoperative patient factors discussed, presence of maxillary constriction and width and projection of the nasal dorsum were the most important aspects in the decision making process to perform box osteotomies versus facial bipartition.
Conclusion: The craniofacial surgeon must have a thorough understanding of the indications and treatment modalities available for treatment of hypertelorism secondary to unique facial clefting conditions. Central to this understanding is a thorough clinical and radiographic work-up.

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Evaluation of the bony nasal septum development of cleft lip and palate patients using three-dimensional computed tomography measurement

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Objective: To evaluate the development of bony nasal septum of cleft lip and palate patients.
Methods: This retrospective study included 157 patients aged over 14 years with cleft lip and palate (CLP) and 54 normal people. The three-dimensional computed tomography reconstruction images of the posterior and inferior part of the bony nasal septum were measured. We evaluated the development of the bony nasal septum.
Results: There were 39 patients with cleft lip only (CLO), 38 patients with cleft palate only (CPO), 80 patients with CLP. The L1, L2, and S of CLO and/or CPO patients were smaller than the normal control group. The L1 and S of cleft palate group and CLP group were smaller than cleft lip group, there was no significant difference for L2 between the three groups. Compared with the postoperative cleft palate group, the S of preoperative group was significantly bigger, the L2 was bigger without significant difference; but compared with the normal group, L1 and S of preoperative group was significantly smaller, L2 was not significantly different.
Conclusions: The patients with cleft palate only were most affected. There was not only decrease of the fusion of maxilla and vomer, but also growth inhibition of the sutura between vomer and nasal septum cartilages, vertical plate of ethmoid bone in patients with cleft lip and palate. The adverse effects of the cleft palate operation to bony nasal septal development mainly lie in anterior inferior direction.

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Early secondary alveolar bone grafting with bone morphogenetic protein

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Background: The gold standard for alveolar bone grafting for children with clefts involves autogenous bone harvest from the anterior iliac crest between the ages of six and eleven. Despite the popularity and high success rate one major disadvantage of this procedure is the additional surgical site and added morbidity from bone graft harvest. The authors believe high quality, early secondary bone grafting can be achieved in children with alveolar cleft defects using bone morphogenetic protein (BMP), obviating the need for remote site harvest, and accelerating time to cleft continuity.
Objectives: The purpose of our study was to compare bone quality in grafted alveolar cleft sites using BMP versus clefts grafted with autogenous iliac crest bone, as well as highlight the benefits afforded by early secondary grafting.
Methods: Study subjects included children aged between 4–5 years with previously ungrafted primary alveolar clefts. The clefts were grafted using only BMP in standardised fashion, without the addition of autogenous bone. Pre- and postoperative cone-beam computed tomography was used to judge bone volume and density as compared to patients grafted with iliac crest bone.
Findings: The BMP group was found to have statistically similar postoperative alveolar cleft bone volume and density to the autogenous bone graft group. Additionally, the BMP group achieved cleft bone consolidation nearly two years sooner than the autogenous group.
Conclusion: Based on the results of this study, patients with alveolar clefts can be treated at a younger age with similar results and decreased morbidity via early secondary grafting using BMP.

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A modified approach to surgical correction of brachycephaly

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Background: Remodelling procedures for the correction of brachycephaly has traditionally been carried out by the craniofacial surgeon utilising techniques such as cranial vault remodelling and fronto-orbital advancement remodelling (FOAR). However, some centres are now moving away from this tradition to embrace the use of internal distractors for posterior cranial vault expansion. This presentation highlights such a case.
Objectives: The purpose of this report is to highlight a modified approach to the surgical correction of brachycephaly using posterior distractors instead of cranial vault remodelling and FOAR.
Methods: For our index case we used internal distractors over a two-week period to expand the posterior cranial vault, by over 20 mm. This was a strategy applied to manage intracranial hypertension in a child for whom a fronto-orbital advancement and remodelling would have normally been delayed until the child was older.
Findings: After the removal of the internal distractors we found favourable remodelling of the occiput and an improvement of lowered intracranial pressure.
Conclusions: This case has given some support to recent findings that correcting brachycephaly with posterior cranial vault expansion by the use internal distractors may have long-term benefits for the patient in terms of future corrective surgery and the management of intracranial pressure. It is anticipated that the remodelling effect may lend to the possibility of favourable anterior cranial vault and midface development that may in itself lessen the impact for secondary procedures to correct midface hypoplasia later on in childhood.

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The benefits of differential fronto-orbital advancement remodelling and midface monobloc advancement with on table external distractors for the management and complexities of craniofacial manifestations of Pfeiffer syndrome

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Background: Pfeiffer syndrome is a rare genetic disorder that presents many challenges to both medical and surgical specialities as well as allied medical professionals in a multidisciplinary team. Surgical correction and timing of surgery for craniofacial abnormalities is crucial in optimising the delivery of care throughout the life and development of the patient.
Objectives: To describe the benefits of large immediate on table distraction on a patient presenting with Pfeiffer syndrome and undergoing correction for craniosynostosis and midface hypoplasia.
Methods: Current procedures to correct syndromic patients presenting with craniosynostosis and midface hypolplasia usually result in multiple corrective surgery undertaken at specific times in the management of craniosynostosis. This usually occurs before twelve months of age followed by a secondary procedure to correct the midface hypoplasia. This case was fairly unique in that both fronto-orbital advancement remodelling (FOAR) and midface monobloc advancement were carried out on the table concurrently with differential advancement using the aid of an external distractor.
Results: We found that early correction with FOAR and monobloc midface differential advancement with on table distractors gave a more predictable outcome in the form of airway management and protection of the eyes.
Conclusion: The use of on table distractors for differential advancement for the correction of craniosynostosis and midface hypoplasia with FOAR and monobloc advancement allows for a more predictable outcome strategy for airway management and eye protection in an attempt to minimise tracheostomies and secondary procedures.

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Modifications for the fisher technique for unilateral cleft repair

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Background: Dr David Fisher described the anatomical subunit approximation technique for the repair of unilateral cleft lips.[1] This technique varied significantly from the Millard procedure which is the one that is most commonly used. There are several advantages to this newer procedure. This author has presented a comparison of the two techniques at previous meeting, and has shown some of these advantages.[2] This presentation will do the following:

1. Present long-term results on the Fisher cleft lip repair of up to eight years follow-up.
2. Discuss modifications of the original technique.
3. Present adjunctive treatments for preoperative and postoperative care including Dynacleft taping and nasal molding
4. Explain the use of the technique in a range of severities of cleft deformities
5. Explain how to use the method for secondary repair.

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Evaluation of airway and obstructive sleep apnoea in cleft lip and cleft palate adolescents using cone-beam computed tomography — a retrospective study

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Background: Abnormalities of the final conformation and function of the upper airway exists in cleft lip and/or cleft palate

(CLP) patients. As a result, these individuals have a significantly increased risk of developing obstructive sleep apnoea (OSA). Majority of studies that have examined the CLP airway to understand why this population is at a higher risk for developing OSA, have utilised two-dimensional (2D) imaging techniques that ignore the transverse dimension of the airway and do not allow volumetric measurements.
Objectives: (1) Determine differences in airway dimensions between CLP and non-CLP individuals using three-dimensional (3D) imaging. (2) Investigate the relationship between airway morphology and dimensions with the occurrence of OSA in CLP individuals.
Methods: 55 cone-beam computed tomography (CBCT) scans of nonsyndromic CLP subjects and 55 CBCT scans of age and sex matched controls were collected from multiple cleft clinics. Based on 2D and 3D analysis and a paediatric sleep questionnaire (PSQ), the subjects were grouped in the following ways: (1) all control subjects, (2) all CLP subjects, (3) CLP subjects with PSQ score $\geq$8, (4) CLP subjects with PSQ score <8. Descriptive statistics were calculated for each group.
Findings and Conclusion: CLP patients have smaller volumetric airway dimensions compared to non-CLP individuals and airway characteristics that have been shown to be associated with OSA. CLP individuals also have larger transverse airway dimensions and display both maxillary and mandibular growth deficiencies compared to controls. CLP individuals with OSA compared to non-OSA CLP individuals have craniofacial findings that have been shown to be associated with OSA.

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Maxillary distraction osteogenesis for correction of maxillary retrognathia in cleft lip and palate patients: a case series

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Background: Maxillary intraoral distraction osteogenesis is described as a safe and efficient treatment procedure in patients with cleft lip and palate (CLP) for elimination of maxillary retrognatia.
Objectives: The treatment protocol of patients having maxillary retrognatia is presented in this case series.
Methods: Maxillary expansion, secondary alveolar bone grafting and/or oronasal fistula closure were performed in six cleft lip and palate patients. Preoperative simulation of Le Fort I osteotomy and adaptation of maxillary distractors were realised with stereolytographic cranium models. Intraoral maxillary distraction was applied under general anaesthesia. A single unit acrylic occlusal splint was ligated to maxillary dental arch and worked as a guide during entire activation and consolidation period of distraction osteogenesis. Rigid internal fixation plates were placed in the osteotomy sites at the end of consolidation period.
Findings: The amount of maxillary advancement was between 15–25 mm. Satisfying occlusal and skeletal relationships were obtained in all patients. Preoperative adaptation of maxillary distractors on stereolytographic models reduced total operation time.
Conclusion: Advancement of maxilla by distraction osteogenesis results in gradual formation of bone at the osteotomy line and enhances treatment outcome in patients with cleft lip and palate.

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Surgical correction of craniosynostosis — a single institution's outcome analysis of 70 patients

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Background: Craniosynostosis, the premature fusion of one or more cranial sutures, occurs in approximately 3.5–4.5 out of 10,000 births worldwide. Surgical correction is recommended during infancy for those patients. As the number of craniofacial procedures performed annually has steadily increased over the recent years, surgical repair of craniosynostosis is routinely performed with improvements of the open techniques and advances in patient management.
Objective: The purpose of the current study is to provide outcome data for open cranial vault reconstruction at a single institution by a single craniofacial-neurosurgical team.
Methods: A total of 70 patient records were reviewed. The inclusion criteria were patients aged below three years undergoing primary surgery with open cranial vault reshaping and a minimum follow-up time of two years.
Findings: Of the 70 patients (32 females, 38 males) meeting the selection criteria, 4 were syndromic and 66 nonsyndromic. Average age and weight were 8.7 months and 9.42 kg, respectively. The oldest child was 29 months and the youngest 4 months at the time of surgery. The estimated blood volume lost was 35.8% of total calculated blood volume. Average surgical time was 225.7 min. Complications included one hematoma, four dural tears and one sagittal sinus bleed.
Conclusion: Our review of 70 open repairs of patients with craniosynostosis demonstrates good long-term results with an overall low complication rate and represents open cranial vault reconstruction as a valuable method for repair of such defects.

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Initial application and evaluation of palatally accessed alveolar bone graft

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Objective: To introduce an improved method about alveolar bone graft (ABG) and evaluate the short-term outcome.
Methods: Palatally accessed alveolar bone graft was performed in 18 patients with nonsyndromic unilateral cleft lip and palate. Seven patients were with cleft alveolar only, and 11 patients were with cleft alveolar accompanied with cleft palate. Cone-beam computed tomography was employed to evaluate the short-term outcome by comparing bone mass before and after operation. The related data was measured and analysed by Image-Pro Plus 5.1 statistically.
Results: The overall filling ratio of 18 patients was 90%, the labial filling ratio was 93%, and the palatal filling ratio was 87%.
Conclusion: The treatment solved the shortcoming of insufficient bone in palatal side by palatally accessed alveolar bone graft. Triangle nasal flap in gap assumes the closure of nasal floor and

palatal mucosa, avoid a large range of relaxation incision and buccal mucosal advancement flap, and no postoperative vestibular groove shallow loss.

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An analysis of relationship between appearance and nasal septum deviation in unilateral complete cleft lip palate alveolus using cone-beam computed tomography

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Objective: To analyse and compare the detailed differences of nasal septal deviation and the appearance in unilateral cleft lip/palate patients.
Methods: 106 patients with unilateral cleft lip/palate were recruited in the study. All the subjects have undergone cone-beam computed tomography scan and photography measurement in frontal photographs. The range, angle, vertical location, and convex direction of nasal septal deviation apex nasi symmetry parameters, basis nasi symmetry parameters, columella nasi symmetry parameters were carefully studied for each subject. Person analysis of radiographic evaluation and measurement of photograph was made by SPSS 22.
Results: In the total 106 patients (69 males, 37 females) the mean value of HRSD was 9.37 mm ± 4.79 mm, HASD is 9.91° ± 3.53°, CRSD is 8.75 mm ± 3.50 mm, CASD is 11.00° ± 4.29°. In UCA patients, high mean value of HRSD (12.93 mm ± 5.11 mm), CRSD (11.59 mm ± 3.33 mm), CASD (15.27° ± 3.99°) is measured. The mean value of apex nasi symmetry parameters is 1.20 ± 0.21, basis nasi symmetry is 1.36 ± 0.29, columella nasi symmetry is 1.13 ± 0.13. UCl showed the most symmetry in apex nasi (A = 1.17 ± 0.02). The UCLP types showed the most symmetry in basis nasi (B = 1.28 ± 0.25). Apex nasi symmetry and basis nasi symmetry parameters showed slightly positive significant correlation ($r = 0.281$, $P = 0.000$).
Conclusions: Apex nasi symmetry and basis nasi symmetry parameters have slightly positive significant correlation. There is no significant difference between UCLA and UCLPA in nasal septum deviation and nostril symmetry.

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The influence of primary repair technique for cleft lip and palate on secondary alveolar bone graft outcomes

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Background: We present the findings of a single surgeon centre for secondary cleft maxillofacial surgery. Secondary alveolar bone grafts were performed by a single surgeon during a 22-year period, midway through which the primary repair technique employed by the plastic surgeons was changed.
Objective: To determine whether altering the primary cleft repair technique has influenced the success of secondary alveolar bone grafting.
Methods: Postoperative periapical radiographs were assessed. The Enemark grading system was used to evaluate alveolar graft take.
Findings: Ongoing study due to be completed in November 2016. Data collected so far shows 10% more Grade 1 and 2 outcomes with Millard technique compared to Tennison-Randall.
Conclusion: Secondary alveolar bone grafting generally has an excellent success rate with minimal morbidity. Primary repair technique can influence these outcomes.

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Cleft palate fistula closure utilising acellular dermal matrix

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Background: Fistula presence represents a failure of the surgical repair of the cleft palate. Fistula repair is challenging with a high rate of fistula recurrence that increases with each added repair attempt.
Objectives: In the present retrospective study, we review the efficacy of using acellular dermal matrix (ADM) for cleft redo palate fistula closure.
Methods: 18 consecutive patients were included in the study from 2013 to 2016. Each patient was assigned a Veau designation and a Pittsburgh fistula classification. All patients with palate fistula, underwent fistula repair utilising ADM.
Findings: There were 10 females and eight males. Mean patient age was 15 years, ranging from 3–43 years. The mean length of follow-up was 10 months. Complete fistula closure was obtained in 14 patients. Three patients had partial closure with reduction of the fistula size and minimising of their symptoms. One patient had recurrent fistulas without improvement in solid or liquid nasal regurgitation.
Conclusion: Utilising ADM for cleft palate fistula repair as an interposition layer is a safe and simple procedure, with satisfactory outcomes that reduces fistula recurrence compared to closures without ADM. A larger, prospective, randomised trial is required for determining efficacy in secondary and tertiary fistula repairs.

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Ectrodactyly-ectodermal dysplasia-clefting syndrome: reconstruction of the functional and skeletal relations

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Background: Ectrodactyly-ectodermal dysplasia clefting (EEC) syndrome is a rare autosomal dominant disorder with variable expression and penetrance. The three cardinal signs are ectrodactyly and syndactyly of the hands and feet, cleft lip and palate, and abnormalities in several ectodermal structures including skin, hair, teeth, and exocrine glands.
Methods: Four ECC patients were treated in our department. All patients had severe oligodontia with severe resorption of the alveolar bone thus presenting with an edentulous appearance. All

patients had cleft lip and palate. They presented with a skeletal class III appearance showing mid face hypoplasia and mandibular prognathism. The patients underwent several procedures at different ages: cleft lip and palate repair, autogenous bone graft to the alveolar cleft with simultaneous maxillary sinus floor augmentation and reconstruction of the symphyseal basal bone. Later all patients underwent Le Fort I distraction osteogenesis for correction of the facial deformity.
Results: All four patients received several bone graft augmentations to the cleft area with acceptable results. One patient had persistent oronasal fistula. All patients underwent successful Le Fort I advancement via internal distractors. One patient received full mouth rehabilitation with implant-supported prostheses.
Conclusions: Facial and skeletal reconstruction is one of the major challenges in EEC syndrome. Some of the surgical procedures are repeated several times in order to achieve adequate results. Functional rehabilitation is achievable. The multidisciplinary team is paramount when dealing with these patients in order to improve their dental condition, skeletal development and assess the need for orthognathic surgery.

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Management of congenital nasal pyriform aperture stenosis

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Background: Upper nasal airway obstruction in neonates is a dangerous condition because infants are predominantly nasal breathers. Congenital stenosis of the nasal pyriform aperture (CNPAS) is a rare but important condition to consider. Treatment varies from conservative measures, to surgical intervention with widening of the pyriform aperture.
Objectives: To present surgical management of CNPAS as an alternative to conservative treatment.
Methods: Six patients with CNPAS were presented at the tertiary care Academic Medical Center, diagnosed with respiratory insufficiency, obstructive breathing pattern and/or feeding difficulties. All patients underwent computed tomography scan and nasal endoscopy. Distance measurements of the pyriform aperture were performed.
Findings: The mean age on presentation was 12 days. The widest and smallest mean distances of the pyriform aperture were 6.4 mm (range, 5.6–7.8 mm) and 5.1 mm (range, 3.6–6.1 mm). One conservatively treated patient showed no improvement in aperture width after 7 months. Three patients received surgical widening of the pyriform aperture. All patients recovered successfully. No complications occurred.
Conclusion: CNPAS is a rare disorder, which can be very well managed by surgical widening of the pyriform aperture. Considering the fact that recovery of the surgically treated patients was quickly and without complications, one might think that surgical widening could be a good alternative for long-term conservative treatment with unknown outcome. Standardised documentation of patients is necessary to get insight in the (dis)advantages of conservative treatment versus surgical treatment**.**

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Three-dimensional computed tomography airway analysis in patients with syndromic craniosynostosis and obstructive sleep apnoea

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Background: Midfacial hypoplasia predisposes patients with syndromic craniosynostosis to obstructive sleep apnoea (OSA). Relatively little is known about their three-dimensional (3D) airway anatomy.
Objective: Determine anatomical factors that explain airway obstruction in these disorders.
Methods: Retrospective study of patients ($n=43$) with syndromic craniosynostosis between 6–18 years with a computed tomography (CT) scan before midfacial advancement. Subjects with polysomnography (PSG) confirmed OSA were compared to patients with no OSA. Predictor variables included age, gender, body mass index (BMI), syndromic diagnosis, and 3D CT measurements. Airway was segmented using semiautomatic region growing method (Dolphin). Total airway volume and airway volumes of nasal cavity (NC), nasopharyngeal (NP), retropalatal (RP), and retroglossal (RG) segments analysed. Upper airway (UA) volume defined as sum of RP and RG. Minimum axial cross-sectional airway area was analysed in each segment. Descriptive and bivariate statistics computed.
Findings: Patients ($n=18$ patients) with or without OSA ($n=25$ patients) did not differ in age, gender, BMI, or syndromic diagnosis. Nonparametric comparisons revealed patients with OSA had smaller total airway ($P=0.000005$), NC ($P=0.002$), NP ($P=0.00007$), RP ($P=0.001$), and UA volumes ($P=0.0001$), compared to patients without OSA. RG volume was not different between two groups ($P=0.31$). Minimum cross-sectional area was smaller in RP ($P=0.0000009$) but not RG segments ($P=0.13$) between two groups.
Conclusions: Patients with syndromic craniosynostosis and OSA have significant reduction in nasal cavity and upper airway volume compared to patients without OSA but the RG volume was similar in both groups.

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Distraction osteogenesis — a paradigm shift in craniofacial surgery: a case series

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Distraction osteogenesis (DO) has become a growing trend in the field of craniofacial surgery in the recent years. It has become widely popular and is being used particularly in syndromic craniosynostosis cases.

We report a series of six cases of Crouzon syndrome, aged between eight months and six years, who presented to us with isolated or multiple functional issues such as increased intracranial pressure, inability to achieve full eyelid closure due to severe exorbitism and obstructive sleep apnoea secondary to narrow nasopharyngeal airway.

Five of these cases were treated with monobloc Le Fort III advancement DO and one with posterior cranial vault expansion via DO. This technique has shown to provide major clinical as well

as functional successful outcomes. However, DO in the field of craniofacial surgery has its complications as most DO applications are still in their infancy level with scarce data available in current literature. Nevertheless, this method has proven to be superior to the conventional technique in the craniofacial skeleton especially when a substantial amount of advancement is required, despite its minor setbacks.

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Nasal aesthetics in unilateral cleft lip and palate with and without presurgical nasoalveolar molding: a preliminary assessment

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Objectives: To compare the immediate preoperative nasal morphology in patients with unilateral cleft lip and palate who underwent presurgical nasoalveolar molding (PNAM) versus no PNAM at the time of primary surgery.
Methods: A total of 80 patients with unilateral cleft lip and palate were divided into two equally matched groups (group A: 40 patients with PNAM therapy; group B: 40 patients, no PNAM therapy) and assessed for nasal symmetry by basal view photographs immediately prior to cheiloplasty at the age of 6–7 months. Photographs were processed using ImageJ software and analysed for various parameters including nasal height, nasal width, columellar length and columellar angle.
Results: Statistical analysis (unpaired *t* test) showed that patient group A which underwent PNAM therapy had an increased nasal height ($P = 0.003$), nasal width ($P = 0.007$), columellar length ($P = 0.001$) and were closer to a natural columellar angle ($P = 0.02$) when compared to group B without PNAM treatment.
Conclusions: In our study, patients with unilateral cleft lip and palate exhibited superior nasal aesthetics when treated with PNAM prior to cheiloplasty. However, the results of this study can only be considered to be preliminary, as re-evaluation after growth cessation still has to confirm long-term effects on nasal morphology.

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Vertebral anomalies in craniofacial microsomia: a systematic review and large multicentre cohort study in over 1000 patients

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Craniofacial microsomia (CFM) is characterised by a heterogeneous underdevelopment of the facial structures related to the first and second branchial arches, but extracranial malformations such as vertebral anomalies may occur. It is unclear which specific patients with CFM are at risk of vertebral anomalies.

To study the prevalence and symptoms of vertebral anomalies in CFM, to determine which patients are at risk of vertebral anomalies, and whether these anomalies are associated with other extracraniofacial anomalies in CFM.

All patients diagnosed with CFM seen in four major craniofacial centres were included and reviewed. Data on vertebral anomalies, symptoms, treatment and presence of other extracraniofacial anomalies was extracted. Patient characteristics were documented. The O.M.E.N.S. and Pruzansky classification were used to grade the facial malformations in patients. The authors performed a systematic review to provide an overview of literature on vertebral anomalies in CFM.

Over 1000 patients were diagnosed with CFM. The reported prevalence of vertebral anomalies in CFM is 24–79%, and is mostly based on small patient numbers. A pilot study at the Boston Children's Hospital based on 305 patients, showed that 31% of the patients with CFM had vertebral anomalies. Patients with an epibulbair dermoid or with a higher O.M.E.N.S. classification were at higher risk for vertebral anomalies. Patients diagnosed with both CFM and vertebral anomalies, were also at higher risk for other extracranial anomalies, such as cardiac, renal, or brain anomalies. The results of our total cohort of over 1000 patients will be presented.

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A morphable model of the human head validating the outcomes of an age-dependent scaphocephaly correction

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Scaphocephaly is the most common craniosynostosis. Our Supra-Regional Unit has developed an age related protocol offering two different procedures. Children less than 6 months of age are treated with a passive strip craniectomy and microbarrel staving. Children older than this at the time of diagnosis undergo a total vault remodelling based on a modified Melbourne technique.

This presentation describes the two procedures that we have modified and developed over the last 10 years and reviews the morphological outcomes, identifying the advantages and pitfalls in both techniques, and compares them against a standardised morphological human head (the 'Headspace Project'). We believe this to be the first validated outcome of this kind for scaphocephaly correction.

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Bone surgery for maxillary cleft — an update

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Background: A very important problem, unique to cleft patients, is the presence of an alveolar cleft. This anomaly, when left unrepaired, contributes to many problems. The type of repair range from early primary repair to secondary and tertiary repair however secondary bone grafting offers great clinical benefits.

Even after adequate cleft repair, variable degree of secondary maxillary hypoplasia and velopharyngeal incompetence is expected which should be corrected to improve both functioned aesthetics.
Objectives: To comprehensively evaluate the treatment planning using different surgical techniques and graft materials to treat 110 cleft patients.
Methods: Autogenous bone grafts had been used with variable degree of success in 70 patients for repair of alveolar cleft. However various allograft and alloplastic materials have been introduced in the field of alveolar cleft grafting. Recently, the use of tissue-engineered biomaterials seeded on carriers to replace autogenous grafts achieved a potential success. The use of tissue-engineered osteogenic material comprising platelet-rich plasma and autologous mesenchymal stem cells were utilised in 40 patients for bone augmentation procedures as a replacement for autologous bone grafts.

Intraoral distraction osteogenesis has been successfully used for advancement of 40 hypoplastic cleft maxillae overcoming the limitation in both soft and hard tissues with minimal effect on velopharyngeal competence.
Findings and Conclusion: Bone surgery in cleft patients is considered very controversial and debatable issue which should be accurately planned and executed using the most efficient techniques and materials taking in consideration the deficient quality and quantity of both hard and soft tissues.

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Repairing alveolar cleft defect using autologous concentrated bone marrow derived mesenchymal stem cells: a preliminary study

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Background: Successful alveolar bone graft is important to allow proper eruption of the lateral or canine teeth through the cleft segment and to close the oronasal fistula. Most commonly, bone for alveolar bone grafting is cancellous bone from the iliac crests. However, autogenous bone grafting has it disadvantage that there are limited in amount, need second operative site and may cause donor site morbidity. In order to avoid these adverse effects, tissue-engineering strategies has been proposed.
Objectives: The present study was to evaluate new bone formation in alveolar cleft defect using autogenous concentrated bone marrow-derived mesenchymal stem cells (BMSCs) with beta-tricalcium phosphate (β-TCP) scaffold.
Methods: Three consecutive patients with unialveolar cleft defect were enrolled in the study. Bone marrow aspirate was harvested by trocar from anterior iliac crest intraoperatively and concentrated via automatic machine, The Res-Q^{TM} BMC system, to obtain BMSCs. The concentrated bone marrow derived mesenchymal stem cells were mixed on β-TCP scaffold with fibrin glue and use as a combination graft material.
Results: All patients showed uneventful healing without any complication in both donor and recipient sites. Postoperative radiographic investigation demonstrated optimal new bone formation with minimal resorption in the cleft site defect.
Conclusion: A combination of BMSCs harvested from bone marrow aspirate concentrate with β-TCP scaffolds may enhance new bone regeneration in alveolar cleft defects and can be used as an alternative method for alveolar bone grafting.

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Epidemiology and characteristics of cleft lip and palate and the influence of consanguinity and socioeconomic in West Java, Indonesia: a five-year retrospective study

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Background: Cleft lip, with or without cleft palate is the most common craniofacial anomaly in newborns. The incidence varies among different ethnic populations and is presumed to be higher in developing countries. There is currently no literature reporting the incidence of clefts in West Java territories, and the influence of consanguinity and socioeconomic.
Objectives: The aim of this study was to determine the incidence and characteristics of cleft lip and/or cleft palate in a population from West Java, Indonesia.
Methods: The records of a total 1596 cleft patients treated between 2011 and 2015 at the hospitals of West Java, and the data collected by the Cleft Lip and Palate Foundation, Universitas Padjajaran were assessed on a retrospective basis using cluster sampling. Data regarding cleft type, sex and side of cleft, consanguinity and socioeconomic status was collected and analysed.
Findings: Cleft lip and palate (50.53%) was most frequently found, followed by cleft lip (24.42%) and cleft palate (25.05%). The cleft was more frequently found in male patients (55.95%) rather than females (44.05%). Left-sided clefts were observed in 44.29% and right-sided clefts in 25.02%. A family history was detected in 20.08% of patients. Most of the patients have lower socioeconomic status.
Conclusion: The incidence of cleft lip and palate in West Java is higher than other type. Cleft in male patients were more frequent than females. The left side was more frequently found. One fifth of the patients had a family history of clefts. Most of the patients with cleft have lower socioeconomic status.

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Genetic variation of single nucleotide polymorphism rs566926 Wnt5a gene with nonsyndromic cleft palate in Deutromelayu population in West Java

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Background: Nonsyndromic cleft palate (NSCP) is a malformation disease that does not show any other signs or symptoms of abnormal condition such as abnormal physical appearance or psychological disorder. Genetic and environmental factors have been causally implicated and studies have begun to delineate genetic contributions. Wnt genes are involved in regulating midface development and palate fusion, and are therefore strong candidates for an etiological role in NSCP. In some study, Wnt genes showed association with cleft lip/palate in either European American or Hispanic population. Expression of Wnt5a in the mouse palate

was shown to be ubiquitous, and Wnt5a knockout mice develop a cleft palate.
Objectives: To investigate a role for Wnt5a genes in non-syndromic oral cleft palate, we interrogated single nucleotide polymorphism (SNP) rs566926 in Wnt5a genes that had been previously associated with cleft lip/palate in humans for association with cleft palate.
Methods: We investigated SNP rs566926 in Wnt5a, for association with cleft palate in 25 cleft cases and 25 unrelated controls of Deutromelayu population in West Java. Sequencing of selected polymorphisms was carried out using polymerase chain reaction/sequencing.
Findings: Individuals carrying variant alleles in Wnt5a presented an increased risk for cleft palate in Deutromelayu population.
Conclusion: Our results continue to support a role for Wnt5a genes in pathogenesis of cleft palate. Although much remains to be learned about function of Wnt5a genes during craniofacial development, additional studies should focus in identification of potentially functional variants in these genes as contributors to human clefting.

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Simultaneous maxillomandibular unit distraction osteogenesis in treatment of hemifacial microsomia patients with facial using multiple internal distraction devices

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Background: Hemifacial microsomia (HFM) is a congenital anomaly with multiple forms of facial asymmetry. Comparing with conventional orthognathic surgery, the surgical corrections of this condition are more challenging. Distraction osteogenesis has been introduced in the orthopaedic field for decades to induce new bone formation between the osteotomy gap with minimal complication. To date, this technique has become a versatile choice for the reconstruction of the maxillofacial defects including the treatment of asymmetrical defect in HFM patients.
Objective: To assess the clinical outcome of using multiple internal distraction devices to correct the facial asymmetrical defect in HFM patients.
Methods: Adult HFM patients with severe facial asymmetry were enrolled in the study. Le Fort I was performed in maxilla while horizontal ramus osteotomy and intraoral vertical ramus osteotomy was done at affected and normal side respectively. Two alveolar distractors were installed at maxilla bilaterally and a vertical ramus distractor on affected side. With parallel maxilla-mandibular unit distraction, devices on affected side acted as a distractor while the opposite side acted as a compressor with nasal septum being a fulcrum to rotate the whole unit in the planed position.
Result: Facial asymmetry and occlusal canting were uneventful corrected and no relapse found after six months follow-up. The facial symmetry and aesthetic were finally attained.
Conclusion: Technique described in the present study assures its effectiveness and application to achieve excellent clinical outcomes.

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Checklist manifesto for craniosynostosis correction

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Background: A surgeon should look beyond just surgery. Apart from the preoperative assessment and intraoperative care, importance should also be given to the postoperative intensive care. No specific protocol exists in India for the intracranial craniofacial surgeries and hence we have tried to developed one.
Objective: To develop a checklist protocol for the care of children undergoing craniosynostosis correction surgery.
Methods: This protocol was prepared using the experience of all the cases done by our team in yester years. The aim was to prepare and implement the developed protocol for all the children undergoing the craniosynostosis correction surgery. The team which involved plastic surgeons, maxillofacial surgeon, neurosurgeon, anaesthetist and paediatric intensive care team applied it to successive cases of craniosynostosis who were operated in our hospital.
Results: The preoperative work-up due to adherence of the protocol helped us find some issues in the patients, which included latex allergy and Factor IX deficiency. The surgeries done included box osteotomy and fronto-orbital advancements. The complications noted were managed well due to the protocol. The outcome in all the five cases was good and all children were discharged home.
Conclusion: A strict protocol helps in working up cases thoroughly not only prior to the surgery but also after the surgery. Preoperative work-up helped in diagnosing significant comorbid conditions and as a result appropriate measures could be taken and thus problems being avoided. A good postoperative team approach helps early identification of life-threatening complications and thus prevents major morbidity and mortality.

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The use and reliability of SymNose for quantitative measurement of the nose and lip in unilateral cleft lip and palate patients

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Background: It is essential to have a reliable assessment method in order to compare the results of cleft lip and palate surgery. In this study the computer-based program SymNose, a method for quantitative assessment of the nose and lip, will be assessed on usability and reliability.
Objectives: Evaluation of this system, with which it is possible to determine quantitatively asymmetry of the face, after complete and incomplete unilateral cleft lip and palate surgery. SymNose has been extensively tested, and the system barriers have been documented.
Methods: The symmetry of the nose and lip was measured twice in 50 six-year-old complete and incomplete unilateral cleft lip and palate patients by four observers. For the frontal view the asymmetry level of the nose and upper lip were evaluated and for the basal view the asymmetry level of the nose and nostrils were evaluated.

Results: A mean interobserver reliability when tracing each image once or twice was 0.70 and 0.75, respectively. Tracing the photographs with two observers and four observers gave a mean interobserver score of 0.86 and 0.92, respectively. The mean intraobserver reliability varied between 0.80 and 0.84.
Conclusion: SymNose is a practical and reliable tool for the retrospective assessment of large caseloads of two-dimensional photographs of cleft patients for research purposes. Moderate to high single interobserver reliability was found. For future research with SymNose reliable outcomes can be achieved by using the average outcomes of single tracings of two observers.

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The attachment of levator labii oris superioris-levator labii superioris alaeque nasi and transverse nasalis muscles disorder in the unilateral cleft lip/palate: nutesu method

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Background: The disorder of nasolabialis muscles in terms of their attachment of the levator labii superioris, levator labii superioris alaeque nasi, and transverse nasalis muscles in cleft lip/palate remains untouched. Presently, the residual deformity formation above three muscles were not separated from the alveolar and the maxillary bone.
Objectives: The remained deformities as such can be eliminated through well identification of the levator labii superioris muscle disorder which form supernumeri frenum; the levator labii superioris alaeque nasi located in the cleft of the maxillary; and transverse nasalis.
Methods: Operative measures using the Nutesu method in complete nonsyndrome unilateral cleft lip and palate. The labii oris superioris has to be separated from the supernumeri frenum and the alveolar cleft. Levator labii superioris allaeque nasi muscle also has to be separated from the cleft of the maxillary region up to the premaxillary palate muscle and the transverse nasalis from the maxillary cleft region up to the palate nasal cleft, and can even up to the inferior conchae nasal — then the construction of muscles can be executed accordingly.
Findings: The statistical analysis of 9–10 months post labioplasty showed that the anthropometry points in the median line of the face were significantly simetrical compared to normal babies. The baby boys showed symmetrical, except for pronation and subnasal points which were in perpendicular position the baby girls showed symmetrical appearance.
Conclusion: The reconstruction of the three muscles, when managed properly, can improve the symmetrical anatomy achievement of nasal and lip in post unilateral labioplasty.

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Aesthetic camouflage for correction of cleft deformities: surgical options and outcomes

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A secondary facial deformity be it mild, moderate or severe following corrective surgery of the cleft lip and palate is an inevitable consequence of even the most diligent and meticulous surgery. Besides the soft tissue disabilities of the lip, most patients present with an obvious element of maxillary regression consequent to maxillary hypoplasia resulting in a grotesque class III skeletal deformity. In addition, concomitant nasal deformities do occur which also need to be addressed. These deformities could also be a result of repetitive surgical interventions done in a manner that do not follow a chronological sequence of procedures.

Given a choice most patients who present for the correction of the residual aesthetic deformities do not subscribe to a prolonged and a cumbersome distraction osteogenesis schedule. Also many of these patients having gone through an array of surgical procedures are now looking for an aesthetic correction with a minimal surgical morbidity and downtime. Careful and diligent planning of combining orthognathic procedures in conjunction with facial implants and rhinoplasty can produce predictable and excellent results much to the satisfaction of the patients. Cases illustrating this very concept are presented and discussed.

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Patients and professionals have different views on online patient information about cleft lip and palate

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Background: Patients with cleft lip and palate (CLP) and their parents are actively searching for online information about CLP. For many conditions the quality of online information has been evaluated. However, the quality of online information on CLP is unexplored. Furthermore in the well-known quality assessment checklists, the patients' perspectives on quality were not taken in account. In the current shift towards patient-centred care, involving patients in the evaluation and development of online information is a logical next step. To be able to evaluate the quality of online information, quality needs to be defined by the end-users of this information.
Objective: The aims of this study are to define quality criteria for online information and assess the quality of frequently accessed online information sources. Patients, parents and professionals are equally involved in all stages of this study.
Methods: A literature review was performed to distillate the most relevant quality criteria. These criteria were prioritised on relevance by patients ($n = 25$), parents ($n = 25$) and professionals ($n = 9$). The most important quality criteria were subsequently used by patients ($n = 20$), parents ($n = 20$) and professionals ($n = 20$) to rate existing online CLP information.
Results: Distinct differences in prioritised criteria and evaluation of information between the three groups emerged. For instance professionals find reliability criteria of high importance, while

patients and parents don't. Privacy criteria are of importance for patients and parents, not for professionals.
Conclusions: This study shows the importance of patient–participation in healthcare research, as well as a feasible approach to do so.

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Electronic follow-up of developing world cleft patients: a digital dream?

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Objective: To identify potential access to telemedicine follow-up of children with clefts operated on a humanitarian mission.
Methods: A cross-sectional study of parents of children presenting to a humanitarian cleft lip and palate mission in a provincial hospital in the Philippines. A purpose-designed questionnaire was used to assess access to electronic and digital resources which could be used to aid follow-up.

Participants: 45 parents of children having primary cleft lip and or palate surgery.

Interventions: None

Main outcome measure(s): Parent perceived affordability of Internet access and parent owned devices used to access Internet.
Results: 31 respondents were female. There was a 93% mobile phone ownership. The mean distance travelled to the clinic was 187 km. 56% were fluent in English. 31% accessed the Internet daily. 16% reported use of email. 51% accessed the Internet on a mobile device and SMS (Short Message Service) use was the most affordable means of communication.
Conclusions: Due to perceived unaffordability and low levels of access to devices with cameras and the Internet, as well as issues with privacy, we cannot recommend relying on electronic follow-up of patients in the developing world.

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Cephalometric analysis of newborns with bilateral cleft lip and palate

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Background: Bilateral cleft lip and palate results in aberrant facial morphometry in adulthood. On the one hand due to surgical intervention and on the other hand due to different growth of face and skull. The question arises whether patients with cleft lip and palate have a malposition of the praemaxilla in relation to the face.
Objectives: The targeted objective of this study was to find out, if patients with cleft lip, jaw and palate had a malposition of the praemaxilla in relation to the face.
Methods: For the assembly of this open, retrospective study a collective of radiographs from the Department for Oral and Maxillofacial Surgery, Medical University Vienna were consulted. In total radiographs of 31 male and female patients were used. These patients were born between 1986 and 2004 with a cleft lip or a bilateral complete cleft lip, jaw and palate. All the radiographs were made before the first operation started.
Findings and Conclusion: There was a statistical significant difference in the position of the praemaxilla between the two groups ($P < 0.01$). In the "cleft" group the SNA angle was $100.21° \pm 11.06°$ versus $86.47° \pm 4.63°$ in the controls. The distance Articulare – A- Point was enlarged in the "cleft" group (44 mm versus 40 mm in the controls). There was also a difference found in the distance Nasion – A- Point between "cleft" and "control" (23 mm versus 27 mm).

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Cleft lip repair using Pfeifer's technique — our experience

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Background: During development of face, in a unilateral cleft lip, the maxillary prominence on the affected side fails to unite with the merged medial nasal prominences so a labial groove develops and persists thus divides the lip into medial and lateral components. With a bilateral cleft lip, the mesenchymal masses of the maxillary processes do not merge with the mesenchymal masses of the median nasal process the epithelium in both the labial grooves stretches and breaks down, resulting in a bilateral cleft.
Objectives: To know the effectiveness of Pfeifer's technique in cleft lip patients.
Methods: The study was carried out in patients attending hospital directly and those referred from outside hospitals were considered for study. All cases were performed using Pfeifer's technique.
Findings: The results are good in terms of white roll match, vermilion match, Cupids bow, nasal architecture etc.
Conclusion: Though the technique is not new, the literature available for the Pfeifer's technique is limited, either in books or Internet. Since the technique is easy to learn, teach and applicable to all types of clefts, this study was conducted. Good results were seen clinically and statistically.

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Dermatoglyphics and cheiloscopy as genetic markers in transmission of cleft lip and palate patients

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Background: Labial mucosa has elevations and depressions forming a pattern called lip prints. Parents of patients with cleft lip and or palate are known to have a particular lip print pattern. Determining the relative risk of cleft lip and palate on the basis of lip prints and dermatoglyphics as genetic background may be useful for genetic counselling and the development of future preventive measures.
Objectives: Analysis of various pattern types of lip prints and dermatoglyphics in parents of cleft lip and palate children and to detect if any specific type can be contemplated as genetic markers in transmission of cleft lip and palate.
Methods: We conducted a study with 62 parents, 31 parents of children with cleft lip and palate and 31 parents of unaffected children as control group. Lip prints and fingerprints were collected from all subjects and analysis of both parents was carried.

Findings: Based on the observations from our study type 2a and type 0 lip patterns in parents of cleft lip and palate affected children. ATD angles assymetry provide positive objective criteria for estimating the relative risk and could be used as genetic markers.
Conclusion: Noninvasive tools are an effort to take a step forward in shedding light on the prediction of transmission of cleft lip and palate deformity to the offspring.

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The reliability of stereoscopic display in assessing dentofacial deformities

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Background: To date no studies have investigated the reliability of stereoscopic display in dentistry. It has been reported to significantly improve diagnosis and treatment planning in medicine since it could recover "binocular" depth perception as experienced in human visual system.
Objectives: To compare stereoscopic projected three-dimensional (3D) images with routine viewing media i.e. plaster casts, two-dimensional (2D) images, and 3D images in the evaluation of dental arch relationships and facial features in patients with dentofacial deformities.
Methods: The GOSLON Yardstick was used to assess dental arch relationships on plaster casts, 3D study models scanned by an intraoral scanner, and stereoscopic projected 3D study models in 29 patients with unilateral cleft lip and palate. Specific facial features (height, symmetry, profile) representing facial spatial configuration were evaluated on 2D, 3D and stereoscopic projected 3D images of forty presurgical skeletal Class III patients using 100 mm visual analogue scales (VAS). Rating panel consisted of a group of professionals. Rating sessions were repeated once.
Findings: Intrarater and interrater reliability were all above "good" except intrarater reliability of assessing facial features. There was no significant difference when rating facial height using 2D photographs, symmetry using 3D images, and profile using stereoscopic 3D images. The agreement between plaster casts and either 3D or stereoscopic 3D study models was "good" to "very good".
Conclusion: Stereoscopic projected 3D could supplant the plaster casts and conventional 3D when assessing dental arch relationships in cleft patients; however, reliability of rating each specific feature relied upon the type of viewing media.

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Craniomaxillofacial Trauma

ong-term experience with endoscopic intraoral plating of orbital floor fractures

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Background: Minimal invasive techniques have an increasing role in all surgical fields because they result in improved morbidity rates and better aesthetic outcomes. We present a minimally invasive technique for treating orbital blowout fractures.
Objectives: This article describes the endoscopic approach for orbital floor fractures, reduction, and fixation and reports the clinical results of long-term experience of 32 cases.
Methods: 32 patients who sustained either a comminuted or trap door orbital floor fracture were treated in our medical centre following the same surgical protocol. The indications for orbital reconstruction were limited eye movement, diplopia, and significant enophthalmos. The approach is discussed in detail.
Results: All patients healed uneventfully, one patient with no resolution of diplopia after surgery because of late intervention (two weeks) and one patient with chronic sinusitis due to anterior antral wall bony sequester. No major complications were noted in the postoperative period, and good functional and aesthetic results were obtained. Prolonged infraorbital paraesthesia was the most common mild long-term complication.
Conclusions: Our results presented a high success rate with minimal complications thus our technique is a safe way with minimal morbidity for treating orbital floor fractures.

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Temporomandibular joint response to mandibular parasymphysis and angle fracture: an overview of risk factors

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Background: Fractures of the mandibular angle account for 23–42% of all facial fractures with a high complication rate (0–32%). Although the ideal treatment remains debatable, two main procedures are commonly used to manage the majority of mandibular angle fractures that are open reduction and internal fixation by a noncompression miniplate placed on the external oblique ridge with or without a second miniplate on the outer cortex.
Objectives: This study had two objectives: first to define the geometric changes in the mandibular condyle and secondly to examine in a clinical study the temporomandibular joints (TMJ) of 60 patients after treating fractures of to find out if there were any long-term adverse effects.
Methods: Total 60 patients were treated and divided into two groups. Group A patients manage by single miniplate and Group B patients treated by double miniplate. Group A and B further divided into A1, A2 and A3; B1, B2 and B3. A1 and B1 patients with favourable angle and parasymphysis fracture. A2 and B2 favourable angle and unfavourable parasymphysis. A3 and B3 with unfavourable angle and parasymphysis. Patients were evaluated for malocclusion, interincisal mouth opening, condylar resorption, height of ramus, condylar pain, condylar remodelling. All patients were followed up for minimum of 6 months to maximum of 24 months.
Findings: Eight patients developed postoperative complications. A higher rate of complications was found among patients with Group A2 and A3.
Conclusion: This study suggests that the use of two miniplates for the internal fixation of mandibular unfavourable parasymphysis and angle fracture provided a low rate of complications.

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Frontal lobe abscess due to orbital roof blow out fracture

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Background: A medically fit and well 34-year-old female patient initially presented to the emergency department at Queens Medical Centre following an accident in which she fell from her bike and hit the left orbit with handlebar. Plain film radiographs (OM10o and 30o) showed no evidence of any facial fractures. Clinically, she had no functional problems apart from diplopia on lateral gaze associated with left eye. A two-week review was planned by ophthalmology.
Objectives: Patient attended eye causality department 7 days after the initial trauma complaining of ongoing restriction of movement. Ophthalmological examination revealed restricted ocular motility and diplopia on all directions of gaze particularly downwards.
Methods: A computed tomography (CT) scan performed to investigate the cause of restriction revealed an orbital roof fracture. Following discussion with neurosurgery a magnetic resonance imaging (MRI) was arranged to exclude abscess.
Findings: CT showed blowout fracture through the superamedial left orbital cavity with displaced fragments projected 2 cm into the left frontal lobe. Subsequent MRI scan showed abscess formation around the left frontal lobe. The patient had urgent bifrontal craniotomy and drainage of the abscess. Due to risk of infection, no roof repair was performed.
Conclusion: This case emphasised the importance of multidisciplinary approach in trauma cases; in this scenario the patient was managed by the maxillofacial surgical team, neurosurgery and ophthalmology. This case also highlights the need for consideration of mechanism of injury in light of clinical findings. A penetrating injury should always make the surgeon consider and exclude underlying bony injury.

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Penetration of the neck by an unusual foreign body

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Background: Wounds are among the commonest presentation to the emergency department. A true appreciation of the mechanism of injury i.e. the transfer of energy and likely anatomy involved in any source of injury is vital for further management.[1]
Case Report: We present the extraordinary case of a 24-year-old intoxicated male with a delayed presentation of a penetrating neck injury. The patient claimed that he fell down a flight of stairs the previous evening and a foreign body had penetrated his neck. He then went to sleep and woke up the following morning with a sore throat! There were no witnesses to confirm his story. Preoperative imaging revealed a large 11 cm foreign body of uncertain density, passing anterior and posterior to the left and right carotid sheaths respectively with no exit wound noted. Exploratory surgery revealed a 'remarkable' object that corroborated the patient's somewhat questionable history in his intoxicated state. The patient was discharged from intensive therapy unit three days following admission.
Discussion: Issues of note include the importance of objective history taking, understanding various mechanisms of injury, preoperative and intraoperative imaging, the interesting antibiotics advice in such a unique case, and the necessity of a tracheostomy in non-mucosal breach.

Reference

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Mandibular fractures: a one-year analysis of data from a major trauma centre

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Background: Mandibular fractures are the most common types of maxillofacial fractures. Numerous reports and epidemiological studies show a higher frequency in young males. Other contributing factors, such as socioeconomic status, environment, alcohol use and mechanisms show a greater variability. Management strategies differ around the world depending on various different factors.
Objectives: Our aim was to identify all patients who sustained mandibular fractures that were either seen primarily at, or referred to Kings College Hospital from January to December 2016, a major trauma and regional referral centre in South London.
Methods: Retrospective operative data analysis was implemented to identify all interventional surgical cases using the Galaxy operating database and case notes. Outpatient clinic appointments, case notes and correspondence were used to identify all non-operative cases during the same time period. Each case was analysed to ascertain numerous variables including; patient age, gender, aetiology of trauma, management decisions and complications.
Findings: At the time of writing this abstract, over 180 mandibular fractures had undergone operative intervention during 2016. Whilst awaiting a further two months of additional data, provisional results show an array of coefficients between gender, age, aetiology and management strategies.
Conclusion: The results of this study will provide valuable epidemiological, clinical and academic information on management of the most common facial fracture within our speciality at a major trauma centre in the United Kingdom.

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Camel-related maxillofacial injuries: retrospective study of seven patients

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Background: We studied retrospectively the incidence, mechanism and outcome of patients admitted to Al Ain Hospital with isolated maxillofacial camel-related injuries.
Methods: Seven male patients who were admitted to Al Ain Hospital with camel-related maxillofacial injury during period 14 June 2015 to 13 June 2016 were retrospectively studied. Time of injury, mechanism of injury and severity of injury were studied.

Results: Camel kicks were most common (57.14%) followed by camel bite (28.57%) and fall from camel (14.28%). Camel kicks and falling from camel were more common during the summer time, and camel bites were more common during rutting season. Comminuted fractures facial bones were seen in 5 patients and all occurred with kicks mechanism. One patient was admitted to the intensive care unit. No mortality seen in this study.
Conclusion: Camel-related injuries are extensive injuries and knowing behaviour of the camel is important for prevention possible future injuries.

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Interpersonal violence and facial trauma: a population based study

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Background: Recent studies have shown the increasing prevalence of interpersonal violence (IPV) as a cause of maxillofacial trauma.
Objectives: To examine the epidemiology, aetiology and management of IPV-associated facial trauma in the Australian state of Victoria.
Methods: Using the Victorian Admitted Episodes Dataset, patients admitted with facial trauma to a hospital in Victoria between 2004 and 2014 were identified. Data on patient demographics, fracture type, cause of injury, operative management and length of stay (LOS) was extracted. Comparative analysis of patients presenting due to IPV was performed.
Findings: There were 54,730 patients admitted with facial trauma over the 10-year period. IPV was listed as the cause of injury in 12,948 patients (23.7%). Of this subgroup, the mean age was 30.6 years (range, standard deviation = 12.14) with a male predominance (92%). These patients were twice as likely to be under the influence of alcohol ($P < 0.05$).
Conclusion: Our large population based study shows that interpersonal violence is a significant cause of facial trauma within our population, with those affected being predominately young males exhibiting a variety of facial injury patterns. IPV-associated facial trauma is a serious public health issue. Resources should be directed towards targeted education and intervention programs.

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Should "lateral canthotomy" be taught on the advanced trauma life support course?

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Background: The Advanced Trauma Life Support (ATLS) program is currently the gold standard in the assessment and management of the multiply injured patient. The only head and neck trauma skills taught on the ATLS course are protection of the cervical spine and emergency surgical airways. The management of orbital compartment syndrome is not taught in any detail. This study was undertaken to determine the knowledge base of trauma related specialties, who could be in a position to undertake lateral canthotomy and cantholysis in the emergency department.
Methods: A questionnaire was designed for this study with regard to:

- Immobilising a cervical spine
- The procedure for an emergency surgical airway
- Undertaking a lateral canthotomy and cantholysis

Respondents were from a range of trauma related specialties.
Findings: There were 96 respondents in total. Neurosurgery, orthopaedics, accident and emergency (A&E) and anaesthetics scored the highest for C-spine management. Oral and maxillofacial surgery (OMFS), neurosurgery, orthopaedics, general surgery, A&E and anaesthetics scored highly for airway management. For lateral canthotomy, OMFS and ophthalmology scored the highest, but overall the knowledge for this emergency procedure was inferior compared to the other two emergencies.
Conclusion: Despite being a time critical and simple to perform sight saving procedure, those specialties that were more likely to be immediately available to undertake lateral canthotomy and cantholysis, were generally uncertain what to do. It would therefore seem appropriate that this intervention should be included as part of the ATLS course.

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Intraoperative computed tomography scanning in zygomatic fractures — a randomised controlled trial

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Background: Intraoperative computed tomography (CT) allows the real time assessment of fracture reduction whilst the patient is in the operating theatre with the ability to adjust the reduction of fractured bones without a return to theatre. Despite its theoretical advantages its use is not widespread and there is no level 1 evidence to support its use.
Objectives: The aim of this study was to determine if intraoperative CT scanning led to improvements in fracture reduction, returns to theatre, facial scarring and facial profile. Additionally the number of on table reductions was investigated.
Methods: Patients who presented with fractures of the zygomatic complex or arch were randomised to receive either intraoperative CT or standard care. Both groups were assessed with postoperative radiographs. The assessor of radiographic reduction and the patient were blinded as to treatment allocation.
Findings: A power calculation indicated that 200 patients would be required to determine a statistically significant difference between the groups. Issues with the trial have included theatre allocation and patient follow up. The results from the first 20 patients randomised will be discussed in this ongoing trial.
Conclusion: Intraoperative CT scanning allows the on table correction of malreduced fractures of the zygoma. It has advantages and disadvantages for specific patients to be discussed.

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Intermaxillary fixation screws for conservative condylar fracture treatment: a review of the literature and results of a randomised clinical trial

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Background: A mandibular condyle fracture can be treated conservatively by intermaxillary fixation (IMF) or by open reposition and internal fixation (ORIF).
Objectives: The present review and randomised clinical trial (RCT) aimed to evaluate the evidence for the use of IMF screws (IMFS) as a treatment modality for condylar fractures.
Methods: A systematic literature search was conducted in PubMed, Embase and Cochrane databases. Articles using IMFS as an IMF-modality in mandibular trauma were evaluated. Also, a prospective multicentre RCT was conducted, comparing IMFS with arch bars for conservative condylar fracture treatment. Patients were allocated in the IMFS group (24 patients) or assigned to the arch bar group (26 patients). Pain intensity, quality of life and complications were assessed.
Findings: 22 articles (17 case series, 4 RCTs, and 1 cohort study) were included. The results suggest IMFS have similar malocclusion rates as arch bars, fewer wire-stick injuries, improved oral hygiene, and shorter operative time. Root damage is less likely to occur with self-drilling screws and seldom requires treatment. In the trial, all pain scores were lower for IMFS. Three patients developed a malocclusion (IMFS-group: one patient, arch bars-group: two patients). Mean surgical time was significantly shorter in the IMFS group ($P < 0.001$). There were no wire-stick injuries in the IMFS group and eight (30.7%) in the arch bars group ($P = 0.003$).
Conclusion: Considering the advantages and the disadvantages of IMFS, and observing the results of review and the clinical trial, the authors conclude that IMFS provide a superior method for IMF.

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Identifying additional clinical training requirements for military maxillofacial surgeons deploying on current operations

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Background: The evolution of surgical training is resulting in ever sub specialisation, with head and neck trauma in a civilian environment now managed by a combination of surgical specialties. However such combinations of specialties may not be present in future United Kingdom (UK) led military settings, necessitating identification of skill sets required for predicted clinical scenarios.
Objectives: The aim of this study was to identify any additional training required for maxillofacial surgeons to adequately manage acute head and neck trauma in the current deployed military environment.
Methods: A systematic review of the literature was undertaken with Preferred Reporting Items for Systematic Reviews and Meta-Analyses methodology to identify surgical procedures necessary to manage head and neck trauma in the deployed military environment. Procedures were matched to those surgical competencies within the UK maxillofacial surgical training pathway.
Findings: Damage control surgical procedures required within 12 h of injury comprise tracheostomy, haemorrhage control of the neck, face and head regions, decompressive craniotomy, facial fracture stabilisation and lateral canthotomy. Competencies required within 3–5 days comprise facial fracture internal fixation, ocular repair, evisceration and enucleation.
Conclusions: UK maxillofacial surgical training fulfils the majority of those competencies required to treat those predicted head and neck surgical injuries on future operational deployments. Additional training that would be required include orbital evisceration and decompressive craniotomy. Clinical attachments to ophthalmology and neurosurgery are recommended and these may be covered as part of a tailored military specific fellowship.

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Outcomes on implementing an emergency daytime theatre for oral and maxillofacial surgery at Mid-Essex Hospital Trust

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Background: The Confidential Enquiry into Perioperative Deaths (CEPOD) identified insufficiencies in the perioperative management of the emergency surgical patient. This report suggested more junior supervision and removal of night-time operating to reduce mortality rates. The introduction of available daytime emergency theatre was implemented at Broomfield Hospital, Mid-Essex Hospital Trust on May 2014. The aim of this project was to determine outcomes after emergency daytime theatre availability and its impact on the perioperative management of the oral and maxillofacial surgery (OMFS) surgical patient.
Methods: We retrospectively gathered OMFS emergency theatre lists from January 2012 to October 2016 using our electronic database. Specific documentation included time of operation, emergency procedures, length of operation and operating surgeon grade.
Findings: A total of 2474 emergency cases were undertaken at Broomfield Hospital Trust during the specified period with a total of 939 cases before May 2014 and 1535 after. Preliminary data have suggested significant differences in the average time of operation start time. The average start time for emergency procedures before May 2014 was 15:30 hours with approximately 30% of these cases done after 17:00 hours. Average start time after May 2014 was 11:30 hours with approximately 8% of cases done after 17:00 hours. This represented a 73% reduction in emergency cases being undertaken on an after-hours theatre list.
Conclusion: The aim of this project was to show the impact daytime theatre availability has on emergency surgical patient outcomes. This will reinforce our present practice in improving patient care and reducing morbidity and mortality surrounding emergency surgical care.

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A three-dimensional method of assessing the outcome of orbital reconstruction after trauma

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Background and Objective: Orbital blow-out fractures are commonly a result of motor vehicle accidents, interpersonal violence, or sports injuries and often require reconstructive surgery. A plethora of different surgical approaches are currently used in orbital floor reduction. These include transconjunctival, subciliary, mid-lower eyelid, infraorbital and, more recently, endoscopic transantral approaches. Some of the aforementioned treatment strategies are combined with additional measures like intraoperative imaging or navigation to enhance the accuracy hence surgical outcome. The current treatment method at the VU University Medical Center consists of a combination of virtual preoperative planning and three-dimensional (3D) printing. This novel approach has resulted in very good "subjective" clinical outcomes. However, an "objective" method of assessing the outcome of orbital reconstructions after trauma is still sought.
Methods: To date, 15 patients have been operated using the aforementioned method. In order to assess the overall accuracy and the outcome of the orbital floor operation, virtually planned STL models were compared with the postoperative STL models of three patients. This presentation will describe all steps required to objectively assess the outcome of orbital reconstruction after trauma.
Findings: The proposed 3D method demonstrated a strong agreement between the virtually planned and the resulting orbital floor reduction. This novel strategy offers a possible alternative to intraoperative CT and navigation in the treatment of orbital floor patients.
Conclusions: Pre- and postoperative STL models can be used to evaluate the accuracy of orbital floor reconstructions after trauma.

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Magnetic resonance versus computed tomography: imaging bony fractures of the orbit with view to surgical reconstruction — a retrospective feasibility study

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Objective: To examine the disparity between orbital fractures imaged with magnetic resonance (MR) versus those imaged with computed tomography (CT) using virtual segmentation and three-dimensional (3D) modelling.
Methods: Data from a previous study involving patients with suspected unilateral orbital fracture recruited from Royal Brisbane and Women's Hospital Maxillofacial Surgery clinics was used. The primary predictor variable was the imaging technique (MR versus CT) and the secondary predictor variable was type of fracture (orbital blowout versus zygomaticomaxillary complex [ZMC]). Outcome measurements were average deviation of fracture margins and greatest deviation of fracture margins as defined on MR and CT based virtual 3D models.
Findings: Of the cases made available three were ZMC fractures and seven were blowout orbital fractures ($n = 10$). Defect margins mapped from MR exhibited an average of 1.24 mm deviation from CT overall and an average greatest deviation of 3.10 mm. Blowout fractures ($n = 7$) exhibited an overall average deviation of 0.85 mm and average greatest deviation of 2.01 mm. ZMC fractures ($n = 3$) exhibited an overall average deviation of 2.14 mm and average greatest deviation of 5.64 mm. There was a significant difference between blowout and ZMC fractures average deviation (0.85 mm versus 2.14 mm, $P < 0.01$).
Conclusion: Orbital blowout fractures can be defined on MR with clinically acceptable accuracy as evidenced by the overall average deviation of 0.85 mm. The same cannot be said for ZMC fractures. MR should be considered as an alternative imaging modality for orbital blowout fracture when the risks of CT are clinically significant.

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Meta-analysis of orbitozygomatic complex trauma. The cost–benefit relationship for the usefulness of eye care and orthoptic screening

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Objectives: The aim of the study is to demonstrate the importance of the ophthalmologic and orthoptic evaluation in the management of the orbitozygomatic complex fractures in both stages: immediately and in the postoperative follow-up.
Methods: The ophthalmologic and orthoptic assessment at the "Time 0" (acute) and distance can have indeed a double advantage: from a clinical point of view to have objective data on the outcome of the surgery and from an ethical point of view to improve the "concordance" of the patient, showing him the outcome of the situation pre- and postsurgery. Only in 2015, 81 patients have been hospitalised, 74 of whom underwent surgery. In particular 40 fractures COMZ (54%), 23 fractures of the orbital floor (31%), 4 fractures interesting only the medial wall (5%), 1 NOE fracture (2%), 6 fractures Le Fort (8%).
Results: All patients were studied clinically and functionally with Hess-Lancaster screen before and after the surgery. Seven patients have been managed conservatively for the absence of symptoms and signs of ocular movements involvement detected by Lancaster screen. Three patients still present diplopia.
Conclusions: A thorough clinical study of ophthalmologic and orthoptics evaluation with Hess-Lancaster screen in the pre- and postoperative appear so necessary both in the indication of surgical timing, both in identifying the presence or onset of diplopia appear useful in order to establish needs and timing of surgical treatment. Advantage of Hess Lancaster screen is the capability to quantify through numerical parameters the entity of ocular impairment and help the clinician in order to treat and follow such patients in a correct way.

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Use of topical local anaesthetics for paediatric lacerations

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Background: Closure of facial lacerations in young children can be difficult under local anaesthetic (LA) in an emergency department (ED) setting. Sedation or general anaesthetic (GA) is often required to close lacerations safely and to a good surgical standard. Our hospital introduced local anaesthetic gel (LAT) in 2015 to reduce the need for paediatric admissions.
Objectives: To ascertain the usefulness of LAT in reducing paediatric admissions.
Methods: Data was collected prospectively of all children presenting to ED for input by oral and maxillofacial surgeon after the introduction of LAT. Data collected included age, aetiology, length and position of laceration, associated injuries and management. Use of LA, sedation, LAT and GA was also recorded.
Findings: Over three months, 126 children attended ED. Lacerations accounted for 46% of attendances. LAT has been used to close one-third of these lacerations. 23 children (18% of all attendances) were admitted to hospital during this time, of which 40% were paediatric lacerations. The use of LAT was unsuccessful on two occasions and one patient required a GA for wound closure. All children admitted were under the age of five years. The majority of patients had been referred from local hospitals and had attended starved for theatre. Two patients had absolute indications for closure under GA — human bites and long lacerations.
Conclusion: LAT has been an effective adjunct to management of paediatric facial lacerations. There is still work needed to ensure patients referred from local hospitals also have an opportunity to be managed without the need for GA.

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A comparative study of three treatment modalities for mandibular angle fractures

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Background: Mandibular angle fracture remains one of the most common mandibular fractures with a reported incidence of 20–40%. Optimal treatment of these fractures remains controversial.
Objectives: To compare treatment outcomes of isolated mandibular angle fractures using three different treatment methods.
Methods: A prospective study in which patients with isolated mandibular angle fractures randomly allocated into one of three treatment groups: Group1 — superior border wire; Group 2 — single miniplate and Group 3 — double miniplate. The patients were assessed for the presence of postoperative infection, malocclusion and fixation failure and the outcomes were correlated. The data was analysed statistically and reported upon using STATA.
Results: 75 patients were included in the study with 25 patients per group. Complication rates were equal between the miniplate groups (16%), with the Superior border wire having the best outcomes. The average "days to surgical fracture repair post injury" ($P = 0.08$) and the category of "severely displaced fractures" (>5 mm) are the factors shown to increase the incidence of complications, $P = 0.02$. Overall a 13.3% complication rate was noted.
Conclusions: The use of two miniplates seems to offer no benefit over a single miniplate. In stark contrast to previous global findings, fixation using a superior border wire with intermaxillary fixation showed the best outcome with a 92% success rate and its usage should be reaffirmed as a cost-effective alternative in a resource-constrained environment.

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Solitary frontal sinus fractures compared to multiple facial fractures, energy impact dependency — a novel classification

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Background: Frontal sinus fractures account for 2–15% of maxillofacial injuries. Up to 66–87% of the patients with frontal sinus fractures suffer from associated facial fractures. The majority of classifications used today categorise frontal sinus fractures depending on the integrity of the anterior table, posterior table, and the nasofrontal outflow.
Objective: We introduce our findings on the relation of frontal sinus fractures with other facial bone fractures correlated with the energy of the trauma. We also suggest a modification to the classifications in use today.
Methods: 24 patients diagnosed with frontal sinus fractures were included. Treatment in all patients consisted of open reduction and bone fixation. We analysed population variables, injury aetiology, fracture site, associated craniofacial injuries, surgical technique employed, handling of the nasofrontal duct and postoperative complications.
Findings: The most frequent aetiology was falling accidents. 58% percent of the fractures involved both the anterior and posterior tables. 66% suffered from associated facial fractures. 50% of frontal sinus fractures were treated by open reduction internal fixation as the only treatment, 33.3% underwent sinus obliteration and 16.6% were treated with cranialisation.
Conclusions: Frontal sinus fractures resulting from high-energy impact exhibited additional facial bone fractures in 100% of the cases compared to 27% following low energy impact. We suggest a modification to the anteroposterior classification of frontal sinus fractures. In addition to the involvement of the anterior and posterior walls and the degree of dislocation, high/low energy impact can direct us to the involvement of additional facial fractures and influence the surgical strategy.

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Is the aetiology of facial trauma in Libya is the same as in the west?

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Background: The Ali Omar Askar Neurosurgery Hospital, Esbea Tripoli serves a population of 1.6 million and the hospital is a tertiary referral centre for all fractures that occur in the west of Libya.

Objectives: To compare the aetiological factors between west of Libya and Western developed countries.
Methods: Between January 2010 and December 2012, we treated 326 facial fractures in 187 patients.
Findings: The patients consisted of 161 (86.10%) males and 26 (13.90%) females; ratio 7:1. Most fractures were in the 21–30-years age group (73 patients, 39.04%). Road traffic accident was the main cause 109 patients (58.29%) with assault accounting for 32 (17.11%) and gunshot wounds 21 (11.23%) patients. Fractures due to missile and gunshot all in males were highest in 2011 during the country's uprising/revolution yet only accounted for 19 patients (10.16%). In developed western countries interpersonal violence and assault is the main cause accounting up to 40.2%. Alcohol abuse reported in United Kingdom, Finland and Sweden. It is noteworthy to mention that in this study alcohol was not reported as cause in any of the injured cases as alcohol consumption is not allowed in Islamic states.
Conclusion: Road traffic accidents remain a major cause in Western Libya and this may be accounted for by the lack of seat belt legislation and implementation of traffic laws. In comparison with the developed western countries interpersonal violence and assault is increasing. What is clear is that National collection of data is necessary in planning prevention, legislation and resource allocation in the treatment of facial fractures.

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Maxillofacial fractures in west of Libya: a review of 437 cases

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Background: A maxillofacial fracture constitutes substantial proportions of trauma cases, which results to aesthetic, functional and psychological problems.
Objective: The aim of this study is to analyse retrospectively age, gender, and mechanism of injury, sites of fractures, treatment modalities, associated injuries, complications and suggested preventive measures.
Methods: A retrospective review of all patients with maxillofacial fracture presented to Oral and Maxillofacial Surgery Department, Ali Omar Askar Neuro Center Sbea, Tripoli between January 2010 and December 2015 was performed. It includes the retrieval of different patient's data using Microsoft® Excel.
Findings: Total of 437 patients with 752 maxillofacial fractures. Males were mostly affected comprising 83%, with the majority occurring in the 21–30-years age group. Road traffic accidents were the most common cause with a total of 63.84% of maxillofacial fractures. Mandible fracture was most affected consisting 59.18%. The most fractured part of the mandible is parasymphysis compromising 23% of all mandible fractures. Open reduction and internal fixation was the most common treatment modality. 13% of patients had associated injuries, and 4% had complications.
Conclusions: Road traffic accidents still the main cause of facial bone fractures in Libya in comparison with the rest of the world due to non-implementation of traffic laws!!! Violence much less. Urgent intervention by government officials to implement traffic rules, legislation and develop National programs to educate the public to reduce such injuries.

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Internal fixation of mandibular fractures with or without tooth extraction — finite element analysis of biomechanical stability

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Mandibular fractures are the second most common fractures of the maxillofacial skeleton due to its position. Approximately, more than half of the mandibular fractures occur in the teeth-bearing region. Consequently, every fracture in the dentate area has the potential to involve teeth in the fracture line. Extraction of the teeth in the fracture line may sometimes become a difficult decision since they can cause a potential obstacle to reduction and healing. On the other hand, if the tooth in the fracture line is conservatively managed correct repositioning of fractured fragments is made quicker and easier providing occlusal reference and posterior stop.

The purpose of this study is to analyse the biomechanical behaviours and consequences of internal fixation of mandibular fractures with or without extraction of the tooth in the fracture line.

This experimental study designed as finite element model (FEM) analysis. A three-dimensional FEM of a human mandible without anomalies was generated. The fracture lines were created at parasymphisial, corpus and angulus areas and osteosynthesis materials were used for fixation conduct on Champy's osteosynthesis lines, after that same fracture lines were created again and this time teeth on the fracture lines were extracted and fracture lines were fixated with same osteosynthesis materials on software. For both situations load transferring; biomechanical stability and stress, strain and tension distribution over the fixation materials and bone were analysed with software and results were compared.

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Analysis of bony landmarks of the orbit "an aid in the localisation of the orbital process of the palatine bone"

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Objectives: In case of repair of an orbital floor fracture, adequate support of the reconstruction material is essential. Since the orbital process of the palatine bone as part of the posterior ledge remains intact in most trauma cases, this bony process plays an important role in the support posteriorly. The aim of the study is to determine mean distances between specific landmarks in the orbit in men and women, with a special emphasis on localisation of the orbital process of the palatine bone.
Methods: Four landmarks were identified retrospectively on computed tomography (CT) scans of 100 adult Caucasian patients (50 males and 50 females): top of the infraorbital margin superior to the infraorbital foramen (point A), top of the orbital process of the palatine bone (point B), anterior bony part of the superior orbital fissure (point C), and ventro-lateral aspect of the bony entrance of the optic canal (point D). Distances between these points were measured.

Findings: Mean distances between the orbital rim (A) and orbital process of the palatine bone (B) were 32.5 mm in females and 33.7 mm in males. Males had significantly larger bony orbits than females.
Conclusions: These measurements can enable a safer and more predictable surgical approach to the orbit, which may help reduce the risk of damaging important neighbouring structures. It may also help adequately localise the posterior ledge, specifically the orbital process of the palatine bone thereby ensuring a more precise reconstruction of the orbital floor and promoting a better surgical outcome.

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The use of Floseal haemostatic matrix for acute maxillofacial haemorrhage: experience from a major trauma centre in the United Kingdom

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Background: Floseal haemostatic matrix (Baxter) is indicated in surgical procedures as an adjunct to haemostasis when the control of bleeding by ligature or conventional procedures is ineffective or impractical. It comprises two independent haemostatic agents: gelatin granules which swell to produce a tamponade effect and high concentrations of human thrombin which converts fibrinogen into fibrin, thereby accelerating clot formation. There are few reports of its use in the maxillofacial region.
Objectives: To review our case series of patients who have had Floseal haemostatic matrix utilised in the control of acute haemorrhage and to assess the efficacy and safety.
Methods: All patients who underwent maxillofacial surgery or sustained maxillofacial trauma in which Floseal haemostatic matrix was utilised in acute haemorrhage control within our Unit were identified and analysed.
Findings: Our case series of patients is presented. Demographics and the nature of the bleeding were recorded. The outcomes assessed were control of the haemorrhage, need for other haemostatic measures and any complications recorded. These included postoperative bleeding following elective tracheostomy and in epistaxis resulting from midfacial fractures.
Conclusion: Floseal haemostatic matrix is an effective and safe adjunctive method of controlling acute haemorrhage in the maxillofacial region. We have found this to be useful when conventional measures have been ineffective and therefore recommend its use in selected cases.

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The use of Norian bone cement for secondary orbital reconstruction: a case series

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Background: Norian craniofacial repair system (CRS) calcium phosphate bone cement (Synthes) is a biocompatible putty that has been used for augmentation and restoration of the craniofacial skeleton. There is limited experience of its use in the secondary reconstruction of posttraumatic orbital defects.
Objectives: To review our case series of patients who have had Norian bone cement used for secondary orbital reconstruction and to assess the efficacy and safety.
Methods: Patients were assessed clinically for enophthalmos and diplopia and with fine cut computed tomography scan of the orbits to assess the size and position of the defect. Intraoperatively access was via a transconjunctival approach, the defect was exposed and a PDS sheet was used to retract the orbital contents. The Norian bone cement was placed into the defect and allowed to set, before removal of the PDS sheet and closure with sutures.
Findings: Our case series of patients is presented. Demographics and the nature of the orbital defect were recorded. The outcomes assessed were postoperative enophthalmos, diplopia and any complications recorded.
Conclusion: Norian bone cement is an effective and safe method of orbital reconstruction in secondary posttraumatic deformity. We therefore recommend its use in selected cases.

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Intraoral transmucosal rigid fixation to treat severely infected mandibular fractures

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Objectives: To combine incision and drainage of facial infections and treat mandibular fractures in a singular surgical stage
Methods: Eight patients (aged 16–42 years, five males and three females) with severe multi-spaces facial infections after mandibular fractures secondarily to gun-shot wounds or trauma were treated by Erich arch bars to obtain an ideal occlusion and physiotherapy post surgery, bone reduction was performed either open or closed, transmucosal rigid fixation was apply to avoid internal plates colonisation. The arch bars and plating system were removed 8–12 weeks after, according to bone healing. The infections were treated by incision and drainage with drains installation and removal, either 24 or 48 h after surgery.
Results: All infections were cured; the fractured bones were aligned and fixated without complications, ideal dental occlusion, aesthetics and function were obtained.
Conclusions: This new method allows the combination of facial infections and fractures treatments in one surgical stage, with major economical savings and less time away from work.

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Management of frontal sinus fractures — review of cases

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Background and Objectives: The goals in the treatment of frontal sinus injuries are to provide an aesthetic outcome, restore function, and prevent complications. However there is no consensus as how to best achieve these goals. The authors retrospectively reviewed the cases of frontal sinus injuries managed at their centre.
Methods: This retrospective cohort study was conducted at the Oral Health Centre, Government Medical College Hospital, Chandigarh. The data was collected from the trauma records of

patients who presented to the outpatient department and the accident and emergency department. The data was reviewed for the demographics, associated injuries, treatment given and complications.
Findings: We reviewed 14 consecutive cases of frontal sinus fractures managed at our institution. All patients were male with the mean age of 32 years. 13 (93%) of 14 patients received injury due to road traffic accident. 50% of patients ($n = 7$) had isolated anterior table fracture and the remaining 50% of patients had fractures at both anterior and posterior tables. Majority of the patients ($n = 8$, 57%) had associated panfacial injuries. Nine (64%) patients had brain injury in various forms like pneumocephalus, etc. Seven patients (50%) underwent surgical intervention, while others were managed conservatively. Complication was seen in two (14%) patients.
Conclusions: The correct diagnosis and thorough assessment of the frontal sinus fractures is important for the successful treatment planning. Various treatment methods are available to offer the patient depending on the severity of injury. The management of frontal sinus fracture requires a team approach for the successful outcome and reduced complications.

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Minimal access percutaneous approach for the management of zygomatic arch fractures

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Background and Objectives: Zygomatic arch fractures are traditionally treated using either closed approach or using the open approaches like preauricular and hemicoronal approaches. Percutaneous minimal access approach is a novel approach which gives direct access to the fracture site with minimal morbidity. The authors share their technique and experience by reviewing the cases operated at their centre.
Methods: This retrospective cohort study was conducted at the Oral Health Centre, Government Medical College Hospital, Chandigarh. The data was collected from the trauma records of patients who presented to the outpatient department and the emergency department. The data was reviewed and evaluated for the benefits and outcomes of this novel approach.
Findings: We reviewed eight consecutive cases of zygomatic arch fracture operated using the percutaneous minimal access approach at our centre. All cases had tetrapodal zygomatic complex fracture with gross displacement at zygomatic arch. All patients had successful osteosynthesis with early recovery in the postoperative period. Neither temporary nor permanent facial nerve injury was seen in any of the cases. Aesthetic outcome was very good as evaluated from the patients' perspective and scar was imperceptible in most of the cases.
Conclusions: This approach for the management of zygomatic arch fractures has many advantages like minimal imperceptible scar, minimal stripping of zygomatic arch, quick access to the fracture, minimal risk to the facial nerve, reduced risk of infection and early recovery. This approach is easy to master. The right case selection, good assessment of fracture and controlled technique is the key of success.

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Pearls fat graft as additional procedure in reconstruction of maxillofacial: a case series

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Background: Pearls fat graft is a graft procedure using a patient's own fat for reconstruction, cosmetics, and for additional procedures after reconstruction.
Objectives: In patients with loss of volume or form of soft tissue caused by aging proses, disease, trauma, congenital defects, defects after tumour extirpation.
Methods: Compared to other reconstruction techniques pearls fat graft is more simple, safer and more natural results.
Findings: Reported two cases of patients who underwent pearls fat graft procedure. The first case in a man 35 years old with multiple maxillofacial fractures, had been performed open reduction internal fixation (ORIF) because there was still defect after ORIF, the defect was closed by fat graft. The second case in female patients 20 years with posttraumatic saddle nose that performed costal cartilage augmentation because there was still depressed nose. This was enhanced with fat graft.
Conclusion: Pearls fat graft is a procedure that is effective for improvement of the small size of the maxillofacial defect and because the material is instantly available, the result is more natural, inexpensive, safe and acceptable by the body.

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Evaluation of the condyle remodelling after lateral arthroplasty in growing children with temporomandibular joint ankylosis

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Background: Temporomandibular joint (TMJ) ankylosis in growing patients can cause both mouth opening limitation and jaw bone deformity. Lateral arthroplasty (LAP) can restore the medially displaced condyle and thus keep its growth potential. But can the condyle grow as normal is unknown.
Objectives: This study was to evaluate the long-term result after LAP in growing children.
Methods: Patients from 2010 to 2014 were evaluated. Their computed tomography data within 1 week after operation and during at least 1-year follow-up were measured by ProPlan CMF 1.4 software. The condyle-ramus length of both sides and angles and the chin deviation before and after operation were compared. SPSS 17.0 software was used for statistical analysis.
Findings: A total of nine patients with a mean age of 10.2 years were included in the study. The mean follow-up period was 1.94 years. The mean condyle-ramus growth was 2.90 mm in the affected side and 2.50 mm in the unaffected side ($P = 0.31$). All of the affected side exhibited growth and remodelling of the condyle and ramus. All 9 cases had a mean chin deviation of 3.69 mm before operation and 2.92 mm during follow-up ($P = 0.16$).

Conclusion: The residual condyle grows after LAP, which can reduce the gravity of jaw bone deformity.

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Intraoperative arthroscopy of temporomandibular joint in patients with condylar head fracture

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Background: There is a general understanding that condylar trauma results in both hard and soft tissue injuries. Plain films and computed tomography (CT) are standard for radiographic evaluation of facial bone fractures. The bony elements have historically been the focus of the diagnosis and treatment. Magnetic resonance imaging (MRI) can detect both bone and soft tissue pathology. We have used perioperative arthroscopic evaluation of upper joint compartment during open surgery in cases with condylar head fracture.
Methods: Arthroscopy of upper compartment was performed in 24 patients with dislocated condylar head fractures. We have evaluated disc position, disc perforation, cartilage damage, haemorrhagic clots, hypervascularity and synovitis. Patients were divided to two groups, depending on the period from trauma, less than five days and more than five days.
Results: In majority of the cases the disc was dislocated anteromedially following fragment dislocation. We have had no case with disc perforation or disc rupture. Hyperemia, haemorrhagic clots and cartilage erosions were the most frequent changes.
Conclusions: Information from this study is useful in furthering the understanding of intraarticular damage occurring in acute trauma. Presence of haematoma after acute joint trauma and its evacuation and early movement may prevent later pathology.

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Planes of reference for orbital fractures: computed tomographic assessment of orbital fractures made easy

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Background: The posterior ledge (PL) is the portion of the orbital floor left after a fracture. It is important for implant placement during orbital reconstruction. Correct placement involves resting its posterior aspect on PL. Without knowledge of its location, dissection to PL is challenging. Inaccurate placement leads to postoperative complications. We developed a novel technique (Planes of Reference for Orbital Fractures [PROF]) to determine the most common location of PL from infraorbital margin (IM).
Methods: This retrospective study evaluates 104 consecutive patients with unilateral orbital floor fractures who underwent orbital floor reconstruction from 2008 to 2013. Of 104 cases, 52 had intact IM and 52 had fractured IM. We excluded patients with pre-existing orbital pathologies. Facial computed tomography (CT) scans were analysed using Osirix® Lite Digital Imaging and Communications in Medicine (DICOM) Viewer v7.0.1 (Geneva, Switzerland). The skull was positioned upright according to the Frankfurt and midsagittal planes. Measurements were taken on the sagittal view corresponding to the midorbital line (MOL) bisecting the fractured orbit. Without intact IM, MOL of the nonfractured orbit was reflected and superimposed onto the fractured orbit. The location of PL is determined from the reflected intact IM.
Results: Orbits with intact IM, PL were located 15.0 mm to 25.0 mm from IM (mean, 22.1 mm; 95% CI, 21.2–23.0 mm). Fractured IM, PL located 15.0 mm to 25.0 mm from IM (mean, 21.1 mm; 95% CI, 20.2–21.9 mm).
Conclusion: PROF is an efficient technique in locating PL, avoiding insufficient or overaggressive dissections during orbital reconstructions. The mean distance of PL from IM is 22.1 mm and 21.1 mm for intact and fractured IM, respectively.

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Comparison of titanium mesh versus polycaprolactone-tricalcium phosphate implant in orbital fracture reconstruction

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Background: Controversy exists regarding the choice of implant material for orbital floor reconstructions. This study aims to compare the effectiveness of titanium mesh and polycaprolactone-tricalcium phosphate (PCL/TCP) implant for repairing traumatic orbital fractures.
Methods: A total of 19 patients with orbital floor reconstructions operated at the National University Health System, Singapore were included in this prospective study between November 2010 and June 2013. Titanium mesh was used in 10 patients, while PCL/TCP implant was used in the other nine patients. Patients were evaluated for the worsening of visual acuity, presence or absence of infraorbital nerve paraesthesia, extraocular muscle function, enophthalmos and diplopia. Postoperative complications such as infection, early resorption, extrusion and persistent pain were also recorded.
Results: Restoration of orbital wall continuity was successful in all patients. Follow-up duration was at least one year. There was no statistically significant difference in worsening of visual acuity, presence or absence of infraorbital nerve paraesthesia, extraocular muscle function and enophthalmos. Even though there was no statistically significant difference in diplopia between the two treatment groups preoperatively, there were more patients who had diplopia following titanium mesh postoperatively ($P < 0.05$). One patient had persistent diplopia, enopthalmos and lateral rectus muscle dysfunction postoperatively, but declined further corrective surgery. There was no infection, early resorption, extrusion or persistent pain.
Conclusions: Both groups showed satisfactory results. PCL/TCP composite can be used to fabricate biodegradable fixators for the reconstruction of orbital wall fractures.

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Effects of treatment timing in the management of mandible fractures: a prospective case series

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Background: The ideal timing for treatment of mandible fractures has not been well established.
Objectives: The objective of this study was to analyse the effects of definitive treatment timing in the management of all mandible fractures.
Methods: A prospective case series of 215 continuous patients with a total of 360 mandible fractures was undertaken. Nine outcome measures were analysed in relation to treatment delay by logistic regression modelling: wound dehiscence, hardware exposure, local postoperative infection, malocclusion, trismus, nerve damage, fracture non-union, return to theatre, and radiographic reduction adequacy. 19 additional covariates were included in the analysis to adjust for potential confounding: age, gender, fracture aetiology, dental status, ASA, alcohol use, cigarette use, illicit drug use, prior mandible fracture, number of fractures, location of fractures, fracture comminution, tooth in line of fracture, local preoperative infection, associated maxillofacial injury, significant other injury, operation type, length of surgery, operator experience. Delay was measured in days and ranged from 0–41 days, with a mean delay of 4.6 days.
Findings: A statistically significant association was only found between delay and trismus. For each additional day of delay, the odds of trismus being present, compared to absent, increased by 9% (odds ratio [OR], 1.10; 95% CI, 1.02–1.16).
Conclusions: Definitive treatment of mandible fractures can be safely delayed. Treatment delay may allow for improved resource distribution and prioritisation of more time dependant interventions. Where practical, mandible fractures should be treated promptly to minimise trismus and other unstudied consequences of injury, such as pain and delayed return to work.

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Microplates making a macro impact on mandibular osteosynthesis

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Background: There are a plethora of commercially available plating systems for internal fixation of mandible fractures. Factors pertaining to plate selection include bone quality and intrinsic forces at the fracture site. Traditionally plate thickness is determined by forces acting on the fracture line. In our experience however, consistent selection of a microplate, 1.5–1.7 mm provides for adequate stabilisation and similar outcomes to alternative methods. In light of the risk of metal deposition and disruption of soft tissue architecture, it is advantageous to keep the volume of osteosynthesis material to a minimum.
Objective: To investigate the outcomes and compare the efficacy of utilising a microplate in fixation of mandibular fractures in comparison thicker plating configurations.
Methods: We retrospectively reviewed the case notes of 60 patients consecutively managed, with open reduction internal fixation for fractured mandibles between June 2015 and January 2016. No patients were excluded. The patients were categorised by thickness of plate used and all postoperative complications were documented. Outcome measures at follow up appointments, including infection, plate failure, wound dehiscence, occlusion and plate stability were recorded.
Findings: We tabulated our results on a Microsoft® Excel spreadsheet. In this study we observed negligible difference in outcome, of patients managed with plates of differing thickness.
Conclusion: We believe consistent selection of a slim thickness microplate provides for a smaller surgical footprint and deposition of less foreign material, while achieving satisfactory bony repair.

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Evaluation of postoperative stability after open reduction and internal fixation of zygomaticomaxillary complex fractures

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Background: The main goal of open reduction and internal fixation of zygomaticomaxillary complex (ZMC) fracture is to establish adequate three-dimensional reduction and stable fixation. However, the appropriate location for fixation is controversial.
Objectives: The aim of this study was to evaluate the stability of fixation of isolated ZMC fractures treated by different number of fixation.
Methods: We investigated 14 patients with one-point fixation in the zygomaticomaxillary (ZM) area (group A), 14 patients with two-point fixation in the ZM and frontozygomatic (FZ) area (group B), and 13 patients with three-point fixation in the ZM, FZ and infraorbital rim area (group C). Stability of the reduced ZMC fragment was assessed by comparing immediate postoperative cone-beam computed tomography images with those obtained at least 3 months later.
Findings and Conclusions: Preoperatively, the total maximum displacement was 6.57 ± 1.76 mm in group A, 6.29 ± 1.38 mm in group B, and 6.55 ± 2.88 mm in group C and the total mean displacement was 3.79 ± 1.36 mm in group A, 3.43 ± 0.89 mm in group B, and 3.86 ± 1.57 mm in group C. The total postoperative orbital and screw changes were 0.94 ± 0.17 mm and 0.72 ± 0.07 mm in group A, 0.93 ± 0.16 mm and 0.69 ± 0.09 mm in group B, and 0.90 ± 0.11 mm and 0.67 ± 0.11 mm in group C. There were no significant relationships between postoperative stability and amount of fracture displacement in all three groups, or between the three groups ($P > 0.05$). The amount of fracture displacement did not affect postoperative stability. There was little difference between the three groups in postoperative stability.

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Facial fractures — markers for brain injury? A prospective study of incidence of head injury associated with maxillofacial trauma

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Background: Presence of head injuries in patients with maxillofacial trauma is a life-threatening condition. Prompt determination of head injury in these patients is crucial for improving patient survival and recovery. Hence, the need to know about the incidence of head injuries associated with maxillofacial trauma becomes an important aspect.
Methods: A total of 100 patients were included in the study. The patients were divided into two groups — Group I: patients with maxillofacial trauma associated without head injuries, Group II: patients with maxillofacial trauma associated with head injuries. They were evaluated for epidemiological demographic and clinical characteristics.
Results: The present study had 91% predominance of male patients with age ranging from 1–75 years. 91% cases were as a result of road traffic accidents. The most frequent maxillofacial injury represented was the fractured mandible. The incidence of head injuries associated with maxillofacial trauma was 67%. Amongst all the patterns of head injuries, concussion was the most common head injury associated with maxillofacial trauma.
Conclusions: In our study, the risk of head injury increased significantly as the Glasgow Coma Scale score decreased and with increase in the number of facial fractures. Hence, there was association between head injury and maxillofacial trauma.

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The management of fronto-orbital complex trauma in Kenya

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The management of craniofacial trauma in Kenya can be characterised as two-tier. In our setting, we have a well-resourced, well-funded private health care, where the minority of the populations are treated and a relatively heavily burdened, resource limited government health service, where majority of the population are treated.

The private hospitals provide an environment where the surgeons can relatively easily apply current international best practice standards. The government hospitals are not as well equipped and often overwhelmed with patient numbers, making application of current best practice difficult.

Surgeons practicing in both environments have to be thus skilled in the application of the latest techniques in management of orbital and craniofacial injuries and in the application of less expensive techniques. Quite frequently the same surgeon will treat patients in these disparate settings on the same day. A need for adaptability, good knowledge of a variety of surgical techniques and ingenuity is required, as the objectives of care must be equal on either side

This paper presents an overview of the techniques used in the various settings, the application of both modern older and hybrid techniques and the outcomes of this care.

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Role of transmylohyoid oro-endotracheal (submental) intubation in complex maxillofacial injuries

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Background and Objectives: It has been almost three decades since the submental route of intubation was first introduced. Ever since then numerous authors worldwide have reported its use and shared their individual experiences with this technique. The main objective of this paper is to share the author's experience about this technique in complex maxillofacial injuries.
Methods: In 37 patients (35 males, 2 females) with complex maxillofacial injuries during the period of June 2010 to June 2016 (seven years), transmylohyoid (submental) route was employed to manage airway intraoperatively. Data recorded included cause of injury, type of fracture sustained, time elapsed in following this technique and postoperative complications (if any).
Findings and Conclusions: Road traffic accidents emerged as single biggest culprit behind these injuries, all patients were having either one or more combinations of Le Fort I, II, III fractures, fracture of nasal pyramid along with mandibular fracture. The average time taken to establish this route of intubation was 8 min and none of the patients reported with any significant postoperative complication related to this technique. Transmylohyoid oroendotracheal intubation technique is a simple, effective and a reliable substitute to tracheotomy in managing complex maxillofacial surgeries where prolonged postsurgical ventilator support is not required.

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Aetiology and patterns of maxillofacial fractures in a tertiary referral hospital in Rwanda: two-year retrospective analysis

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Background: During the 20 years after the liberation of Rwanda in 1994, sporadic attempts were made to establish Oral and Maxillofacial Surgical services in the country by visiting missions and/or part time surgeons. In September 2014, Rwanda Military Hospital established the first and only Department of Oral and Maxillofacial Surgery department in the country within the public sector.
Objective: Main objective of this study was to establish a baseline aetiological pattern and pattern of maxillofacial fractures in a tertiary referral hospital in Rwanda and comparing the findings to the worldwide data.
Methods: Clinical records in the Oral and Maxillofacial Surgery department between 15 September 2014 and 15 September 2016 were analysed retrospectively to identify cases with maxillofacial fractures. Pathologic fractures, malunited fractures and cases with insufficient clinical data were excluded.
Findings: Out of 3125 patients consulted in Oral and Maxillofacial Surgery department 305 patients were diagnosed to have

maxillofacial fractures with higher incidence in males. Third decade of life had highest incidence within the age range of 1 to 81 years. Road traffic accidents and assault were the top two aetiological factors similar to reports from other parts of the world. Total of 385 fractures were noted with mandibular fractures more common than maxillary fractures. Mandibular parasymphysis fracture was the commonest site of fracture.
Conclusion: Better clinical records and detailed data collection is recommended to isolate individual influencing factors to understand the patterns of occurrence and aetiological influence thus helping in instituting preventative measures on a national level.

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Analysis of the variables affecting the prevalence and topography of the facial soft tissues injuries

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Background: The facial soft tissues injuries have a prominent role in the care of multiple trauma patients, but the literature on this type of injury is scarce.
Objectives: This study aimed to evaluate the prevalence and profile of facial soft tissues injuries of patients treated at the emergency department of the Hospital da Restauração in Pernambuco, Brazil, from September 2011 to July 2012.
Methods: For sampling, 160 patients were selected, and the data were obtained based on a questionnaire relating to personal data and the circumstances of the trauma. The other part of the data collection occurred through physical examination in order to verify the presence of lesions in the facial soft tissues, and their anatomical and topographical features recorded.
Findings and Conclusions: Facial trauma occurred most frequently in men (81.9%) in young adult phase (34.4%), mostly due to traffic accidents (46.2%) and interpersonal violence (22.5%). In 58%, it was observed alcoholic drink consumption. The most common anatomic sites were the frontal region (43.8%) and the upper and lower lips (20.6%). The size of soft tissue lesions ranged from 0.2–24 cm, where 58.6% of patients had 1.01–5 cm injury. Facial bones fractures were present in 36.3% and dental fractures in 14.6%. In this study, it was found that soft tissue injuries affect primarily men because of traffic accidents, these lesions vary from 0.2–24 cm in size, and the alcohol consumption is strongly associated to the trauma. It was found that the most affected region was the front.

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An overview of maxillofacial trauma in a tertiary oral and maxillofacial trauma centre, Queen Elizabeth Hospital, Kota Kinabalu, Sabah

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Objective: The aims of this study were to provide an overview of maxillofacial trauma, relationships of patient's demographic data and alcohol consumption within the Sabah state.
Methods: A retrospective study of maxillofacial trauma cases treated at the Oral and Maxillofacial Surgery Department, Queen Elizabeth Hospital, Kota Kinabalu, from 1 January 2009 to 31 December 2013. Total of 630 maxillofacial trauma cases were included. Details of the trauma were collected from patients' record, which including cause of injuries, injuries suffered, treatment indications and treatment received. Patients' demographic data, alcohol consumption in relation to causes and type of maxillofacial injury were analysed.
Results: There were 538 males (85.4%) and 92 females (14.6%) patients, with a mean age of 31.0 years. Most common causes of maxillofacial injury were motor vehicle accident (MVA) 66.3%, followed by fall 12.4% and assault 11.6%. Motorcyclists made up more than half of the total cases (53.1%). Cases referred were primarily due to soft tissue injury (458 cases). Other cases were dentoalveolar and maxillofacial bones fracture. Treatment provided for the fractures included open reduction internal fixation 22.9%, closed reduction (28.7%) and conservative management (48.4%). Toilet and suturing were done for all patients with soft tissue injury.
Conclusions: Maxillofacial trauma is a major problem in Sabah. It affects mostly males in the age group of 21–30 years. Most of the MVA patients were motorcyclists. Mandibular fracture, with parasymphysis involvement recorded the highest number. Most of the patients preferred conservative management, probably due to financial and logistic issue.

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The characteristics of facial injuries presenting to the oral and maxillofacial department at the University Hospital of Wales, United Kingdom: what has changed?

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Background: Oral and maxillofacial surgeons repair routine and complex facial injuries on a daily basis. The University Hospital of Wales remains the largest hospital within Wales providing treatment to approximately 350,000 people in Cardiff and the surrounding areas. Over a 12-month period the incidents of facial trauma were analysed. Previous research has outlined the sharing of accident and emergency (A&E) data with violence prevention initiatives have helped reduce the number of patients receiving treatment for assault injuries by 35%. In addition of this, we were able to explore A&E waiting times and outline common trends amongst all injuries in order to help with the management of emergency admissions.
Methods: Information related to 1200 traumatic injuries was obtained from the oral and maxillofacial surgery (OMFS) database. Relationships between gender, age, postcode, type and method of injury and the management were analysed. The proportion of injuries related to assault and alcohol intake were also investigated.
Findings: The study was able to isolate injuries to specific locations within the city centre and predict when there was an increase in A&E attendance, helping to plan the distribution of public services.
Conclusion: The OMFS team were meeting national targets and the work within the unit on violence and prevention had helped to reduce alcohol related injuries.

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The precise orientation of preformed titanium plates in digital surgery technology assisted in reconstruction operations of mandibular segmental defects

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Objective: To explore the precise method of orientating preformed titanium plates in digital surgery technology assisted in the reconstruction operations of mandibular segmental defects.
Methods: Seven cases of segmental resections in mandibles with simultaneous free fibula flap reconstructions from oral and maxillofacial surgery in Xiangya Hospital were selected, using cone-beam computed tomography (CBCT) and CT scanning mandibles and fibulas to collect data respectively. Expected mandibular models were printed after surgical simulations. Titanium plates were preformed for expected mandibular models. CBCT used to scan the sample to obtain composite models composed of titanium plates and expected models. Finally, designing the osteotomy guide plates with location holes. Osteotomy guide plates were emplaced during operation, resecting mandibular lesions after being drilled and fixed, and emplacing preformed titanium plates by existed holes. CBCT reconstruction models were checked after operation, analysing the absolute deviation of special, and describing deviation by percentiles in the collected statistics.
Findings: Seven cases with preformed titanium plates were emplaced reliably, obtained good recovery in occlusal relationship and were satisfied with the contour of reconstructed mandibles. The absolute deviation of postoperative reconstructed mandibles compared with expected operative models were: P25 = 0.26 mm, P75 = 1.17 mm; the absolute deviation of titanium plates were: P25 = 0.08 mm, P75 = 0.43 mm.
Conclusion: The position relationship between preformed titanium plates and mandibles could be obtained by CBCT scanning the composite models composed of preformed titanium plates and expected mandibular models, and the osteotomy guide plates with location holes could meet the demands for orientating titanium plates in clinical operations, which deserve the clinical expansion.

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Do we need routiner postoperative radiographic assessment in orbital repair?

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Objective: The purpose of this study was to retrospectively assess the incidence of implant malposition and revision surgeries in orbital repair in a large trauma centre, where postoperative computed tomography (CT) assessments are performed routinely.
Methods: This observational study was conducted at the Department of Cranio-Maxillofacial Surgery at the University Hospital of Bern, Switzerland. 71 adult patients were treated with a titanium mesh between September 2008 and December 2015. The primary indication for surgical repair was the presence of an isolated or combined orbital fracture causing a functional or aesthetical deficit. Exclusion criteria included missing postoperative follow-up documentation and/or CT scans. Preoperative CT scans were obtained to assess the size and location of the fracture. To evaluate accuracy in reconstruction, postoperative CT scans were performed routinely and the results were classified.
Findings: A total of 71 patients with 73 implants were included in this study (49 male, mean age 56). The mean defect size was 2.81. Twelve patients (17%) were confronted with an unsuccessful treatment outcome and needed revision intervention. The main risk factor for revision was a poor postoperative outcome assessment according to Ellis ($P < 0.001$).
Conclusions: Patients with extensive orbital defects who require surgical treatment with a titanium mesh are at high risk for implant malposition. Since an insufficient position of the implant is the main reason for a surgical revision, we postulate that a postoperative radiographic control should be done routinely. Only then long-term sequel due to inappropriate reconstruction can be avoided.

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Patients perception of good occlusion and functional rehabilitation following open reduction and internal fixation of fractured mandible

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Background: Open reduction and internal fixation of the fractured mandible is a common procedure undertaken in Oral and Maxillofacial surgical specialty. In our unit over 200 of them were performed over a year. Objective assessment of occlusion on the table while the patient was under general anaesthesia is the usual practice. It is not possible to get patients feedback about their proprioception of occlusion when the teeth were put together before the fixation.
Objective: To evaluate the patient's perception of their occlusion and functional satisfaction following fixation.
Methods: A retrospective study of postsurgical occlusal and functional satisfaction among this patient group was done over the telephone. The survey was undertaken using a template questionnaire focussing on 1) perception of bite (occlusion), 2) mouth opening and 3) chewing ability. All the patients in the study were six months postsurgery.
Findings and Conclusion: In our study all our patients were under general anaesthesia one has to relay on objective assessment of occlusion by surgeons. Majority of our patients have reported satisfied with the achieved occlusion by the surgeons. They have achieved normal functional ability to their satisfaction following the fixation. However, those who had hypodontia prior to surgery and those who had extractions at the time of surgery reported to have low level of satisfaction.

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Near miss — a penetrating injury

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Penetrating injuries involving face, neck and thorax together is uncommon and can be particularly difficult to manage since multiple vital structures are present in each of these regions. Injuries of these kinds have the potential for significant morbidity and mortality. The modern approach to these patients should be multidisciplinary and requires cautious integration of clinical findings and appropriate imaging studies to formulate an effective, safe and minimally invasive treatment modality.

We present a case report on a patient with a penetrating metallic rod injury following a fall from tree involving face, neck and thorax managed successfully with a multidisciplinary approach.

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Remodelling of the condylar head after fracture fixation with ultrasound activated resorbable pins

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Background: Ultrasound activated resorbable pins have been used successfully to treat condylar head fractures. One concern initially with their use was osteolysis of the condylar head when the material resorbed.
Objectives: To review the remodelling and any resorption of the condylar head during the healing phase through resorption of the fixation material.
Methods: Patients who underwent condylar head fracture fixation with ultrasound activated poly-D-L-lactic acid pins were followed up, and computer tomography scans undertaken between 12 and 24 months postoperatively to assess condylar head remodelling, the resorbable pins were still evident, and whether there was any evidence of osteolysis.
Results: Condylar heads showed evidence of remodelling beyond 12 months, although there was no evidence of negative effects such as loss of condylar height, temporomandibular joint pain or change in occlusion after the initial postoperative healing period. No scans showed any evidence of osteolysis around the pin tracts and by 24 months there was no longer any evidence of resorbable material.
Discussion: Current resorbable materials do not appear to demonstrate significant resorption reactions in bone and their presence does not appear to adversely interfere with remodelling of the condylar head after initial fracture healing. Whilst the overall benefits of reduction and fixation of condylar head fractures remains to be clarified, where surgery is proposed we support the use of ultrasound activated resorbable pins which therefore do not require removal and here provide reassurance that there do not appear to be any long-term problems with their use.

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White-eyed orbital blowout fracture in children — a case series

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Trapdoor or white-eyed orbital blowout fracture is an uncommon paediatric maxillofacial injury. Although potentially a life-threatening injury, lack of clinical manifestations with minimal orbital wall disruption with or without evidence of entrapment of inferior orbital content on radiological examination may contribute to late diagnosis and inadvertently impair the prognosis.

We describe three cases of a white-eyed blowout orbital floor fracture in children that underwent different managements. One patient with radiological evidence of incarcerated muscle and clinical evidence of entrapment was treated surgically while the other two patients presented only with computed tomography evidence of a linear fracture of the orbital floor without any other clinical symptoms were treated via nonsurgical approach.

This report is in agreement with bulk of literature that trapdoor or white-eyed orbital fractures pose a true surgical emergency for the symptomatic paediatric patient but observation alone may be appropriate in selected cases.

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Midfacial trauma: subtarsal lower-eyelid incision to access and repair orbital floor fractures

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Background: At Mid Yorkshire NHS Trust we encounter a high volume of traumatic injuries to the zygomatic-orbital complex. Historically, at this unit these fractures were accessed and repaired via lower blepharoplasty and subtarsal incisions. These are well-established approaches for several reasons but have the obvious drawbacks of potentially unaesthetic scarring and ectropion. We discuss our experience of using the subtarsal lower-eyelid incision, including the adequacy of exposure, the perioperative and long-term complications and alternative surgical approaches.
Methodology: A retrospective analysis was made of patients receiving orbital floor access and repair during a 24-month period. Complications were determined by reviewing operation notes and subsequent follow up. Analysis of postoperative photographs was also conducted; scarring or ectropion was highlighted.
Discussion: The most common mechanism of injury was via interpersonal violence/assault (78%). We found that 33% of patients had a degree of diplopia following initial injury and in 11% of patients that double vision had remained or worsened one week post surgery. 11% of patients reported ongoing pain from the lower eyelid one month post surgery after wound healing. We had two cases of ectropion (11%) and neither required any further surgical intervention.
Conclusion: There are several well-published surgical approaches to access the orbital floor. Most patient's main concerns preoperatively were based on being left with visible facial scarring. We feel that the subtarsal incision still has a place in accessing orbital

floor fractures but there should be a move towards favouring the transconjunctival approach.

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Pattern of facial trauma — a two-year study

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Background: A modern fast-paced life, and an increasingly violent and intolerant society have made facial trauma a form of social disease. This has resulted in changes in the pattern and clinical features of facial injuries — ranging from mild to massive disfigurement of maxillofacial skeleton along with functional loss.
Objectives: To study the incidence, aetiology and pattern of facial injury in Mumbai, India. Evaluate the causative factor for facial trauma and to correlate the age, sex and nature of facial injury to the causative factor.
Methods: Over a period of two years, from 2014 to 2016, 300 patients with maxillofacial injures were identified and assessed. Patients were grouped on the basis of age, sex, aetiology, pattern and site of facial trauma.
Result: A total of 300 patients were assessed in which male predominance was seen. The most common cause of trauma was fall followed by road traffic accidents, assault and others. There was approximately equal incidence of soft and hard tissue injuries. Young adults were found to be more affected compared to old-age group.
Conclusions: The changing trend of aetiology and pattern of trauma and the mechanism of injury correlates significantly with the fracture and the knowledge of these associations will guide the surgeons in accurate and timely management. Our study highlights the areas in developing countries in which further focus is required.

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Associated injuries in maxillofacial trauma — a study in a tertiary hospital

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Objectives: Maxillofacial trauma when associated with concomitant injuries has a significant potential for increased morbidity. This study aims to identify the causes of trauma, evaluate the types of associated injuries and to highlight the significance of multi professional collaboration in sequencing of treatment.
Methods: A total of 300 patients who reported to the casualty of a tertiary hospital with facial fractures were enrolled.
Results: Associated injuries were sustained by 162 patients. The predominant aetiology was road traffic accidents with maximum number of patients, in the age group of 20–29 and a male to female ratio of 10.1:1. The mandible was the most frequently fractured bone. Head injury was the most common associated injury. The mortality rate was 0.66%. The mean Injury Severity Score and Glasgow Coma Scale values among the patients who sustained associated injuries along with maxillofacial trauma were higher and lower respectively, as compared to those without associated injuries with a statistically significant difference ($P < 0.001$).
Conclusion: Implementation of strict road safety measures in the rural and interior regions of India, to prevent morbidity and mortality due to road traffic accidents is essential. Injuries to the facial skeleton must be approached with the knowledge of probable associated injuries that could have been incurred.

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Influence of substance abuse and oral hygiene: postsurgical complications of mandibular fractures

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Objective: This study was designed to evaluate the influence of substance abuse (tobacco use, alcohol) and role of oral hygiene in treatment of mandibular fractures since fracture of mandible is common in patients who sustain facial trauma.
Methods: This study was conducted at the Department of Oral and Maxillofacial Surgery, HKES S. Nijalingappa Dental College, Kalaburagi in the period 2010–2013. 50 patients with mandible fractures treated by open reduction and internal fixation were included in this study. Patients' social histories were reviewed for a history of human immunodeficiency virus status, alcohol abuse and drug abuse, oral habits like tobacco chewing and smoking.
Results: 32% of our cases developed minor complications. Of the 50 patients, 20% were smokers, 20% were chewed tobacco and 20% were alcoholics. 65% of tobacco chewers, 50% alcoholics and 75% smokers developed minor complications after one month. 88% with poor oral hygiene/periodontal status patients developed mild infection.
Conclusion: The results of this study shows that chronic substance abuse and poor oral hygiene can significantly affect treatment outcomes in the management of mandibular fractures.

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The role of navigation system, endoscopy and intraoperative computed tomography scan for the treatment of midface trauma

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Management and treatment of midfacial trauma is still challenging for head and neck surgeon because of the functional and aesthetic deformities that can occur more likely in complex fractures. The use of new technologies (navigation, endoscopy and intraoperative computed tomography [CT] scan or a combination of these devices), due to their greater accuracy, allows improving results.

Navigation-aided reconstruction is becoming essential to achieve precise and predictable results in midface complex trauma, especially in orbital reconstruction. It consists in an ideal virtual reconstruction of the target area created using a mirroring tool, superimposing and comparing the unaffected side with the fractured sides.

This technique opens a broad spectrum of possible surgical approaches, especially in situations in which anatomical landmarks for precise positioning of bone fragments, or bone grafts, are missing. Navigation system, with preoperative study, using mirroring of the healthy side and an instant virtual control with CT scan, improves the accuracy in the reduction of fractured segments.

The endoscopic approach avoids, in isolated orbital floor and medial wall fractures, an external incision and allows the observation of the fracture site clearly. With the use of an intraoperative CT scan we are able to control immediately the good results of fracture reduction neither mistakes and inaccuracies. It is intuitive how the combined use of these systems can exponentially help surgeons for the best results in midface trauma and secondary treatment of outcomes.

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Reconstruction of temporal and zygomatic posttraumatic defect with polyetheretherketone custom made — case report

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Traumatic brain injury (TBI) that requires decompressive craniotomies procedures for encephalic protection usually leads to cranial defects compromising patient aesthetics because of asymmetries. Orbitozygomatic fractures are common to car accidents and it correction is made during acute approach of trauma, but in a TBI patient this surgical correction is made as a trauma sequel.

A 26-year-old patient with TBI sequel and right Class V (Knight and North) zygomatic fracture secondary to metallic object ejected by a vehicle that led to severe TBI and right temporal and zygomatic fracture that required emergency craniotomy and intensive care unit care for two months. Patient was discharged without any kind of reconstruction or fracture reduction. Patient consulted one year after trauma because of osseous defect in temporal right area and orbitozygomatic asymmetry, so it was decided to perform fracture reduction and defect reconstruction with a PEEK (polyetheretherketone) custom made for the temporal area with titanium plates and screws for fixation and for zygomatic area, a special design was made to protect infraorbital nerve and improve implant insertion. Immediate satisfactory results and asymmetry correction was obtained.

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Comparison of ceftriaxone with amoxicillin for efficacy and cost-effectiveness for antibiotic prophylaxis in the management of open facial fractures

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Background: Many randomised and retrospective studies have been performed to evaluate the effect of antibiotic prophylaxis for open facial fractures, important information is lacking regarding the time between injury and definitive treatment and cost effectiveness.
Objective: The main objective of this study is to evaluate and compare the efficacy and cost viability of ceftriaxone with amoxicillin for antibiotic prophylaxis in the management of open facial fractures.
Methods: 70 patients with open facial fractures were enrolled for this study. The participants were randomly divided into Group A (35) and Group B (35) based on the type of receiving postoperative antibiotics. Group A patients received amoxicillin 1 g eight hourly and Group B patients received ceftriaxone 1 g twelve hourly for not more than 24 h postoperatively. Patients in both groups were followed up at days 7, 14 and 21 postsurgery. The treatment modality was open reduction and internal fixation.
Results: Postoperative infection rate in Group A was seen in two patients and in one patient in Group B which was found to be statistically not significant at 0.5. Smoking was found to be significant at 0.01. The cost difference was approximately between rupees 200–300/patient/day.
Conclusion: In the surgical management of open facial fractures use of postoperative prophylactic antibiotics does not have a statistically significant effect on postoperative infection rates. Ceftriaxone was found to be more cost effective than amoxicillin.

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A system for decision-making process on whether to treat mandibular condylar fractures open or closed

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Background: Despite decades of study, consensus on therapeutic approaches to condylar fractures remains elusive, and question of surgical or nonsurgical treatment remains to be definitively answered.
Objectives: To outline factors that influence treatment outcomes of mandibular condylar fractures (MCFs); and based on these to create a MCFs scoring system that will guide the decision-making process on whether to treat the fractures open or closed.
Methods: Patients with MCFs were prospectively randomised into open and closed treatment groups. In the open group fractures were approached via retromandibular incisions. In the closed group patients were placed in IMF for one week. In both groups, elastic guidance was used for five weeks and physiotherapy for three months. Both groups were assessed for mouth opening, occlusion, range of movement, temporomandibular joint function and complications at one and six weeks, and 3, 6 and 12 months.
Results: 114 patients (male to female ratio, 106:8) were included in the study. In the closed group, 10 patients had malocclusion and 27 patients had deviations (greater than 2 mm). In the open group, four patients had malocclusion, three had deviations, 12 had transient facial nerve palsies, four developed keloids, while five had fistulae. Risk of complications in the closed group was higher in older fractures, vertical height loss >8 mm, greater than 30° angle of displacement and dislocated fractures.
Conclusion: Several factors are to be considered when making therapeutic decisions: type of fracture, degree of displacement, condylar head dislocation, ramal vertical height loss, presence of teeth and associated injuries.

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Dose reduction does not decrease the diagnostic acceptability of cone-beam computed tomography and multislice computed tomography for the diagnosis of

Zygomaticomaxillary fractures in a blinded and randomised approach

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Background: Cone-beam computed tomography (CBCT) and multislice computed tomography (MSCT) are the imaging modalities of choice in midface trauma diagnostics and treatment planning.
Objectives: To assess the diagnostic acceptability of low dose CBCT and MSCT protocols for zygomaticomaxillary fracture diagnosis.
Methods: Unilateral zygomaticomaxillary fractures were inflicted on four out of six fresh frozen human cadaver head specimen. All specimens were scanned using two CBCT and four MSCT protocols where the radiation exposure was systematically reduced. A blinded diagnostic routine was recreated where 16 radiologists and 8 oral and maxillofacial surgeons performed 144 randomised image assessments. The presence of fractures was verified by a dissection of the zygomatic region and used as a gold standard to verify the outcome of the image assessments.
Findings: Zygomaticomaxillary fractures were correctly diagnosed in 90.3% ($n = 130$) of the image assessments. The zygomatic arch was the most often correctly diagnosed (91.0%). The zygomatic alveolar crest showed the highest degree of misdiagnosis (65.3%). No significant decrease of correctly diagnosed fracture sites was found between the baseline and low dose CBCT and MSCT protocols. Dose reduction did not significant decrease the ability to assess dislocation, comminution, orbital volume and the quality of volume rendering and soft tissue reconstructions. Oral and maxillofacial surgeons considered the low-dose protocols sufficient for treatment planning. The effective dose of MSCT (129.9–51.0 μSv) remained well in range of CBCT (122–28 μSv).
Conclusions: Low-dose CBCT and MSCT protocols do not deteriorate the diagnostic acceptability for the diagnosis of zygomaticomaxillary fractures.

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Implant positioning and patient outcome in orbital reconstruction with patient-specific implants

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Background: In complex orbital reconstruction, a patient-specific implant (PSI) is believed to be the best concept for reconstruction. Desired shape and overcorrection of the reconstructed orbit can be implemented in the design. Intraoperative navigation, with embedded markers or vectors in the design and a compulsory fit should make positioning precisely to plan achievable.

Upon evaluation, small deviations between planned and acquired implant positions may be seen due to different factors, ranging from image processing to patient's anatomy-dependent design choices. Design may be an import factor in the reconstruction outcome.
Methods: Retrospective evaluation of all consecutive PSI cases for orbital reconstruction in the Academic Medical Centre Amsterdam from 2014 to date was performed. Acquired implant position was compared to planned position in three dimensions through calculation of rotational and translational parameters. The effect of implant design (screw hole positions, rim extension, ledge/wall support, anterior elevation) on implant position was evaluated. Clinical outcome was evaluated in light of implant position and anatomy-related design.
Findings: 18 PSIs in 18 patients were evaluated. The mean deviations in acquired position versus planning were roll 3.7°, pitch 2.0°, yaw 2.5°, translation 1.6 mm. Using old screw hole positions and a rim extension seem to improve positioning. Near perfect positioning does not necessarily lead to optimal clinical outcome.
Conclusion: PSIs can be positioned with great accuracy; specific details in design can improve positioning. A perfectly positioned PSI does not necessarily lead to perfect patient outcome, emphasising the need for research regarding optimal shape and overcorrection in complex reconstructions.

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Craniofacial trauma — an enigma

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The surgical modalities and management of craniofacial fractures has undergone an important and radical change in the past two decades. Various approaches are implicated in the treatment of these fractures. The bicoronal approach was one among them and was popularised by Paul Tessier in sixties is one of the most versatile in treating frontal and midfacial fractures. Modern era surgeons have modified and improved the new craniofacial surgical techniques. The approach gives a broad exposure to the frontal bone, nasal bones, orbits, zygoma and zygomatic arch and gives an ideal aesthetic result. This paper highlights the treatment modalities of craniofacial fractures with bicoronal approach at the St. Joseph Dental College, Eluru, India.

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Is lignocaine with out adrenaline a better choice for lip wounds crossing vermillion border?

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Background: Laceration of the lip is a common referral to maxillofacial surgeons via emergency units. These are usually managed under local anaesthesia or general anaesthesia depending on patient ability to cooperate. We have carried out randomised control trial on patients undergoing the procedure.
Objectives: It is very well known that adrenaline used in the local anaesthetic aids in vasoconstriction which helps in prolonging the anaesthetic time and achieve haemostasis. We wanted to establish how it affected our patient group and weather the adrenaline content in local anaesthesia aided surgeon in our patient group.

Methods: All the lacerations that involved the vermillion border were selected for the study. We have divided the sample into those who underwent procedure under local anaesthesia with and without adrenaline. We compared the needle gauge used, type of local anaesthetic used, amount of local anaesthetic used, appearance of surgical field while performing the procedure and comfort of patient undergoing the procedure.
Findings and Conclusion: Local anaesthetic with adrenaline causes local vasoconstriction resulting in localised blanching. This causes difficulty in locating the exact demarcation between skin, white roll and lip. Primary haemostasis was already established in this patient so the role of adrenaline was not really justified. We also found the use of subcutaneous needle for infiltrations reduced the volumes of local anaesthetic infiltrated and reduced the distortion of anatomy post infiltration while meeting analgesic needs.

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Risk assessment of orbital swellings using ultrasound

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Background: Ophthalmic ultrasound provides a quick and noninvasive evaluation of the orbit by allowing the clinician to view structures that may not be visible with routine equipment. It provides a detailed cross-sectional view of the globe and real-time display of the moving organ. There were no reports in the literature of ultrasonography being used by maxillofacial surgeons to assess the eye.
Objective: Assessment of orbital swelling, in general, is mandatory when examining a patient with facial trauma and infection. Missed ocular pathology could be detrimental to a patient's vision.
Methods: Assessment of patients following trauma who had gross periorbital swelling using ultrasound and colour Doppler. Focusing particularly on pre- and postseptal tissues which include, periorbital fat, optic nerve, extraocular muscles and retrobulbar tissue.
Results: Ten patients with periorbital swelling were assessed using ultrasound and colour Doppler. Two patients were diagnosed with retrobulbar pathology, one with retrobulbar haemorrhage and another with a retrobulbar collection. The remaining patients had preseptal cellulitis and orbital floor fractures.
Discussion: Assessment and diagnosis of orbital pathology are both clinical and radiological. Acute retrobulbar pathology may not allow the luxury of time to organise computed tomography. This noninvasive procedure could be performed by accident and emergency doctors and frontline maxillofacial doctors following training.
Conclusion: We found ultrasound helpful in detecting and addressing ocular pathology. Use of ultrasound as an immediate investigation in the accident and emergency department will help delineate and rationalise the treatment planning.

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An update on management of firearm injury in maxillofacial region

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Although the frequency of firearm-related injuries and the number of deaths associated with them decreased markedly during the 1990s. Firearm-related injuries are still the second leading cause of injury-related death worldwide. Management of firearm injury in maxillofacial region is a challenge. Previous conventional approaches include debridement, soft tissue closure, conservative treatment of fractures, delayed closed reduction and external fixation.

But, recently initial final treatment — (advanced aggressive approach) no consensus on time for reconstruction (ABC's and GCS stable). Treatment of choice is early definite reconstruction of bone and soft tissue deficits with vascularised flaps (free flaps, rotational flaps and grafts, etc).

This recent management has the advantages of:
1. Reduced infection rate
2. Elimination of scarring and deformities
3. Resulting from contraction of tissues
4. Improved function
5. Improved emotional condition and social activity
6. Shorter hospital stay
7. Fewer surgeries.

Thus the initial final treatment is considered better than old conventional therapy.

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Management of condylar fracture

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The treatment of condylar process fractures has generated a great deal of discussion and controversy in oral and maxillofacial trauma and there are many different methods to treat this injury. For each type of condylar fracture, the techniques must be chosen taking into consideration age of patient, the presence of teeth, fracture height, patient's adaptation, patient's masticatory system, disturbance of occlusal function, deviation of the mandible, internal derangements of the temporomandibular joint and ankylosis of the joint with resultant inability to move the jaw, all of which are sequelae of this injury. Many surgeons seem to favour closed treatment with maxillomandibular fixation, but in recent years, open treatment of condylar fractures with rigid internal fixation has become more common.

The objective of this review was to evaluate the main variables that determine the choice of method for treatment of condylar fractures: open or closed, pointing out their indications, contraindications, advantages and disadvantages. To treat condylar and subcondylar fracture the most important factors are age, site of fracture, occlusion and of course surgical skills.

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Workflow of computer-assisted surgery in midfacial and orbital reconstruction with selective laser melted patient-specific titanium implants

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Background: Highly precise computer-aided design/computer-aided manufacturing patient-specific titanium implants (PSTI) which were introduced recently, lifted craniomaxillofacial reconstruction on a higher level.
Objectives: Aim of this paper is the description of an algorithm for midfacial and orbital reconstruction.
Methods: Patients' facial defects were assessed in multiplanar and three-dimensional (3D) views. Reconstructions were performed as follows:
(1) Preoperative virtual reconstruction by the use of iPlan-CMF software (Brainlab®).
(2) Virtual reconstruction served as basis for PSTI which were computer-aided-designed and manufactured by selective laser melting technique.
(3) Surgery was performed using minimalised approaches. PSTIs were positioned regarding best fit and/or in combination with intraoperative navigation.
(4) Surgery ended with intraoperative 3D-C-arm imaging and image fusion of the intraoperative scan with the preoperative plan to control the achieved result.
Findings: Up to now 19 patients could be treated with the described algorithm successfully. iPlan-CMF software reduced planning time significantly. Size and fit of PSTI were satisfactory in all cases. Positioning of PSTI could be realised by their precise fit. Navigation was used in complex cases additionally. The intraoperative radiological 3D-control and the image fusion of preoperative planning and intraoperative data sets enabled the surgeon to evaluate his result intraoperatively. This led to a reduction of operation time, enabled minimal invasive approaches and minimised the risk of sequelae. Soft tissue deficiency and scaring can limit the aesthetic outcome.
Conclusion: The described workflow can improve surgeon's confidence in midfacial and orbital reconstructions and leads to predictable results. In addition, it reduces time for planning and surgical procedures with minimal invasive approaches.

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Mango madness

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Background: The relationship between weather variables and trauma has been well-established in previous trauma research. The link with facial trauma specifically however, has not previously been evaluated. Facial trauma needs to be evaluated separately, given the role of interpersonal violence as a contributing aetiology. The temperature-aggression hypothesis predicts that higher temperatures results in increased aggression, and may account for increases in facial trauma.
Objectives: To evaluate whether weather variables influence facial trauma rates in the Northern Territory of Australia.
Methods: A retrospective chart analysis was conducted evaluating rates of facial trauma over a 12-year period, between 1995 and 2007. These data were correlated with weather data attained from the Australian Bureau of Statistics, including temperature, rain, sunlight and humidity.
Conclusion: There is a statistically significant association between a number of weather variables and facial trauma rates. There are likely multiple variables affecting this relationship reflecting the varied aetiologies of facial trauma. The temperature aggression hypothesis is a useful model to account for facial trauma caused by interpersonal violence. Further research is required to specifically evaluate these motives. This epidemiological data can have value in workforce planning, particularly for maxillofacial units where facial trauma represents a large component of work.

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Management of oral and maxillofacial war injuries during Libyan Conflict 2011: lessons learned by an oral surgeon

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Background: Treatment of facial injuries, particularly those involving soft and hard tissue loss, requires a profound knowledge of anatomy as well as competent oral and maxillofacial skills. The purpose of this presentation is to describe the personal experience of an oral surgeon during the Misrata battle of the Libyan civil war. The surgeon's reflective thoughts on patterns of injuries and their primary management present useful lessons to optimise care of these victims.
Methods: The author was involved in oral and maxillofacial cases treated in Misurata Central Hospital during 2011. There was no effective record management system. Only cases documented on the surgeon's digital camera have been reflected upon and analysed which represents his current Doctorate of Philosophy project at the Queen Mary University of London.
Results: Series cases of facial trauma have been included in this reflection. There are different, frontline usually is young soldiers and fighters, which are more destructive injuries. Victims usually different types of civilian including infants and babies.
Discussion: Management of patients with oral and maxillofacial injuries is a challenge. As the majority of cases involved young combatant personnel, quality of life is greatly influenced by the primary management. Surgical access and scar positions along with growth centres in the head and neck should be considered when treating these cases. The author hopes that lessons will be learned and such patients receive optimum treatment in such situations.

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Dental Implantology, Preimplant Surgery and Grafting

Four-year experience with dynamic implants with internal port for minimally invasive sinus elevation

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Objective: The purpose of this article is to describe long-term results of the dynamic implant valve approach (DIVA) for the dental implant procedures when the implant system with internal ports was used.
Methods: During 2012 to 2015, 378 titanium-aluminum-vanadium implants were implanted in 172 patients using the DIVA technique. The DIVA implants were used in cases when sinus membrane and/or nasal floor elevation procedures were needed. The condition of the implants was assessed during the follow-up period up to 60 months.
Results: Out of 378 inserted implants, 257 implants were inserted in the maxilla with the bone level <5 mm, and 121 implants were inserted in the maxilla with the bone level >5 mm. In 357 cases (94.5%), the implantation was totally successful. The comparison of complication rates between the cases with the bone level <5 mm and the cases with the bone level >5 mm indicated no significant difference ($P = 0.32$).
Conclusion: Preliminary results that the DIVA simplifies the dental implantation procedure and augmentation treatment were confirmed. The implant with an inner sealing screw can be used in cases with elevation of the maxillary sinus membrane, and simplifies the surgery and secures optimal dental implant placement.

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Effect of implant length on osseointegration in maxillary sinus augmentation (clinical and radiographic study)

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Antral pneumatisation of the maxillary sinus consider of most common dental manipulation with introducing of implants in posterior maxilla. Resorption of buccal and alveolar bone height in this area consider more complicate to receive this implants i.e. inadequate posterior alveolus and increased pneumatisation of the maxillary sinus. The objective of this study was to increase the amount of bone graft as possible and to correlate between the implant length subantral.

The study was done on two groups 20 patients with mean age 40 years suffered from decreased both buccal and vertical bone height at posterior maxilla, each patient received one or two implants after a Caldwell Luc osteotomy and both panoramic and cone-beam computed tomography at the follow-up to evaluate the radiographic bone density. The clinical assessment was to evaluate the implant stability at the follow up.

The results of this study demonstrated that the success rate of implant osseointegration in maxillary sinus augmentation depend mainly on the increased graft dimensions and primary stability of implants.

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Cardiac surgery, endocarditis and the question of dental extraction

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Background: The risks that are associated with dental extraction prior to cardiac surgery have not been clearly addressed in the literature. This study further evaluates and details this relationship, in order to pursue a better outcome for patients.
Objective: To formulate a possible framework and scientifically accepted guidelines, as how we should proceed with dental extraction prior to cardiac surgery.
Methods: Is based on using and incorporating the fundamentals of pathology, oral surgery and infectious disease into the speciality of cardiac surgery.
Results: Discussion and questions in this research would be helpful to both oral and cardiac surgeon in providing a higher quality of patient care and achieving a more favourable outcome.
Conclusion: This study may show us a new direction and guide us to improve and amend the old way and implement new guidelines regarding cardiac surgery and dental extraction.

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Extramaxillary zygomatic implants for maxillary prosthetic rehabilitation

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Background: Aging, maxillofacial trauma, periodontal disease, cysts, lesions and ablative surgery can result in decreased alveolar bone volume. In the maxilla, limited bone quantity and quality, especially in the posterior region results in low success rates for dental implants. Various methods for bone augmentation have been described. An alternative for these patients are zygomatic implants. The most common technique for zygomatic implants is the intrasinus technique. Lately a new approach was introduced; the extramaxillary technique.
Objectives: Describe the extramaxillary approach, its advantages and present our experience.
Methods: 17 patients exhibiting a severely atrophic maxilla were included. 46 zygomatic implants were placed, with special consideration to the infraorbital nerve and base of the orbit. Immediate rehabilitation was performed. A mean follow-up of eight months was conducted and included assessment of osseointegration, soft tissue, proper implant location and proper rehabilitation.
Findings: All implants have undergone proper osseointegration, no implants were removed during the follow-ups and no significant bone loss was observed. Soft tissue healed properly with normal probing pocket depth. All implants were prosthetically restored successfully.
Conclusions: Zygomatic implants allow for immediate loading in cases of severely atrophic maxilla. In the extramaxillary approach the emergence of the implant head is more prosthetically correct in comparison to the intrasinus approach, thus leading to better dental hygiene and decreased mechanical resistance. In this study we showed our experience with extramaxillary zygomatic implants.

All of the implants survived, with good anchorage and proper soft tissue healing and were all rehabilitated.

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Reconstruction with "tent pole" grafts for severely resorbed jaws: a case report

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In the past, numerous efforts or treatment modalities have been offered to reconstruct severely resorbed mandibular ridge only to result in rapid resorption of bone graft associated with soft tissue contraction and they might even be complicated by jaw fracture, wound dehiscence, fistulas formation, and neurosensory disturbance. With the "soft tissue matrix expansion" and "tent pole" grafting concepts advocated by Prof. Robert E. Marx, simultaneous implantation and bone grafting as 1-stage procedure through submental approach can be achieved with well consolidation and volume maintenance of grafted bone and predictable long-term implant success.

We would like to present a case of a 56-year-old female patient referred from a local dental clinic for oral rehabilitation using implant restorations. Clinical examination and cone-beam computed tomography revealed severe atrophy of both maxilla and mandible. After consultation with prosthodontist, implant supported overdentures was planned for her including autogenous iliac J-bone blocks grafting for maxillary arch and simultaneous implant placement with "tent pole" grafts for mandibular arch through submental approach. Surgical wound on both arches healed uneventfully and subsequent placement (stage-I implantation) of regular sized dental implants on maxilla and uncovering (stage-II implantation) of the four mandibular implants was performed at five months after surgery.

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Factors affecting the release of titanium into human serum

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Background: Often cited to be virtually insoluble, clinical studies confirm the release of titanium into human serum even in the absence of wear. This paper presents *in vitro* results to explain this ongoing release titanium from surgical devices in humans, and improves our understanding of the underlying kinetics of this process.

Objectives:

1. To review the evidence for the release of titanium ions in human cells and tissues.
2. To present *in vitro* evidence for the release of titanium ions into human serum.
3. To investigate the role of transferrin and buffering organic acids on titanium release.
4. To examine the binding of titanium to transferrin (Ti-Tf) by X-ray crystallography.

Methods:

1. Systematic review of literature summarising relevant *in vitro* data relating to titanium release
2. Determination of titanium (IV) levels in human serum, and the effects of citrate, lactate and transferrin on titanium release after 7 days immersion using ICP
3. X-ray crystallography of the Ti-Tf structure

Findings: The presence of lactate and citrate greatly enhance Ti(IV) levles, reflected in a linear logarithmic relationship. This relationship does not exist with transferrin. Citrate is found to bind Ti(IV) in the transferrin.

Conclusions: The release of titanium ions from surgical devices implanted into the human body may occur under physiological conditions, and is primarily dependent on the presence of citrate and lactate. It is likely that binding to transferrin occurs secondarily, in a process coordinated by citrate.

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Evaluation of periimplant bone level around implants with platform-switched abutments inserted using computed tomography-based software planning and computer-aided design/computer-aided manufacturing guided surgical template

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Background: The maintenance of periimplant bone is a major factor in the prognosis of prosthetic rehabilitation supported by implants. In an attempt to improve long-term bone maintenance around dental implants, a new implant-to abutment connection referred to as "platform switching" has been proposed.[1]

Objectives: To compare the crestal bone height changes around dental implants with platform- and nonplatform-switched abutment inserted using computed tomography-based software planning and computer-aided design/computer-aided manufacturing (CAD/CAM) guided surgical template.

Methods: A total of 14 implants were placed and patients were divided into two groups. Seven implants with a diameter of 4.6 mm and restored with platform-switched abutments (3.5 mm) served as the test group. Seven implants with a diameter of 4.6 mm and restored with a horizontally matching abutment diameter served as the control group. Standardised digital panoramic images were obtained for evaluation of marginal bone levels at the time of placements of prosthesis (baseline), 6 and 12 months follow-up. All implants were placed with CAD/CAM-generated surgical guides after virtual planning of implant placement.

Findings: The platform-switched implants exhibited statistically significant less bone loss at time of insertion of the definitive prosthesis (0.93 ± 0.10 mm versus 1.40 ± 0.26, $P < 0.05$) and at one year (1.47 ± 0.15 versus 2.19 ± 0.15 mm, $P < 0.05$) when compared to the nonplatform-switched implants.

Conclusion: It can be concluded that platform switching is capable of reducing or eliminating crestal bone loss.

Reference

Lazzara, R. J., & Porter, S. S. (2006). Platform switching: a new concept in implant dentistry for controlling postrestorative crestal bone levels. *Int J Periodontics Restorative Dent*, *26*, 9–17.

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Soft tissue expansion with a new osmotic tissue expander has delayed swelling capability: an experimental study in sheep mandible

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Background: Osmotic soft tissue expanders used in preimplant surgery to increase insufficient soft tissue prior to bone augmentation swell absorbing body fluids in itself and cause soft tissue expansion. Although this method is easy, various complications like wound dehiscence, tissue necrosis and expose of the tissue expander have been reported.
Objectives: The aim of this study is to develop a new soft tissue expander that has delayed swelling capability will be an alternative to existing osmotic soft tissue expanders.
Methods: Dynamic swelling studies of the new expander (p[AAm-ko-HEMA] based) and Osmed® (methylmethacrylate based) were performed in phosphate buffer solution. In the second stage, expanders were placed in subperiosteally on the bilateral edentulus area of the sheep's mandible. After the completion of tissue expansion, the animals were sacrificed and histological assessment was done.
Findings: As a result of dynamic swelling studies, our new expander and Osmed® have an equilibrium swelling content of 190% and 160%, respectively. The swelling rate of the hydrogels for the first 13 days was decreased with a swelling content 35%, while Osmed® had 70%. During *in vivo* test period, seven tissue expanders with silicone shell exposed. Four of them were Osmed®. According to the histologic results of both expanders groups, the inflammatory cells and other reactive responses were not observed.
Conclusion: In conclusion, the new soft tissue expander has delayed swelling capability can be used as an alternative to other tissue expanders, but further studies including the optimisation of the new tissue expander are needed.

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Modified subperiosteal implants: no major surgery

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The struggle and desire to aesthetically restore the lost body parts is as old as the history of humanity. Restoring the function and aesthetics of the lost tissues has been the main focus of scientists for centuries. The improvements have been made to this approach in dentistry, and implants have been developed and introduced into the practice of dentistry to restore lost functions. Endosteal dental implant treatment consists of the insertion of an artificial tooth root and has been widely practiced as an effective treatment method for patients who have lost teeth. However, many patients have insufficient alveolar bone height and width.

These patients need to undergo major surgery to graft these areas with particulate grafts, block grafts, sinus lifts, nerve transposition and alveolar distraction osteogenesis, usually taking several months of healing and recovery. In addition, the costs these types of grafts may be too costly for the patients to endure.

In our cases, patients who do not have adequate alveolar bone height and width and do not want major surgery are treated with modified subperiosteal implants. Modified subperiosteal implants design is made using DİCOM image and three-dimensional (3D) software (Materialise N.V. Leuven, Belgium) and made with 3D laser printer (M2 cusing, CONCEPT Laser GmbH, Germany).

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The results of the clinical and histological evaluation of bone autografts after tunnelling bone grafting technique

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Objective: The purpose of this work is to study clinical and histologic features of mandibular bone autografts when using tunnelling technique.
Methods: Partially edentulous patients (28) with bone atrophy underwent surgery and clinical study. Bone autograft were harvested from the retromolar part of the lower jaw. The surgeries were carried out using the tunnel technique and microsaw technique. Severity of pain, healing time and complications were evaluated. Four months after bone grafting bone columns were withdrawn for histologic evaluation prior to dental implantation.
Results: Clinical studies demonstrated that pain severity and collateral oedema were less manifested in the patients who underwent the tunnel technique treatment than those with the conventional bone grafting technique. No complications were reported after tunnelling bone grafting method. Histologic evaluation revealed a greater number of vitality osteocytes in the bone graft in comparison to the patients treated with the conventional technique.
Conclusions: The study demonstrates the benefits of the minimally invasive tunnelling technique with a milder postoperative course and the lack of postoperative complications.

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Measurement of dental implant stability by resonance frequency analysis: a study

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Background: A major cause of implant failure is lack of primary stability which is a prerequisite for osseointegration. Resonance frequency analysis (RFA) offers a clinical, noninvasive measure of stability proven to be a useful tool to establish implant loading time. The RFA values are represented by a quantitative unit called the implant stability quotient (ISQ) on a scale from 1 to 100 measured with the Osstell (Integration Diagnostics, Gothenburg Sweden). An increased ISQ value indicates increased stability.
Objectives: The objective of the present study was to measure the primary stability of dental implants during the healing period and determine the factors that affect the ISQ.

Methods: We chose 50 patients who received 1 or more implants placed at different sites with patient age ranging from 20 to 60 years. Implant stability was tested by resonance frequency analyser for a period of 10 weeks, at intervals of 0, 1, 3, 6 and 10 weeks.
Findings: No differences in stability of implant or failure rate between men and women. Most common site was anterior mandible, followed by anterior maxilla. ISQ was 67.02 ± 2.82 at Day 0, 64.08 ± 6.28 at 1 week and 56.70 ± 4.65 at 3 weeks, 68.24 ± 6.28 at 10 weeks. Probing depth was 2.07 mm at Day 0, 1.79 mm at 6 weeks follow-up.
Conclusion: RFA could serve as a noninvasive diagnostic tool for detecting implant stability during healing stages and subsequent routine follow ups.

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Reconstruction of the posterior mandible with onlay cranial grafts before implant placement: a personal experience of 172 cases operated in 18 years

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Background: The purpose of this study is to present the protocol and results of pre-implant reconstruction of the posterior mandible with cranial bone graft apposition from 1997 to the present.
Methods: 172 cases of bone resorption were grafted over a period of 18 years. Onlay bone grafting was used for horizontal resorption. For vertical resorption, a framework was made of cortical bone filled with bone marrow particles. Pre- and postoperative scans were taken and used to measure the bone augmentation and results. All patients were recalled for radiographs to assess the periimplant resorption and implant long-term survival in the grafted bone.
Results: The results showed an average bone augmentation of 7.8 mm in cases of vertical resorption and 7.2 mm in cases of horizontal resorption. In cases of mixed resorption results showed average bone augmentation of 6.67 mm vertically and 8.1 mm horizontally. Complications included lip and chin hypoesthesia in 6.4%, bone graft exposure in 2.7% and partial, or complete, resorption of the grafts in 5.2%.

The interval between the graft and the placement of bridges was 13.3 months. The success rate of implants was 86.6%, while the rate of implant survival was 97.7%. The radiographic mean follow-up of patients was 52 months (4.3 years).
Conclusion: The results of this study suggest that the onlay graft technique, except for rare cases of very low occlusal space, is possible in all situations (even the most extreme) and has many benefits and very good results for bone augmentation and implant placement.

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Evaluation of a new biphasic calcium phosphate for maxillary sinus floor elevation: microcomputed tomography and histomorphometrical analysis

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Background: Synthetic biphasic calcium phosphate (BCP) with a hydroxyapatite/beta-tricalcium phosphate (HA/β-TCP) ratio of 60/40 (BCP60/40) is successfully used as alternative for autologous bone in patients undergoing maxillary sinus floor elevation (MSFE) for dental implant placement. A high percentage of HA in BCP60/40 may hamper efficient scaffold remodelling, but whether BCP with a lower HA/β-TCP ratio of 20/80 (BCP20/80) is more desirable is still unclear. Osteogenesis and neovascularisation are pivotal in effective bone regeneration.
Objectives: We aimed to investigate whether differences exist in osteogenic and/or vasculogenic potential of BCP60/40 and BCP20/80 in patients undergoing MSFE.
Methods: 20 patients undergoing MSFE were treated with BCP60/40 ($n = 10$) or BCP20/80 ($n = 10$). Bone, graft, and osteoid volumes, number of osteoclasts and blood vessels were determined by microcomputed tomography and histomorphometrical analysis of biopsies of the augmented region that was taken 6.5 months postoperatively prior to dental implant placement.
Findings: Bone and osteoid volumes were higher at the most cranial side of the BCP20/80 biopsies compared to the BCP60/40 biopsies. Graft volumes, number of osteoclasts and blood vessels were similar in both groups.
Conclusions: BCP20/80 showed enhanced osteogenic potential in patients undergoing MSFE compared to BCP60/40, due to either a faster bone-remodelling rate, or an earlier start of bone maturation in BCP20/80 treated patients. Therefore, BCP20/80 might perform better as a scaffold for bone augmentation in the MSFE model than BCP60/40.

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Longitudinal changes of quality of life in patients with maxillary sinus bone augmentation

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Objectives: To determine changes in quality of life (QoL) of patients after maxillary sinus bone augmentation using generic health-related QoL and generic oral health-related QoL questionnaires.
Methods: Patients with the need of maxillary sinus bone augmentation by lateral window technique were recruited as Study Group and were evaluated at different time points with self-completed QoL questionnaires. People, who had not received any oral surgical treatment in the past 3 months, with matched gender and age as the study group were invited to be the Control Group and completed the same QoL questionnaires once. 36-item Short Form Health Survey (SF-36) and 14-item Short Form Oral Health Impact Profile (OHIP-14) were used. The results were analysed

using independent sample *t* tests and paired *t* tests to investigate the changes of quality of life at different time points.
Findings and Conclusion: Poorer oral health-related QoL was noted in study group preoperatively compared to the control group. Significant deterioration of quality of life after maxillary sinus bone augmentation in the first postsurgical week was significantly demonstrated and recovered gradually in a one-year's time. There was a significant improvement of OHIP total scores in the long-term. Older patients also showed a better QoL in terms of OHIP scores at all the times, indicating older patients might have adapted to the partially-edentulous condition for longer period of time, thus they could cope better with this condition. A better understanding of changes of QoL during the treatment is important for a comprehensive overall management.

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What is the survival rate of dental implants in Turkey? A systematic review

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Background: Dental implants are being used for more than 20 years in Turkey Republic, however there is not any review exist, which examines the success and survival rates of implants for this region.
Objectives: The purpose of this study is to examine the success and survival rates of dental implants in Turkey and to investigate the complications, which may lead to implant loss.
Methods: Systematic review was performed in accordance with PRISMA statement and Cochrane guidelines. PubMed, Google Scholar, Cochrane Library and TUBITAK ULAKBIM databases were searched for in English and Turkish between 1996 and 2016. Data on implant success, demographic variables, and prosthetic complications were included. Nonclinical and animal reports were excluded. Search was conducted by two authors. Agreement between authors was determined statistically, conflicts were resolved by a third reader.
Findings and Conclusion: 18 reports satisfied the inclusion criteria. In total, 1800 (55.28% female and 44.72% male) participants were included. The mean age was 46.79 ± 7.37 years (range, 18–80 years). Total of 4559 implants were used. Total implant success was 98.38% (45 early and 29 late failures) in a follow-up period for 43.87 ± 42.85 months. There was no significant relation found between demographic variables of patients. Results indicated that implants have similar success rates with the literature in Turkey region as well. It was observed that few reports with limited data were reported considering the high amount of implants placed in Turkey. Further research is needed to validate these findings.

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Outcome assessment of All-on-four and All-on-six implant restoration in edentulous patients in Indian population

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Objective: To assess the efficacy of graft less implant restorations especially All-on-4 and All-on-6 implant for full mouth rehabilitations.
Methods: The study was a retrospective analysis of 200 implants placed in 28 patients of which 17 patients needed full mouth rehabilitation whilst 11 had single jaw restoration between September 2013 and September 2016. 18 patients were females and 10 were males with 26 arches receiving All-on-4 while 16 received All-on-6 implant restorations. 11 patients were immediately loaded with screw retained prosthesis while 17 had delayed loading since primary stability was not achieved in 1 or more implants. The cases were followed-up clinically as well as radiologically at 3, 6, 12 months and annually thereafter.
Results: Implant survival rate was 100%. Biological complications such as alveolar mucositis was observed in 14.3% patients, peri-implantitis in 10.7% patients and temporomandibular joint pain in 3.5% patients. Radiologically marginal bone loss was noted in 14.3% of the All-on-4 patients and none in the All-on-6 patients. The most common prosthetic complications were the fracture of acrylic teeth in both the temporary and definitive (7.2% patients) prosthesis and ceramic teeth fractures in the definitive (7.2% patients) prosthesis.
Conclusions: The high cumulative implant survival rate proves that both the techniques suited well to the sociodemographic needs of Indian patients. Single stage rehabilitation resulted in higher marginal bone loss as compared to delayed loading.

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Dental management of ectodermal dysplasia: removable prosthodontics, endosseous implants or subperiosteal implants — a case report

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Ectodermal dysplasia (ED) is a hereditary disorder associated with abnormal development of embryonic ectodermally-derived organs including teeth, nails, hair and sweat glands. Hypodontia, reduced vertical dimension, peg-shaped laterals, and poorly developed alveolar ridges are among the oral symptoms. ED is both physically and emotionally devastating to patients. It is important that they are treated to help their social interaction.

There are various dental treatment options for ED patients. Treatment options may include conventional removable prosthesis including over dentures, fixed prosthesis, implant-supported prosthesis, implant-retained prosthesis or combination depending upon the severity of disease. Multiple denture replacements often are needed throughout development, and dental implants may be an option in adolescence.

However, poor bone quality and insufficient bone volume due to critical jawbone atrophy especially in maxillae are main issues. Two main treatment options for severely edentulous atrophic maxillae are bone augmentation procedure and zygomatic implant application.

Designed to simplify the entire dental rehabilitation process, the subperiosteal jaw implant is particularly suitable for ED patients who do not have enough jaw bone to support dental implants. These implants avoid the need for complex adjunctive procedures such as onlay bone grafts, expensive barrier membranes, sinus lift surgery as well as intrusive zygomaticus implants.

This case report describes methods of restoring function and aesthetics in an adolescent man with complete anodontia. Mandible was treated with implant-supported dentures whereas subperiosteal jaw implant was used for the maxilla because of lack of sufficient alveolar bone for implant placement.

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A combination of mental nerve lateralisation, segmental mandibular alveolar bone advancement osteotomy, bone grafting, implants placement and restoration to improve facial aesthetics and functional satisfaction

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Background: Tooth loss is one of the common causes of reduced quality of life in adults. Dental implants have become a widely accepted treatment option for patients with both partially and complete edentulous jaws. Rehabilitation of edentulous mandibular regions with severe bony atrophy using implants is subject to anatomical, surgical and biological difficulties and poses a challenge to dental teams. This may involve combination of multi staged surgical and restorative procedures. Here we describe and discuss a combination of mental nerve lateralisation, mandibular alveolar segmental advancement osteotomy with bone graft and then implants placement and restoration, resulting in excellent functional and aesthetic outcome.
Objectives: To discuss the importance of the preimplant placement surgical planning, mental nerve lateralisation, bone grafting and implant placement to achieve pleasant facial harmony and good function.
Methods: Case presentation and literature review. The technical challenges, anatomical limitations and surgical planning to achieve optimal results are presented and discussed.
Findings and Conclusion: We find early planning involving multidisciplinary approach is essential in complex cases like this to achieve the best outcome. Combination of procedures at single stage are essential to prevent multiple surgical insults and to reduce the cost. Here a multidisciplinary team with range of skills are essential to achieve the desired result.

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Virtual reality endoscopic-assisted implant surgery using head mount monitor

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Background: Virtual reality (VR) typically refers to computer technologies to generate realistic images, replicate a real environment. When we are performing the implant surgery, some invisible area is existing, and it has the possibility to threaten the safety of the surgery. On the other hand, endoscopy is the useful equipment to inspect the area where the direct viewing is difficult. However, it is frequently burdensome to see the monitor during the surgery.
Objectives: We tried to perform the VR endoscopic assisted implant surgery, using special head mount monitor in which the direct viewing, the endoscopic images and the computed tomography (CT) simulation images were simultaneously see.
Methods: The system was used for the implant surgery of the 65-year-old man on light molar area of the mandible. VR system was composed with the head mount monitor and the image processor unit (head-mount image processor unit, SONY Corporation, Japan). Preoperative simulation from the CT data was fabricated using the computer software. A surgeon and an assistant put the head mount monitor during the surgery. The assistant operated the endoscopy from the lingual side to inspect the area where the direct viewing is difficult.
Results: It was possible to see the direct viewing, the endoscopic magnified images of the invisible area, and the simulation images simultaneously not change the sight line during the surgery.
Conclusion: Virtual reality endoscopic assisted implant surgery using head mount monitor may contribute the safety of the surgery.

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An accuracy study of computer-planned implant placement in the augmented maxilla using the osteosynthesis screw

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Background: Previous research on the accuracy of flapless implant placement of virtually planned implants in the augmented maxilla revealed unfavourable discrepancies between implant planning and placement. By using the osteosynthesis screws placed during the augmentation procedure, the surgical template could be optimally stabilised.
Objectives: The purpose of this study is to validate this method by evaluating its clinically relevant accuracy.
Methods: 12 consecutive fully edentulous patients with extreme resorption of the maxilla were treated with a bone augmentation procedure. Virtual implant planning was performed and a surgical template was manufactured. Subsequently, six implants were installed using the surgical template which was only supported by the osteosynthesis screws. Implant deviations between planning and placement were calculated.
Findings: A total of 72 implants were installed. Mean deviations found in mesiodistal direction were 0.817 mm at the implant tip and 0.528 mm at the implant shoulder. The angular deviation was 2.924°. In buccolingual direction a deviation of 1.038 mm was registered at the implant tip and 0.633 mm at the implant shoulder. The angular deviation was 3.440°.
Conclusion: This study shows that implant placement in the augmented maxilla using a surgical template that is supported by osteosynthesis screws, is accurate.

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Distraction osteogenesis. Preprosthetic rehabilitation of patients with extensive defects of the jaws

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Background: Nowadays the number of adult patients with complete and partially edentulous, complicated by the defects of the jaws, which need rehabilitation with the use of dental implants is still very high. More stable, aesthetically satisfactory result, and early restoration of function can be achieved with a combination of a multistage surgery with rational prosthetic on dental implants.
Objectives: Defects of the jaws with extensive bone deficit, caused by trauma, inflammation or operations for malignancies of maxillofacial region, complicates dental implantation. The presence of such defects in jaw bones needs a preparatory phase aimed at increasing the volume of parameters to create optimal conditions for further dental implantation.
Methods: During the period 2006 to 2016 more than 450 patients with extensive defects of alveolar parts of mandible and maxilla due to different aetiological factors were treated in our clinic. Surgical planning was carried individually. Computer software, lithographic models, distraction devices and dental implants were used during treatment.
Findings and Conclusion: Successful rehabilitation of adult patients with defects of alveolar parts of maxilla and mandible after different aetiological factors was conducted. As one of the step of rehabilitation of this patients was used the method of distraction osteogenesis.

Different methods of distraction were used to optimise the parameters of the bone in jaws. Advantages of distraction osteogenesis may provide a solution for many problems associated with the duration of the treatment, with different conditions which cannot be treated with classical preprosthetic surgery.

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Histological evidences of dentin autograft for bone regeneration

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Background: In 1970, C.B. Huggins (Nobel award winner) and M.R. Urist (bone morphogenetic protein discoverer) reported that rat demineralised dentin induced bone at four weeks and the induced bone existed more than one year. We achieved the autograft of demineralised dentin matrix (DDM) for sinus augmentation as a first clinical case in 2002. Dentin is almost similar to bone in chemical components. Our idea is a recycle use of the extracted tooth as an absorbable, collagenous material with cross-linking for bone regeneration.
Objective: The aim of this study was to observe tissue reaction after DDM autograft, histologically.
Methods: Preparation of DDM granules: non-functional, vital teeth was crushed, decalcified in 2.0% nitric acid solution, and extensively rinsed in cold distilled water.

Case 1: A 48-year-old male revealed an atrophied left-upper jaw and received DDM graft from non-functional molars for sinus augmentation in 2002.

Case 2: A 66-year-old female presented a bony healing failure in the extracted socket for two months. The immediate graft of wisdom teeth-derived DDM was carried out by using our newly developed electric mill system in 2009. Biopsy tissues of both cases were taken at five months after the graft.
Findings and Conclusion: Case 1 showed that mature bone interconnected between the remained DDM. Case 2 showed that new bone formation occurred on both dentin and cementum area. DDM was harmonised with original tissue. These evidences indicated that patient-own DDM could be recycled for successful bone regeneration and opened a novel way as biological scaffold.

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Maxillary sinus floor augmentation using biphasic calcium phosphate and a hydrogel polyethylene glycol covering membrane: a histologic and histomorphometric evaluation

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Background: Maxillary sinus floor augmentation with a lateral approach is usually performed using a bone substitute covered with standard collagen or a synthetic barrier membrane in order to prevent soft tissue ingrowth within the bone graft.
Objectives: The purpose of this case series is to evaluate a polyethylene glycol membrane with a hydrogel consistency, used to protect the lateral sinus anstrotomy, by analysing the histologic quality and histomorphometric quantity of newly formed bone in a maxillary sinus graft using biphasic calcium phosphate (BCP).
Methods: 15 sinuses were grafted from 12 patients. Six months after the maxillary sinus floor augmentation, bone biopsies were harvested from seven patients during implant placement second step surgery.
Findings: The histomorphometric evaluation of the seven grafted sinuses showed mean values of $27.4 \pm 4.6\%$ for newly formed bone, $26.9 \pm 5.4\%$ for remaining BCP particles and $45.7 \pm 6.0\%$ for connective tissue/bone marrow. No implant failure was observed in the 14–45 months follow-up period after maxillary sinus floor augmentation procedure and in the 8–39 months period following implant loading. The hydrogel membrane stiffness, associated with the adhesive properties of the membrane on the bone tissue, prevents graft dislodgement throughout the antrostomy, which reduced postoperative pain and swelling.
Conclusion: The use of a hydrogel polyethylene glycol membrane to protect biphasic calcium phosphate proved to be a valuable grafting procedure to enhance the vital bone formation in the maxillary sinus floor augmentation procedure.

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Key factors for aesthetic implant surgery

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The treatment of the aesthetic area with implants is considered one of the challenges in clinical practice, and are an important part of the oral and maxillofacial surgeon's practice.

Several factors can influence the final result, and the stability of the obtained outcome in a long-term period.

Our presentation will discuss the key factors that may influence the aesthetic result, from treatment planning to the final restoration, with emphasis on the moment of implant placement, the choice and position of implants and the need for bone and soft tissue graft.

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The use of plasma rich in growth factors in a structure of surgical methods in guided tissue regeneration

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Background: Platelet-rich preparations constitute a relatively new biotechnology for the stimulation and acceleration of tissue healing and bone regeneration. Dr. Anitua E. proposed the use of plasma rich in growth factors, where the platelets contain growth factors such as transforming growth factor-beta 1, vascular endothelial growth factor, and insulin-like growth factor. These proteins intervene in functions such as directed cell migration (chemotaxis) and in cellular differentiation and proliferation, all of which are key events in repair and regeneration processes.
Objectives: To evaluate the efficacy of plasma rich in growth factors (PRGF) in relation to soft tissue healing and bone regeneration during sinus lift surgery, guided bone regeneration, implantation.
Methods: 30 patients were treated. Various types of osteoplastic surgeries with use of PRGF and without were conducted. In the postsurgical period patients assessed the intensity of postoperative pain, severity of collateral oedema, soft tissue healing, formation of trabecular bone. Multislice computed tomography with a computer analysis of optical density was conducted to evaluate bone regeneration. Present study allows judging the processes of bone regeneration and bone density through 1, 3, 6 and 12 months.
Results: In postsurgical period in the study group decrease of pain response, reduction of postoperative oedema, reduction in terms of epithelialisation were observed. Also in the study group observed the acceleration of bone formation.

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Growth and differentiation of osteoblasts cultured on various polycaprolactone-ceramics scaffolds

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Background: Calcium and phosphate ions released from polycaprolactone (PCL)-ceramics scaffolds fabricated using melt stretching and compression molding (MSCM) technique are proved to indirectly support functions of osteoblast cells. This study assessed effects of the ceramic fillers as well as morphologies of the scaffolds on proliferation and differentiation of the cells in cell-scaffold constructs.
Objectives: To comparatively assess proliferation and differentiation of osteoblast cell lines that directly seeded on various types of the PCL-ceramics MSCM scaffolds.
Methods: The scaffolds including group A; PCL-20% biphasic calcium phosphate (BCP; weight %), group B; PCL-20% hydroxyapatite (HA), group C; PCL-20% tricalcium phosphate (TCP) and group D; pure PCL (control) were seeded with osteoblast cell lines (MC3T3-E1) at 1×10^6 cells/scaffold and cultured in proliferation medium over 30 days. Proliferation and differentiation of those cells were assessed using enzyme-linked immunosorbent assay, mineralised matrix Alizarin red staining (AR) and scanning electron microscope.
Findings: The cells could attach and grow well on of the scaffolds of all groups. There was no significant difference of the cell proliferation among the groups ($P > 0.05$). Alkaline phosphatase activities and levels of osteocalcin of group A–C were higher than that of group D over the observation period ($P > 0.05$). The levels of the solubilised AR of group A-C were significantly higher than that of group D on day 21 ($P < 0.05$).
Conclusion: Morphologies of the MSCM scaffolds can support growth of bone forming cells. Addition of the ceramic fillers in the PCL-based scaffolds would enhance the cell differentiation and bone matrix formation.

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Immediate implant placement as the ultimate minimally invasive surgery

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Background: Ordinary implant placement procedures consist of two separate surgical stages including tooth extraction and implant placement. However, if the patients could receive these two separate surgical procedures simultaneously, such implant placement will become one of strong arms for the patients who want implant treatment because of the reduction of treatment time and the number of surgical interventions.
Objectives: The aim of the present paper is to clarify the clinical outcomes of immediate implant placement in our clinic.
Methods: During the period from September 2007 to April 2016, 25 patients were enrolled in the present study. The median age was 62.5 years (males 62.8 years, females 62.2 years). AQB

hydroxyapatite coated implant system was employed in this study. The patients were followed up for a median of 31.3 months (range, 4 to 103 months).
Results: There were no failures in the cases of immediate implant placement.
Findings and Conclusions: Originally, there was quite a difference in the shape between extraction socket and implant, so a certain consideration for implant site selection was needed to establish the initial fixation. Furthermore, meticulous cleaning, socket curettage/debridement was also necessary to remove infectious areas in extraction sockets of the compromised teeth. Finally, successful immediate implant placement would be promised when fulfilling certain inclusion criteria.

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Rehabilitation of atrophic maxilla by means of Le Fort I osteotomy, zygomatic implants and immediate loading: a report of three cases

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Background: The rehabilitation of atrophic maxilla is a challenge for maxillofacial surgeons. Bone grafts, short implants zygomatic fixtures, has show good results, however on maxillary atrophy associated with hypoplasia, anterior cant lever can lead the rehabilitation to mechanical failure.
Objective: The aim of this paper is to report the surgical protocol adopted to the correction of edentulous atrophic and hypoplastic maxilla.
Methods: Three patients (one male and two females) with sagittal maxillary deficiency and class V (Cawwod and Howell) alveolar atrophy were selected. The patients were rehabilitated by means of Le Fort I osteotomy associated with zygomatic implants and immediate loading. All patients were able to receive fixed prosthesis 3 days after the surgery.
Results: All implants remain healthy and in function. One prosthesis required maintenance on the abutments screws six months after surgery, after that no other problem occurred.
Conclusion: Maxillary reposition by Le Fort I osteotomy associated with zygomatic implants can be an alternative to bone grafts on rehabilitation of atrophic maxilla with maxillomandibular disrepancy.

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An inventory of mandibular fractures associated in atrophic edentulous mandibles

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Background: All clinicians are aware of several patients with broken mandibles after implant placement in whom the fractures occurred immediately after or several years following the initial implant treatment.
Objectives: To make an inventory of the number of fractures, that occurred in conjunction with implants, placed in edentulous patients in the Dutch population, in a given time period and to calculate the incidence with which this might occur.
Methods: questionnaires were send to all 198 oral and maxillofacial (OMF) surgeons, working in 56 hospitals with departments of OMF Surgery in the Netherlands.
Results: A response was received from 53 (95%) departments. During the period 1980–2007, a total of 157 edentulous mandibles were fractured pertaining to implant treatment. All fractures occurred in mandibles of less than 10 mm high as measured in the symphysis. An incidence of 0.033% was calculated based on a total number of 475,000 patients treated with at least 2 implants in the same period to support an overdenture. Reasons for implants loss within one year (58%), included: 'bone height too low, iatrogenic cause, non-integration and jaw too narrow. Peri-implantitis, trauma, explantation were related to fractures which occurred one year or later after implant placement.
Conclusions: This study supports the view that mandibles with a height of 10 mm or less, as measured in the symphysis, are at risk for fractures with a fair chance of serious complications as a result of it. It also stresses the need for proper information about the advantages and disadvantages of implants in thin mandibles.

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Long-term treatment outcome of dental implants placed after sinuslift using novel fully autologous Plasma-Therm material: pilot study

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Background: The placement of dental implant in the edentulous posterior maxilla often present difficulties as a result of insufficient bone due to pneumatisation of the maxillary sinus and bone resorption after extraction. During sinus augmentation different grafting material (GM) can be used for sinus membrane (SM) elevation. Few types of autologous materials are available for this procedure. Recently, we have developed new Plasma-Therm protocol for production of new (fully autologous) graft material and barrier membrane.
Objectives: Evaluate the predictability of new bone formation at sinus floor after elevation of the membrane using a novel fully autologous Plasma-Therm graft materials (NPTGM) for the first time.
Methods: In this study were included twenty sinus lifts selected for implant placement in the edentulous posterior maxilla. Clinical examination, cast preparation, and radiographic examination (panoramic, cone-beam computed tomography) were performed. Under local anaesthesia, SM was elevated through lateral window technique and it was supported and maintained with a NPTGM. Immediate postoperative clinical and radiographic examination was performed for evaluation. Six month postoperatively, core bone biopsy was performed for histological examination of the formed bone using a trephine drill on two points around the placed implant.
Results: None of the patients showed any signs of dehiscence, infection, or sinusitis. New bone formation was proven radiography, histologically and clinically after implant placement and using of the NPTGM.
Conclusion: The new developed material was reliable and predictable as a grafting material after SM elevation.

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Computer assistance success in implant dentistry

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Background: The accuracy of the implant placement could be advantageous for reducing intra- and postoperative complications.
Objectives: This study aimed to present the clinical issues in actual guided surgeries through the examination of the cases of patients that were treated with computer-guided implant surgery and confirm the accuracy of guided surgery by analysing whether the positions before and after the placement matched.
Methods: Intra oral structure of each patient, was scanned using an intra oral scanner (Trios 3Shape, United States of America) and merged with the cone-beam computed tomography (CBCT; GiANO, Newtom, Italy) images. Implant placements (CAMLOG, Germany) were planned, regarding the direction and position, using software (Implant Studio™, Denmark) and placed using the computer-aided design/computer-aided manufacturing (CAD/CAM) guide surgical template. Then, the fabrication of anatomically accurate abutments of the restoration was done using CAD/CAM zirconia. Postoperative CBCTs were recorded and compared with the preoperative using McNemar's test.
Result: Mean angular errors between the preoperative planned implant and postoperative placed implant was 4.81 the mean distance errors between the planned and placed implants were 0.43 mm horizontally and 0.68 mm vertically at the implant neck and 0.81 mm horizontally and mm vertically at the implant apex computer-guided implant surgery also offers some advantages over conventional implant surgery from the prosthetic viewpoint.
Findings and Conclusion: This technology is expected to continue to develop, with the prediction that all factors contributing to the inaccuracy of guided surgery such as the surgical guide shape, length of metal sleeve and surgical drill, template supporting problem, and scanning method.

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Is piezoelectric safer than hall drill during an external sinus lift? A retrospective study

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Background: Avoiding perforation of the Schneiderian membrane during an external sinus augmentation is a technique sensitive procedure. Numerous studies have shown that piezoelectric system reduces the risk of Schnederian membrane perforation.
Objectives: The objective is to assess if the piezoelectric system is safer than hall drill during an external sinus augmentation by measuring incidences of membrane perforations. This study may establish that the risk of perforation may be independent of the type of instruments used when controlled for other factors.
Methods: This retrospective study was conducted at the Tufts University School of Dental Medicine. Following the IRB approval, clinical records of the patients who underwent external sinus lifts at the Oral and Maxillofacial Surgery Resident Clinic in the past 5 years were reviewed.
Results: A total of 76 patients underwent this procedure. Hall drill was used in 36 patients and piezoelectric drill was used in 37 patients and both the drills were used in 3 patients. There were a total of 29 (36.8%) perforations documented. Hall drill was used in 16 (21.1%) patients and piezoelectric drill was used in 10 (13.2%) and there was perforation in all the cases were both the drills were used.
Conclusions: This is an ongoing study and results from this preliminary analysis show that although there is higher incidence of perforation with use of hall drill was used; the results were not statistically significant when controlled for other risk factors.

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Short, ultrashort and narrow implants versus augmentation and grafting with traditional length implants

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Augmentation and grafting with the use of traditional length implants have long been the accepted standard. The 1996 American Association of Oral and Maxillofacial Surgeons Consensus Conference on sinus grafting found the sinus graft "to be a highly predictable and effective therapeutic modality". The use of onlay grafts, particularly horizontal, have shown the same implant success rate as native bone. The advent of short and ultrashort implants has given the surgeon alternatives to grafting. The recent European Consensus Conference on short implants found them to be ". . .a reliable treatment option, given the risks associated with. . .augmentation procedures". This presentation will look at the pros and cons of each treatment modality thus allowing the surgeons options that will allow them to perform treatment that are in the best interests of the patient.

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The use of short implants in adolescents

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For some time, the use of osseointegrated implants in adolescents has been discouraged. We have been placing short, ultrashort and narrow implants in adolescents over the last 10–12 years with excellent results particularly in the anterior maxilla. This presentation will look at growth patterns in adolescents and present a number of cases that supports the use of these implants. The use of subcrestal placement of the implants allow for clinical versatility with adolescent patients. The subcrestal placement of the implant will affect bone growth. A series of cases will be presented showing the successful long-term use of short implants in adolescents.

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Factors associated with crestal bone gain in short single tooth implants

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The use of short implants as a single tooth replacement has become quite common over the past several years. The recent European Consensus Conference on short implants has stated that short implants have the same predictability as traditional length implants. Recently, it was found that there are seven factors that are associated with crestal bone gain in single tooth implants. Among these factors are the use of non-steroidal anti-inflammatory drugs and the presence of an opposing natural tooth.

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Fixed prosthesis of an ectodermal dysplasia patient with total anodontia using maxillary zygomatic implants and mandibular nerve repositioning simultaneous with implant placement

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Background: Ectodermal dysplasia (ED) is a genetic disorder characterised by abnormal development of tissues derived from the ectoderm. The frequent oral symptoms are oligodontia or anodontia and underdeveloped alveolar ridge causing difficulty in prosthetic restoration, including endosseous implants.
Objectives: To evaluate the outcome of fixed prosthesis supported on zygomatic implants and on standard implants placed simultaneous with mandibular nerve repositioning in a patient with ED.
Methods: A 30-year-old female presented with ED with total anodontia. Her chief complaint was the instability, lack of function and unaesthetic appearance of complete denture in the maxilla and overdenture supported on two mandibular implants. Nobel Clinician software (Nobel Biocare, Switzerland) was used for treatment planning. In the maxilla, four zygomatic implants were placed with a modified approach. In the mandible, five standard implants were inserted simultaneous with mandibular nerve repositioning. Hybrid-fixed prostheses were delivered immediately. Mean follow up was 12 months.
Findings: Final restorations recovered significantly the function and the aesthetics for patients. The implants showed good osseointegration and survival rate was 100%. Paraesthesia of lower lip disappeared after three months. No infections or sinusitis were presented.
Conclusions: Modified zygomatic implant approach for maxillary fixed prosthesis and mandibular nerve repositioning in combination with standard implants for mandibular fixed restoration are a reliable option in ED patients with total anodontia.

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Experimental evaluation of the effects of different sand particles that used in dental implant roughened on osseointegration

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The success of treatment with dental implants is proportional to osseointegration. The term refers to the direct structural and functional connection between living bone and the surface of a load-bearing artificial implant. Implant surface property has a great importance in providing osseointegration. Sandblasting is the most basic and commonly used method to modify the surface.

In our study, sandblasted with Al_2O_3, TiO_2, SiO_2 and machined implants were compared with biomechanical testing. Four sheep 18–24 months old and weighing 40–45 kg were used in the study. Eight implants (sandblasted with aluminium oxide (Al_2O_3), titanium dioxide (TiO_2), silicon dioxide (SiO_2) and machined implants), each with different surface characteristics were inserted into bilateral tibia of each sheep under general anaesthesia. Initial resonance frequency analysis (RFA) results were recorded just after implant insertion. Sheep were then randomly divided into two groups each with two sheep for evaluation either at one- or three-month periods. At the end of the certain evaluation period, RFA and reverse torque (RT) tests were performed. Wilcoxon test and Kruskal-Wallis test were used for statistical analysis.

We found that although there was no statistically significant difference between the groups, sandblasted implants with Al_2O_3 showed higher RFA and RT value at the end of the first and third month.

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Dentoalveolar Surgery and Nerve Injuries

Clinical application of platlet rich fibrin in management of surgical defects related to maxillomandibular region

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Utilisation of platelet-rich fibrin (PRF) is simple technique available to increase wound healing after manipulation of surgical procedures in maxillofacial region including tumours excision, cystic lesions, sinus lifting and after impacted teeth. The objective of this prospective clinical study was to evaluate the efficacy of PRF in enhancement of bone formation and soft tissue healing within surgical defects related to maxillomandibular region.

This study carried on 40 patients in maxillofacial department clinic and the patients classified as Group I including 20 patient suffered from surgical defects as pathological defects sub classified into Group I A, in which no application of PRF in 10 patients and Group I B in which application of PRF including 10 patients. Group II impacted surgical defects and sub classified into Group II A, in which no application of PRF in 10 patients and Group II B in which application of PRF including 10 patients. Radiographic follow up by digital panoramic radiograph at the following, immediate, one, three and six months.

The results of the study demonstrate the parameters including healing, postoperative pain, infection and, bone density were highly improved in the groups related the application of PRF.

The conclusion of the study is PRF simple strategy to increase soft tissue healing and bone formation by its growth factors.

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Comparison of success rate of dental implants inserted in autologous bone graft regenerated areas and pristine bone

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Background: Many surgical approaches exist, and a variety of graft materials are used to improve the deficient areas before implant insertion. A common approach consists of raising a full mucoperiosteal flap to access the deficient area and insert autografts.
Objectives: To assess the success rate of implants placed in atrophic ridges, regenerated by means of block bone grafts harvested from mandibular ramus or chin.
Methods: This study included 155 patients. 78 Patients were treated with autogenous block grafts and particulated bone, after 6 months implant placement were performed in bone grafting areas. In 77 patients implant placement were performed, with no need of grafting, Follow-up data (implant survival, success rate, marginal bone resorption) were collected after three years of prosthetic loading.
Findings: None of the 310 implants was lost during the observation period (cumulative implant survival rate, 100%). Radiographic analysis showed stable marginal bone levels, with a mean bone resorption of 1.58 ± 0.48 mm after two years. Only two implants demonstrated increased bone loss (3.12 and 3.37 mm) over the follow-up period, whereas the remaining implants were considered clinically successful, resulting in a cumulative success rate of 96.4%.
Conclusions: The obtained data demonstrated that the success rate of implants placed in regenerated areas are very similar to those obtained in case of implants.

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Palatal injection for the removal of maxillary teeth: is it required? A systematic review

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Background: Palatal injection (infiltration and/or block) is widely used for the removal of maxillary teeth under local anaesthesia. However, its necessity has been questioned by a number of investigators.
Objectives: The purpose of this study was to systematically review available clinical trials that examined outcomes following the extraction of maxillary teeth with a buccal injection of local anaesthetic only.
Methods: We conducted a search on the databases PubMed, EMBASE and CENTRAL. The selected studies were reviewed with respect to study type, sample size, quality, participant characteristics and methodology, outcome variables and findings.
Findings: There were fifteen studies meeting our inclusion criteria; six were randomised controlled trials, four were controlled clinical trials that did not report randomisation, and five were not controlled. Primary outcomes were as follows: pain of local anaesthetic injection(s) in the test group (buccal injection only) versus control group (buccal and palatal injection), number of cases requiring supplemental buccal or palatal injection in cases of unsuccessful initial anaesthesia, and pain during the procedure. Pain on probing of the mucosa was designated as a secondary outcome.

All nine controlled trials that assessed pain during the procedure found no statistically significant difference between the test and control groups. None of the trials presented results according to region of the maxilla appropriately (i.e. with *P* values comparing groups).
Conclusions: Further randomised controlled trials are necessary and it will be important for future trials to present results according to region of the maxilla.

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Piezoelectric device versus conventional rotary osteotomy for the prevention of postoperative sequelae following surgical removal of mandibular third molars: a metaanalysis

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The purpose of this study was to determine if there is a difference in postoperative sequelae (facial swelling, trismus, pain and neurological complications) and operation time when osteotomy for surgical extraction of mandibular third molars is performed with a piezoelectric device rather than a convention rotary drill.

A search for clinical trials was conducted on the PubMed, EMBASE, CENTRAL and Google Scholar databases. Studies were assessed for study type/design, participant characteristics, sample size, surgical method, cointerventions, outcome variables, risk of bias and findings. Confidence in the effect estimates was assessed using GRADE (Grading of Recommendations, Assessment, Development and Evaluation). Meta-analyses of results were performed where possible.

There were 15 eligible clinical trials. Patients in the piezoelectric group had less facial swelling (SMD, −1.15; 95% CI, −2.02 to −0.27; $P = 0.01$), trismus (greater maximum mouth opening, SMD, 0.78; 95% CI, 0.56 to 1.00; $P < 0.0001$) and pain (SMD, −0.81; 95% CI, −1.56 to −0.06; $P = 0.04$) at day one, less facial swelling at day seven (SMD, −0.98; 95% CI, −1.52 to −0.44; $P < 0.0001$), and less neurological complications (OR, 0.28; 95% CI, 0.09 to 0.89; $P = 0.03$). Swelling and trismus at day seven and pain at day five did not significantly differ between the two methods. Operation time was longer with the piezoelectric device (SMD, 0.83; 95% CI, 0.57 to 1.09; $P < 0.0001$). The confidence in the effect estimates was low or very low across all outcomes.

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Effects of platelet-rich fibrin on sciatic nerve regeneration: a histomorphometric study

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Objectives: The objective of the present study was to evaluate the effects of platelet-rich fibrin (PRF) after crush injury of sciatic nerves in rabbits by histomorphometric analysis.
Methods: 18 male, Vienna white rabbits were used in the present study. After induction of general anaesthesia, 9 mL blood samples were collected and centrifuged for 12 min at 2700 rpm to get PRF. Left sciatic nerves of all rabbits were clamped for 30 s to induce crush injuries. Animals were randomly divided into two groups and in the treatment group PRF membranes were wrapped around the injured part of sciatic nerves and immobilised with non-resorbable sutures. After 12 weeks healing period, tissue samples of the injured part of nerves were harvested. Tissue sections were stained with toluidine blue and investigated under light microscope. G values of axons and electromyogram of sciatic nerves were also evaluated for functional recovery of injured nerve.
Results: Analysis revealed that axon density is higher in the control group than PRF treatment group but the differences were not statistically significant ($P = 0.246$). Rate of nerve fibres with optimum G-ratio was significantly decreased in the treatment group ($P = 0.02$). Conduction velocity decreased after crush injury, however at the end of treatment period differences between control and treatment group was not statistically significant.
Conclusion: Although positive effects of PRF application on maxillofacial tissues have been revealed, local PRF application did not show any improvement in recovery of crush nerve injuries. Nerve-specific growth factors containing scaffolds may be applied in future studies.

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Risk of bleeding after dentoalveolar surgery in patients taking anticoagulants

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Background: To avoid increasing the risk of thromboembolic events, it is recommended that treatment with anticoagulants should be continued during dentoalveolar operations.
Objectives: The goal of this study was to evaluate the incidence of bleeding after dentoalveolar operations in patients on anticoagulant therapy and compare this to patients without anticoagulant therapy.
Methods: A total of 245 patients were included in this prospective study. 142 patients were taking anticoagulants and 103 were not taking anticoagulants. In the group of patients on anticoagulant therapy, 71 patients used thrombocyte aggregation inhibitors and the other 71 patients used vitamin K antagonists. Patients were treated according to a guideline developed at the Academic Centre for Dentistry Amsterdam (ACTA), The Netherlands.[1] Patients were given standard postoperative care and those taking vitamin K antagonists used tranexamic acid mouthwash postoperatively.
Findings and Conclusion: No patient developed a severe bleeding that required intervention. Fifteen patients (11%) taking anticoagulants developed mild postoperative bleeding. Among patients not taking anticoagulants, two (2%) developed mild bleeding. This difference was significant ($P = 0.01$). When distinguishing between type of anticoagulant, more bleedings were seen in patients taking vitamin K antagonists (15%) compared to thrombocyte aggregation inhibitors (6%). This difference was not significant ($P = 0.1$). All bleedings were controlled by the patients themselves with gauze compression. We conclude that dentoalveolar surgery is safe in patients being treated with anticoagulants, provided that the conditions described in the ACTA guideline are met.

Reference

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Clinical application of a buccal fat pad for closure of oroantral communication: a report of two cases

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Background: Oroantral communication (OAC) is one of common complication of maxillary surgery. Several techniques for treatment of OAC include primary closure, local and distant sliding tissue flaps, autogenous bone grafts, allogenous materials, xenografts and synthetic material. Buccal fat pad (BFP) is a bulla adipose flap, has been used to repair persistent oroantral fistulae. The BFP has many advantages because it is simple and easy flap to use.
Objective: This study aimed to report two cases of large oroantral fistula that were closed by using buccal fat pad.
Methods: Two female patients aged 19 and 70 years with chronic oroantral fistulae from cyst removal of residual keratocystic odontogenic tumour and tooth extraction respectively were presented. The defects located in the posterior region of maxilla with the size of 2.5 cm in diameter. Both cases were used a buccal fat pad for closure the defect.
Result: The maxillary defects in the two patients were closed uneventful without residual OAC at 3-month postoperatively. Patient had no sign and symptoms of sinusitis.
Conclusion: The buccal fat pad is a simple technique and convenience for using as an effective and predictable technique for closure of medium to large size of oroantral communication in the posterior region.

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Long-term analysis of root migration after third molar coronectomy

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Background: Third molar coronectomy is a safe surgical technique to reduce the risk of inferior alveolar nerve injury (IAN). The technique is relatively new and the long-term behaviour of the third molar root is not well reported.
Objective: To investigate the long-term behaviour of the retained root after coronectomy of lower third molar.
Methods: A prospective study was conducted. Patients who received lower third molar coronectomy for three to five years were analysed. Orthopantomogram were taken at the following time points: preoperative, postoperative 1 week, 6 months, 12 months, 24 months, 36 months and 60 months. A standardised measurement was used to record the root migration pattern. Factors including age, gender, type and pattern of impaction, and root form were analysed for correlations with the root migration rate.
Results: There were 356 coronectomies which were reviewed for three to five years. The mean follow-up was 44.5 months. The mean root migration at postoperative 1 week, 6 months, 12 months, 24 months, 36 months and 60 months were1.98 mm (standard deviation [SD], 1.2 mm), 2.67 mm (SD, 1.4 mm), 2.92 mm (SD, 1.7 mm), 2.96 mm (SD, 1.7 mm) and 2.66 mm (SD, 1.5 mm), respectively. Older age was significantly related to a lesser extent of root migration (correlation −0.203 mm per year increase in age, $P = 0.025$). Gender, status of eruption, pattern and depth of impaction, and root form were not correlated with the extent of root migration.
Conclusion: Root migration rate after coronectomy was highest in the first 6 months postoperatively and slowed down. The root migration was less in older age.

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Modified method for augmentation of localised vertical defects of the anterior mandibular ridge

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The mandibular incisors might lose their bone support due to periodontitis, trauma, neoplasia, orthodontic treatment and tongue piercing. Advanced cases will dictate the extraction of the involved teeth, leaving, possibly, horizontal and vertical defect. Sufficient alveolar bone volume is essential to obtain optimal functional and aesthetic prosthetic reconstructions supported by implants.[1] Alveolar bone grafting might help regain favourable architecture of the alveolar ridge. Different surgical augmentation procedures have been described in the literature such as guided bone regeneration, onlay bone grafts, interpositional bone grafts, and combinations of these procedures.[2] However, augmentation of these defects might be a challenging task to the surgeon due to the three-dimensional characteristics of the remaining alveolar process, which is narrow in the buccolingual dimension and short in the mesiodistal dimension, especially in a single incisor bony defect. In this study, a novel approach for bone augmentation will be described, using a vestibular approach through which both the symphysis as the donor site and the recipient site are exposed. The bone graft is transferred and wedged into the defect site, thus overcoming the difficulties and utilising the advantages of the traditional methods.

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Success rate of symphyseal miniplate anchorage system

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Background: Skeletal anchorage systems are used in orthodontics for many years. Symphysis bone is one of the favourite anchorage area but some complications may occur associated with miniplates or soft tissues.
Objectives: The aim of this study was to evaluate the success rates and complications related with symphyseal miniplate anchorage systems used for treatment of Class II and Class III deformities.
Methods: A total of 58 miniplates were applied to 29 patients. Forsus FRD (fatigue resistant device) were attached to symphyseal miniplates in 12 patients for mandibular advancement (Group I). Intermaxillary elastics were applied on miniplates in 17 patients for maxillary protraction (Group II). Succes rate, infection, miniplate breakage or mobility, mucosal hypertrophy and gingival recession of anterior teeth were evaluated for all miniplates.
Findings: The overall success rate of symphyseal miniplates was 87.9%. Six miniplates showed severe mobility and one miniplate was broken during orthodontic treatment. All these miniplates were removed and replaced with another one. Infection occurred around 25% of the miniplates in Group I while no infection sign was observed in Group II. Statistically significant difference was observed between two groups for infection rate.
Conclusion: Symphyseal miniplates generally were used as successful anchorage units in most of the patients. Although infection occurred more frequently in Class II deformity correction, the success rates regarding two treatment modalities was statistically similar.

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Coronectomy revisited

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As an alternative to extraction of lower third molars with an established high risk to the inferior dental nerve coronectomy offers a safe alternative. The evidence that is emerging is quite positive and in general shows good outcomes when compared to extraction. As there is less radiation associated with cone-beam computed

tomography (CT) than standard CT it has become more justifiable to assess third molars using this technology. This has allowed more accurate assessment of third molars and therefore it is likely in time coronectomy will become a much more routine procedure. Further research is required as there is little evidence in terms of long-term studies.

The present study presents my experience of coronectomies performed under local and general anaesthetics. This paper also discusses the changes in indications as well as the procedure outlined in the past literature.

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Systemic rifampicin treatment accelerates inferior alveolar nerve regeneration: an experimental animal study

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Background: Rifampicin is an antibacterial agent that is widely used in mycobacterial infections. Some researches indicated neuroprotective effects of rifampicin.
Objective: The aim of the present study was to evaluate the regenerative effects of systemic rifampicin treatment on the inferior alveolar nerve regeneration after a crush injury model.
Methods: 28 Sprague Dawley rats were used in the present study. Left inferior alveolar nerves were exposed via an extraoral route and crushed in the mandibular canal with pincer forceps for 30 second. Rats were randomly divided into three groups; one group received vehicle, one group received 5 mg/kg rifampicin and one group received 20 mg/kg rifampicin. Rats were injected daily during healing period. A retrograde axonal tracer, fluorogold (FG) was injected over mental foramen on day 24 after nerve injury. At the end of four weeks, rats were euthanised and left inferior alveolar nerves and trigeminal ganglions were harvested. Histologic examination of nerve samples were performed under electron microscope and FG positive cells were counted in the trigeminal ganglion sections.
Findings: FG positive cells were significantly higher in the 20 mg/kg rifampicin received group than control group ($P < 0.05$). Nerve structure was more organised and regeneration was prominent during the histologic investigation of 20 mg/kg rifampicin group.
Conclusion: Systemic rifampicin treatment with daily dose of 20 mg/kg enhances inferior alveolar nerve regeneration of rats. Detailed examinations should be performed to unearth regenerative mechanism of rifampicin during peripheral nerve regeneration.

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Are we appropriately consenting patients for dentoalveolar extractions under local anaesthetic?

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Background: Consent is a fundamental principle of medical law and one of the vital components for it to be valid is that patients must be given full information.
Objectives: In this audit we look at whether patients are being consented. appropriately for dentoalveolar extractions under local anaesthetic, and if not, how we can achieve this and make changes to protect patients, improve patient care whilst reducing risk to clinicians in the current climate of ever increasing medical negligence claims.
Methods: This audit involved using data collected from the local anaesthetic extractions carried out in the Oral and Maxillofacial Department at Northwick Park Hospital. However, with no gold standard guideline currently available for extraction consent, we reviewed current consent guidelines and an inclusion criteria was established. We analysed written consent forms from patients notes after the patients left the surgery and we did not inform the clinicians that we would be doing this, thus preventing bias from the clinical staff.
Key findings: 36% of patients had no written consent forms at all, 38% weren't informed of the risk of nerve damage and 32% of the forms weren't even legible.
Conclusion: Generally, clinicians were not consenting patients appropriately. In some cases, there was no record of any written consent even though it was trust policy for written consent forms to be carried out for all local anaesthetic extractions. Results were discussed with clinical staff at a Clinical Governance meeting and some of the changes included pre-written consent forms and pretreatment information leaflets.

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The use of cone-beam computed tomography in accurate planning of surgical orthodontic procedures

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Computed tomography (CT) has revolutionised diagnosis, screening and treatment planning of medical and surgical conditions since its development and introduction in the 1970s. More recently, at the turn of the last century, cone-beam CT (CBCT) has focused these attributes into more specific areas including oral and maxillofacial surgery and orthodontics. A typical CBCT scanner can easily be accessed by patients and modern panoral machines can be upgraded. The time needed for a full scan is much reduced and the radiation dosage is significantly less than that of a standard multidetector CT scanner. Our unit first started regularly using this modality in 2013 when six scans were requested. This has progressively increased due to its perceived benefits rising to 54 scans by 2015 and projected to reach 66 scans by the end of 2016. CBCT has enabled our clinicians to more accurately assess, diagnose and treatment plan cases and provide a more effective service. We will demonstrate cases where the use of this technique has facil-

itated the location specific exposure of multiple impacted teeth and allowed the optimal sequencing of traction application. It has reduced the need for unnecessary secondary procedures and has led to increased efficiency and enhanced both patient and clinician experience.

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Evaluation of postoperative oedema and pain following third molar extraction with application of pulsed electromagnetic field therapy

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Background and Objectives: The surgical removal of impacted third molars results in tissue trauma that is often accompanied by severe pain and swelling. Prescription of postoperative oral narcotics is standard care, though these medications are often accompanied by adverse side effects. Pulsed electromagnetic field (PEMF) therapy is a noninvasive, therapeutic method that has been used to reduce oedema and pain following surgery. The purpose of this study is to investigate PEMF therapy for the treatment of postoperative oedema and pain following third molar extraction.
Methods: A prospective, randomised, controlled, double-blind, placebo controlled clinical trial was conducted. Patients who were 18 years and older and who had 2 partial bony or fully impacted mandibular teeth were included in this study. Postoperative pain was measured using visual analogue scale at different time points. Three-dimensional imaging technology was used to accurately quantify the progression and degree of swelling. The use of postoperative medications was recorded as well.
Findings: A total of 41 patients participated in this study. For purpose of this analysis a total of 26 patients (11 males and 15 females) with completed records were included. There was a reduction in postoperative pain medications in the PEMF group when compared to placebo ($P = 0.04$).
Conclusions: These preliminary results show the efficacy of PEMF in reducing postoperative pain. PEMF is well tolerated without complications.

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Association between retained third molars and depth of impaction with prevalence of deep fascial space infections

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Background: Prophylactic removal of third molars continues to be a debated and evolving topic. The sequelae of retained impacted third molars include cystic changes, periodontal ligament damage, and resorption of second molars. One of the most dangerous sequelae of retained third molars is deep fascial space infection (DFSI), which requires emergency surgery and intravenous antibiotic administration placing a burden on the healthcare system.
Objectives: To report the prevalence of subjects with DFSI requiring hospital admission and surgical treatment due to retained third molars and also see if there is an association between depth of impaction and DFSI.
Methods: This retrospective chart review was conducted in the Department of Oral Surgery, Tufts University School of Dental Medicine. Following IRB approval, we reviewed a five-year convenience sample of subjects with DFSI requiring hospital admission and surgical treatment. Radiology studies, clinical notes, and OR logs were used to determine the aetiology in these DFSI cases as well as depth of impaction.
Findings: We reviewed 139 cases involving DFSI and identified the 118 cases which were due to odontogenic aetiology. Of these cases, 52 (44%) exhibited a third molar aetiology and the majority were submandibular space infections. A majority of the third molars that caused DFSI were impacted teeth, with 47% being partial bony impactions and 11% being complete bony impactions.
Conclusions: A disproportionately high percentage of DFSI can be attributed to partial bony impacted third molar aetiology.

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Autotransplantation of immature premolars using the Oslo protocol: outcome of 100 consecutive transplantations during a three-year period

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Background: Autotransplantation of immature premolars (Oslo protocol) is a treatment option in young children with dental aplasia or teeth lost due to trauma (Czochrowska EM, Thesis 2003, University of Oslo). Several studies have reported variable survival and success rates. Many factors need to be considered before surgery, including the root development and accessibility of donor tooth, the condition of recipient site and the experience of the surgeon.
Objectives: The aim of this retrospective study was to evaluate the survival and success rates in a cohort of autotransplanted teeth in young children at the Department of Oral Surgery and Oral Medicine, Faculty of Dentistry, University of Oslo, Norway during a three-year period.
Methods: All autotransplanted premolars performed during September 2010 to December 2013 were included in the evaluation. Hundred teeth were transplanted in 76 subjects during the study period. The average age at transplantation was 11 years (range 9–15 years).
Findings: The study showed a survival and success rate of 94% and 82%, respectively, of teeth transplanted to premolar or frontal regions. 77 of the donor teeth (premolars) were transplanted to premolar areas, 21 (premolars) to upper incisor site, two (premolars) to molar area. Six teeth had to be removed during follow-up due to ankylosis (two), resorption (one), short roots (two), one (unknown). 12 teeth were described to have an uncertain prognosis.
Conclusion: Autotransplantation of immature premolars should be considered as a treatment option in young patients with agenesis or teeth lost due to trauma.

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Coronectomy of an impacted and submerged second deciduous molar

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Abstract: Coronectomy is a widely accepted technique for approaching impacted wisdom teeth. The fundamental principle is to prevent trauma to the inferior dental nerve (IDN). Many literature publications have demonstrated its positive outcomes. To the best of my knowledge there is no literature regarding coronectomy of deciduous teeth. This case report highlights the complex approach to managing a severely submerged LRE in the mixed dentition of a 10-year-old female. The report demonstrates and discusses the combined orthodontic and oral surgery approach to prevent damage to the IDN and to allow space for orthodontic movement. This case emphasises how delicate nerve sparing techniques in the mixed dentition are complex, yet achievable.

Clinical relevance statement: When managing severely submerged and impacted deciduous second molars, clinicians must be aware that the options for a coronectomy should carefully be considered and may be the difference between sparing the nerve or causing permanent injury.

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Are cardiac valve patients 'dentally fit' and can oral and maxillofacial surgery provide a means of optimising patient outcome?

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Background: The 2008 NICE guidelines revised the need for routine prescription of prophylactic antibiotics for 'high-risk' cardiac patients about to undergo invasive dental procedures. Nevertheless, all preoperative patients for cardiac surgery are advised to see their dentist and achieve an optimal level of dental health in order to reduce the possibility of dental pathogens later causing infective endocarditis.

Despite British and European guidelines advocating such measures, there is no direct guidance to cardiologists/cardiac surgeons nor to the dentists to what standard of dental health such patients must obtain.

Objectives: 1. Identify the state of oral pathology within preoperative cardiac patients. 2. Produce structured, coherent guidelines between cardiac surgeons, community dentist and oral and maxillofacial surgery units.

Methods: A prospective assessment of dental health in all preoperative cardiac surgery patients over a two-month period was performed. Following this a comprehensive literature review was conducted.

Findings: The results of the data obtained will be disclosed at presentation.

Conclusion: Whilst the paucity of evidence of antibiotics for dentoalveolar surgery is widely understood, there is little evidence in the mainstay for optimising dental health precardiac surgery. We identify the 'state of play' of dental health prior to such surgery and advocate guidelines for community dentists and cardiac surgeons to adopt.

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The contribution of dietary advice on the well-being after third molar extraction in young adults: a randomised controlled pilot study

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Background: To date there is very little literature on appropriate postoperative nutritional support after third molar removal. Even though there is strong evidence that balanced postoperative nutrition has a positive effect on wound healing.[1]

Objectives: This study seeks to assess the effect of dietary advice on wound healing of young adult patients following third molar surgical removal.

Methods: In this randomised, prospective cohort study 40 young adults, who underwent a third molar surgical removal, were randomised to receive nutritional advice. The patients received nutritional advice to improve their postoperative nutrition to support the wound healing by achieving a sufficient energy, protein and fluid intake and a lower alcohol intake.

Findings: The intervention group ate significantly more energy ($P = 0.02$) and protein ($P = 0.005$) than the control group. 37 out of the 40 (93%) patients said they think a nutritional advice would be beneficial for them. The intervention group showed 0.6 out of 5 points lower pain score and 0.5 out of 10 less days of pain medication use.

Conclusion: This randomised pilot study does not yet support the hypothesis that a nutritional advice has a positive effect on the overall well being of patients aged 18–30 years after a wisdom tooth extraction. A larger follow-up on this pilot study is recommended and data from this study could be used for a follow-up study.

Reference

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The clinical effect of carbon dioxide laser and platelet-rich fibrin on vestibuloplasty

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Background: Vestibuloplasty is a surgical technique to improve functional vestibular sulcus. The technique of vestibuloplasty with secondary epithelisation always results with high relapse rate

which can be improved with grafting with palatal mucosal graft, however second site morbidity still be concerned.
Objectives: To evaluate the effect of carbon dioxide (CO_2) laser and platelet-rich fibrin (PRF) on healing and relapse of vestibuloplasty.
Methods: Six edentulous patients with nine surgical sites, were allocated into two groups of CO_2 laser and PRF group. CO_2 laser, 10.6 nm wavelength, 2 Watts power, noncontact, focus mode, was used. The PRF group, PRF membrane was applied on the denuded periosteum. The vestibular depth was measured immediate postoperatively and weekly up to eight weeks postoperative. The healing and complications were evaluated until eight weeks postoperative. Pain was reported by numerical rating scale by phone on first week postoperatively.
Results: At eight weeks postoperative, the relapse rate of CO_2 laser group ($35.4\% \pm 13.5\%$) was higher than the PRF group ($18.2\% \pm 17.7\%$). The PRF can significantly promote wound healing more than CO_2 laser technique at two weeks. On the postoperative day one, CO_2 laser caused more pain than the PRF group. However, no significant difference was found between two techniques. No complications were found in both groups.
Conclusion: Both methods are effective options for vestibuloplasty. The PRF membrane could reduce pain and relapse rate, and promoted wound healing better than CO2 technique. However, a large number of samples should be included to confirm this observation.

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Anterior arch crowding: a possible predictor for mandibular third molar impaction

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Background: Impaction of the third molar is a high incident problem occurring in up to 73% of young adults in Europe. Appropriate follow-up routines and optimal timing for surgical removal of the third molars can be established in patients judged to be at increased risk of impaction. The purpose of this study was to identify risk factors for mandibular third molar impaction in adolescent orthodontic patients and to establish anterior arch crowding as a predictive model for mandibular third molar impaction.
Methods: Pretreatment orthopantomogram (OPG) of 158 orthodontic patients with the evidence of anterior arch crowding on pretreatment study models were evaluated for mandibular third molar position.
Findings: Out of 158 patients, 45 were male and 113 were female. 97 (61%) of the patients showed anterior arch crowding with a space discrepancy of 5–10 mm calculated on the pretreatment study models. 57 patients showed 107 third molar impactions. Anterior arch crowding in these patients was ranging from 7–10 mm. Out of 107 impacted third molars 73 were mesioangular, 14 distoangular, 6 vertical and 14 horizontal.
Conclusion: If the arch size is smaller as compared to the tooth size the evidence of lack of space would be there in anterior segment as crowding and in posterior segment as third molar impaction.

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Longitudinal treatment outcomes of microsurgical repair of trigeminal nerve injury from lower third molar surgery

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Background: Microsurgical repair after trigeminal nerve injury from third molar surgery is the mainstream of treatment. However, most studies are cross-sectional and the neurosensory tests are not standardised. The postoperative longitudinal change of sensation from the patient's perspective and the objective neurosensory outcomes remain unclear.
Objective: To prospectively evaluate the longitudinal subjective and objective outcomes of the microsurgical treatment of lingual nerve (LN) and inferior alveolar nerve (IAN) injury after third molar surgery.
Methods: A one-year longitudinal observational study was conducted on patients who received LN or IAN repair after third molar surgery-induced nerve injury. Subjective assessments (numbness, hyperaesthesia, pain, taste disturbance, speech and social life impact) and objective assessments (light touch threshold, two-point discrimination, pain threshold, and taste discrimination) were recorded. Functional sensory recovery (FSR) was considered achieved after treatment if the objective tests showing static two-point discrimination less than 20 mm and superficial pain/tactile sensation without over-reaction.
Findings: 15 patients (13 females) with 13 LN and 2 IAN repairs were recruited. The subjective outcomes at postoperative 12 months for LN and IAN repair were improved. Pain and hyperaesthesia were most drastically improved. Light touch threshold improved from 46.8 g to 1.2 g for LN repair and 2 g to 0.5 g for IAN repair.
Conclusion: Microsurgical treatment of moderate to severe LN injury after lower third molar surgery offered significant subjective and objective sensory improvements. 100% FSR was achieved at postoperative 6 months.

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Which procedure is better: germectomy or surgical removal of mandibular third molar?

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Background: Germectomy is a procedure of removal of a tooth that had formed one third or less of its root.
Objectives: The purpose of this study is to compare the incidence of complications between surgical removal of third molar and germectomy, objectively as well as subjectively.
Methods: A prospective non-randomised study for all patients undergoing minor oral surgery of mandibular third molar was carried out in Oral and Maxillofacial Department Hospital Sultan Abdul Halim from April to September 2014. The patients were divided into two groups according to their age, namely germectomy group (14 to 18 years old) and surgical removal group (19 to 23 years old).
Findings: A total of 44 patients enrolled into this research, 22 patients in each group, involving a total of 88 teeth. Mean surgical time for germectomy was significantly lower (14.14 ± 4.94 min)

than the surgical removal group (19.75 ± 7.89 min; $P < 0.05$). Incidence of early postoperative complications were low in both groups. Incidence of transient inferior alveolar nerve injury was 2.3% in the surgical removal group. Incidence of early postoperative infection was 2.3% in the germectomy group.
Conclusion: Delaying the removal of impacted mandibular third molars until a problem developed, subjects the patient to unnecessary pain, more complex and costly operations with higher risk for postoperative complications. Germectomy is a simple procedure, shorter duration of procedure, leading to a reduction in the incidence of complications.

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The anatomical relationship between the roots of the mandibular third molar and the mandibular canal: a study among Malaysian patients

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Objectives: To investigate the location and determine the nearest distance between the mandibular canal to the roots of mandibular third molar in Malaysian patients of Malay ethnicity.
Methods: This retrospective study included patients who had a cone-beam computed tomography (CBCT) done at the Faculty of Dentistry, University Teknologi MARA from 1 January 2011 to 9 January 2015. CBCT images were used to identify and measure the closest proximity and the buccolingual position of the mandibular canal to the roots of the mandibular third molar.
Findings: A total of 161 patients were included in this study and 192 CBCT images were evaluated. The mean closest distance of mandibular canal to roots of mandibular third molar was 1.56 mm (standard deviation = 2.49 mm) in coronal view. Direct contact between the mandibular canal to the roots were seen in 104 cases (54.1%) in coronal view whereby 52 cases (50%) of the canal were located inferior to the tooth roots, 33 cases (31.7%) located buccal to and 19 cases (18.3%) located lingual to the roots. There is no significant difference between the mean closest distance of the mandibular canal to lower third molar roots when compared between tooth 38 and 48, gender and all types of mandibular third molar impaction.
Conclusion: Mean closest distance of mandibular canal to the roots of mandibular third molar was 1.56 mm with a 54.1% case of direct contact. Therefore, CBCT is beneficial for assessing the three-dimensional anatomical relationship and the proximity between the mandibular third molar roots to the mandibular canal.

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Today's dilemma in oral surgery: patients on new oral anticoagulant drugs

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Background: In recent years, new oral anticoagulant (NOAC) drugs have become increasingly popular. It is important to consider the effects of these drugs when carrying out oral surgery procedures. These drugs are often preferred to warfarin as they are easier to manage from a patient perspective. However, how easy are they to manage from a clinician perspective?
Case series: We present a series of three patients who were taking NOAC drugs, had simple extractions under local anaesthesia and returned to casualty due to extensive bleeding.

These patients were either taking rivaroxaban or apixaban. Two patients were managed effectively with local haemostatic agents. One patient required admission for three days and received a two-unit blood transfusion.
Discussion: National Health Service guidelines suggest stopping the NOAC agent prior to surgery and liaison with the appropriate clinician before stopping the drug.

In emergency situations, it is challenging to reverse the effect of these drugs as they cannot be reliably monitored. Comparatively, warfarin can be monitored via an international normalised ratio and reversed with vitamin K.
Conclusion: We recommend liaison with the clinician managing the patient's anticoagulation and discussion about stopping the NOAC drug 48 h prior to the procedure. Moreover, these patients can be reviewed after the procedure and should be aware of measures to take in case of bleeding, including out-of-hours. We encourage general dental practitioners to refer these patients to a hospital setting, as necessary.

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Third molar surgery outcomes: a comparison between intravenous sedation and general anaesthetic

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Background: The surgical extraction of third molar teeth (wisdom teeth) is one of the most common surgical procedures carried out in dentistry. Some wisdom teeth can be extracted under local anaesthesia alone, while more complex impactions may require intravenous sedation (IV) or general anaesthesia (GA). Each of the latter has advantages and disadvantages over the other, and determining which is suitable for the patient can be complex.
Objective: To explore the differences between IV sedation and GA in terms of patient recovery, oral-health-related quality of life, anxiety, level of satisfaction and postoperative pain.
Methods: A clinical convenience sample of patients aged 16–35 years, requiring the removal of two mandibular third molar teeth were recruited. Each completed a questionnaire before surgery and 10–14 days afterwards.
Findings: Of the 125 patients, 73 (58.4%) were in the IV group and 52 (41.6%) underwent GA. Patients opting for GA scored more highly on negative affectivity and dental anxiety at baseline. Post surgery, they reported taking more days off before returning to normal activities, as well as having higher incidence of sore throat and nausea.
Conclusion: Patients with negative affectivity and higher anxiety opt for third molar surgery carried out under GA but this results in more nausea, sore throat and days off normal activities.

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Do we tell our patients the truth about numbness after orthognathic surgery?

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Background: The incidence of neurosensory deficit or damage to the inferior dental nerve following mandibular osteotomies varies widely within the literature. Objective testing figures are often discussed with patients before surgery, however patient reported feedback is less frequently discussed.
Objectives: Determine the incidence of permanent neurosensory deficit in patients under going bilateral sagittal split osteotomies, compare the objective findings with patient perceived deficit and address the effect of deficit on daily living.
Methods: Patients undergoing bilateral sagittal split osteotomy procedures were assessed with two-point discrimination preoperatively and then again at two-years postsurgery. Those assessed to have a two-point discrimination score score $\geq$3 mm were regarded as presenting with measurable neurosensory deficit. At the two-year review patients completed a questionnaire addressing perceived numbness and its impact on daily living.
Findings and Conclusion: 78 patients were examined and 32% of patients were found to have objective neurosensory deficit from the two-point discrimination testing. 71% of patients, however, reported a perceived numbness. Of these, 70.9% of patients stated it "did not affect them" at all. Only 7% of patients with perceived numbness stated it affected their lives "a lot". Overall 96.2% would recommend the surgery again.

Patient perception of numbness is perhaps a more important measure than objective testing especially considering the disparity between objective and subjective measures. We can however inform patients that most of those that perceive numbness do not find it impacts heavily on their lives and almost all would still recommend surgery.

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Effect of hand gesturing on difficulty with deep intravenous anaesthesia

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Background: During deep intravenous sedation some patients exhibited hand gesturing; adduction of thumb third and fourth finger and pointing of the first and second finger, with no tremor evident. We noted this seemed to accompany anxious or uncooperative anaesthetic cases.
Objectives: Identify hand gesturing and explore possible connection with sedation difficulty.
Methods: Gesturing cases noted and data collected. Precise description of hand gesturing was used to alert staff to its appearance and enlist their help in recognising it. Photographs were taken when possible.
Results: One operator; 680 patients treated; 43 clinical sessions; 12 patients (1.76%) with gesturing. Of these, nine showed anxious, uncooperative or even combative behaviour, while three did not. Control was 23 patients (3.38%) without gesturing but with uncooperative behaviour. Patients received varying dosages of midazolam, fentanyl, ketamine and propofol. One patient with gesturing received no ketamine.
Findings: 12 patients showed gesturing, nine of them (67%) were uncooperative during sedation, compared to 23 out of 668 (3.6%) uncooperative with no gesturing.
Conclusions: Gesturing may be marker for anxiety during anaesthesia. Despite similar appearance to Parkinson resting tremor, I found no description of static hand gesturing in the literature as it relates to sedation or anaesthesia. A questionnaire and long-term follow-up should be used to identify any connection to substance abuse or neurologic conditions.

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Esmolol in outpatient oral surgery intravenous deep sedation

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Background: Use of short acting beta-adrenergic antagonist esmolol is a useful adjunct in maxillofacial surgery during general anaesthesia.
Objective: To demonstrate safety and effectiveness of esmolol in outpatient intravenous deep sedation.
Methods: Cases where esmolol was used for treating tachycardia or hypertension in outpatient oral and maxillofacial surgery office. Data collected concurrently with treatment.
Results: One operator; 2950 patients treated; total of 14 months; 37 patients were given esmolol for clinically significant elevations in systolic blood pressure (SBP), diastolic blood pressure (DBP) or heart rate (HR). The average 'peak' SBP, DBP and HR when esmolol was given was 174.9 mm Hg, 105.7 mm Hg and 121.1 bpm, respectively (highest SBP, DBP and HR in study was 221 mm Hg, 130 mm Hg and 168 bpm, respectively). Average baseline SBP, DBP and HR were 135.4 mm Hg, 86.0 mm Hg and 88.6 bpm, respectively. Average post-treatment SBP, DBP and HR were 156.2 mm Hg, 100.0 mm Hg and 102.3 bpm, respectively. Average esmolol dosage was 15.0 mg; (range, 5–40 mg). Average medication dosages were: midazolam 3.93 mg, fentanyl 0.048 mg, ketamine 33.45 mg, propofol 44.86 mg and glycopyrrolate 0.97 mg.
Conclusions: Esmolol was safe and effective. Benefits include not needing to cancel cases due to hypertension, uncontrolled rapid HR (one patient had HR of 168 bpm) or haemorrhage. Treatment was well-received (two patients were below 14 years old and one had asthma). This suggests expanded and more routine use of esmolol not only for haemodynamics but also to reduce nausea and opioid requirement.[1]

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Treatment of cystic lesions of the jaw: a five-year retrospective study

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Background: Cystic lesions of the jaw are common pathologies in the oral region, which may develop from epithelium with dentogenic origin (odontogenic cysts). Depending on their size, odontogenic cysts are usually treated either by enucleation and closure of the defect (cystectomy) or by decompression therapy (cystostomy or marsupialisation). Even though cystic lesions are common and many retrospective analyses were conducted, there are only a few prospective clinical trials.[1,2]
Objectives: This retrospective study was conducted to evaluate the incidence, dimension, location and the chosen therapy of the odontogenic cysts at the Department of Oral and Maxillofacial Surgery (Medical University of Vienna). These results are used for the planning of prospective studies.
Methods: All patients with cystic lesions, who were treated within five years at the Department of Oral and Maxillofacial Surgery of the Medical University of Vienna, were included. Clinical data included gender, age, localisation, histological diagnosis, chosen therapy and follow-up. Radiologic data from all available radiographs (panoramic radiographs, computed tomography scans, digital volume tomography) included localisation and dimensions.
Findings and Conclusion: A total of 899 patients were treated in this time period. 117 patients had to be excluded due to incomplete data. 782 patients were assessed, 106 patients were treated by cystostomy; 745 patients by cystectomy.

Reference

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Clonidine as vasoconstrictor with lignocaine for intraoral anaesthesia in patients with hypertension

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Background: Local block anaesthesia achieved with an adrenaline containing solution can lead to an increase in plasma adrenaline with significant and non-significant cardiovascular changes. Clinical studies have suggested that clonidine might have haemodynamic advantages over adrenaline as a vasoconstrictor because of its central hypotensive effect.
Objectives: The objectives of this study is to evaluate the efficacy of clonidine as vasoconstrictor, to check any changes in haemodynamic parameters and also to find out the onset, duration, intensity of local anaesthesia.
Methods: Study included 280 patients of ASA II group, aged 40–70 years, for extraction of mandibular teeth. Patients received 2 mL of 2% lidocaine with clonidine in concentration of 15 mg/mL. Systolic blood pressure, diastolic blood pressure, mean arterial pressure, heart rate, were recorded before, during, 5 min after administration of anaesthesia, during extraction, and 10 min after extraction.
Findings: One way repeated measure analysis of variance was done using SPSS Vs 20. There is a significant difference in the haemodynamic parameters during different duration of anaesthesia.
Conclusion: Clonidine when used with lignocaine as vasoconstrictor for intraoral anaesthesia in hypertensive patients brought about a reduction in the blood pressure retaining all the properties of lignocaine.

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Risk of osteonecrosis of the jaws after tooth extraction of 270 teeth with alveolectomy and primary surgical closure in 111 patients on antiresorptive treatment

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Background: Tooth extraction often precedes onset of medication-related osteonecrosis of the jaws (MRONJ) in patients on antiresorptive treatment (AR). Limited data exist on the risk of high dose bisphosphonate and denosumab. We have developed a method of tooth extraction with primary closure which is associated with a low risk of developing MRONJ.
Objectives: To examine the incidence of MRONJ after tooth extraction in consecutive patients on AR referred for tooth extraction.
Methods: Inclusion criteria: patients referred for tooth extraction on AR. Patients were evaluated with medical history, duration of AR, clinical and radiologic assessment. The surgical procedure included raising mucosal flap, alveolectomy, removal of the tooth, and primary mucosal closure. Assessment for MRONJ after one and three months.
Findings: One hundred and eleven patients (22 osteoporosis, 89 cancer) were referred for extraction of 270 teeth. AR treatment included bisphosphonate in 70% and denosumab in 39%. Mean duration of treatment was 45 months for bisphosphonate, 21 months for denosumab. Healing was uneventful in 267 extraction sites (99% [95% CI, 97–100]) in 108 patients of the 111 patients (97% [95% CI, 92–99]). Thus, osteonecrosis occurred in three sites (1%), in three patients (3%), all three with breast cancer.
Conclusion: Tooth extraction with alveolectomy and primary closure of the oral mucosa is a useful method for controlling (nearly eliminating) the risk of MRONJ in patients on high dose antiresorptive treatment. Tooth extraction was performed with successful healing in 99% of 267 extractions sites and in 97% of 111 patients.

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To vape or not to vape, that is the question

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Background: The potential oral health effects of electronic cigarettes has received very little attention.
Methods: We conducted a systematic review of the literature from 2010 to 2016 to establish if there was any evidence for oral health effects from e-cigarette usage.
Results: Different advice given by different authorities and countries was found. We discuss in our presentation the results of this literature.
Discussion: More research in this field is required to examine the long-term safety of electronic cigarettes use. All oral health care professionals need to be cautious with the advice given to patients until definitive guidelines exist.

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Autotransplantation of premolars and molars using a three-dimensional printed replica of the donor tooth as a surgical guide: a prospective study

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Background: Autotransplantation provides physiological tooth replacement and is a valuable technique, especially in young patients. New three-dimensional (3D) techniques could improve the autotransplantation procedure and increase the chance of success.
Objectives: This prospective observational study investigated the benefits of 3D imaging and rapid prototyping in autotransplantation. A novel autotransplantation technique is proposed, using a 3D-printed replica of the donor tooth.
Methods: Autotransplantation of premolars and molars with incomplete root development (50–75%) was performed with this innovative technique. A 3D-printed replica of the donor tooth was fabricated based on a cone-beam computed tomography scan that was performed one month before the procedure. With this replica, a precisely fitting neo-alveolus at the recipient site was prepared before extracting the donor tooth.
Findings: 3D autotransplantation was performed in 21 patients (32 transplants). The preparation of the neo-alveolus with a replica of the donor tooth resulted in an easy procedure with a surgical time of less than 30 min. In all transplants, an immediate good fit of the donor tooth was achieved with an extra-alveolar time of less than two min. Postoperative follow-up showed improved healing and root development after 3D autotransplantation.
Conclusion: The risk of iatrogenic damage to the donor tooth is minimised with the 3D autotransplantation technique, because of an immediate good fit of the donor tooth and reduced extra-alveolar time. The use of a replica of the donor tooth enables and easier procedure and facilitates optimal placement of the transplant with high chance of success.

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Novel oral anticoagulants and exodontia: the evidence

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Background: Haemostasis is essential in oral surgery. New anticoagulant medications in the market are slowly replacing warfarin and the other common antiplatelets. They are overall cheaper to run and have better compliance amongst patients.
Objectives: To identify a protocol for the management of oral surgery patients on the new oral anticoagulants (apixaban, rivaroxaban and dabigatran).
Methods: A literature review was conducted in April 2016 of free-text and MESH searches (Keywords: apixaban; rivaroxaban; dabigatran and dental extractions) in the Cochrane Library; PubMed and CINAHL (Cumulative Index to Nursing and Allied Health Literature). Trial registers; professional bodies for guidelines and OpenGrey for unpublished literature were also searched. Studies were selected for appraisal after limits were applied (adult; human and English-only studies) and inclusion/exclusion criteria imposed.
Results: Four studies were identified for critical appraisal using the Critical Appraisal Skills Programme (CASP) tools. These were a combination of retrospective, prospective, cohort and case control studies.
Conclusion: Patients on new anticoagulants, although at an increased risk of postoperative bleeding complications can be managed safely with local haemostatic measures, as with patients on warfarin with an international normalised ratio of between two and three. New reversal agents for these medications are becoming more widely available for use, making these drugs safer to use.

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Decompression on keratocystic odontogenic tumour of the mandible: long-term follow-up

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Background: Decompression is effective in reducing both the size of cystic lesions on jaws and the associated morbidity of resection. Keratocystic odontogenic tumour (KOT or KCOT) is defined by the World Health Organization and recommends the term KCOT as it reflects its neoplastic nature.
Objectives: This report evaluated the long-term results of decompression on KCOT and its role in conjunction with enucleation and curettage.
Methods: There were 35 cases of mandibular KCOT performed between 2010 and 2015. The effect of decompression with a customised removable tube and recurrence data after a follow-up period from six months to five years were evaluated. Clinical and pathological examinations were performed. The space changes of cysts pre- and post-decompression were measured on dental panoramic.
Findings: The cystic space reduced gradually, the bone regeneration was noticed on dental panoramic radiographs. The canal of mandible which was pushed away by the cyst came back to a

normal position. The reposition of shifted teeth was noticed. The overall evaluation was gained the effect rate of 94.3%.
Conclusion: Decompression is a valuable way of reducing the size of large cystic lesions, with low morbidity and recurrence rate. However, the different age groups showed no significant difference in terms of effect rate.

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Endoscope-assisted intraoral approach for removal of ectopic third molar to the lower border mandible using long-tip ultrasonic device

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Background: A lingual approach is uncommon to remove deeply impacted teeth faced to lingual aspect of the mandible because of the poor surgical views and the location of the lingual nerve. Generally, removal of deeply impacted teeth is difficult and has mechanical limitation to remove surrounding hard tissue by using conventional rotating instruments. Sometimes extraoral approach is applied to remove surrounding hard tissue for sufficient surgical view.
Objectives: In this report, we present an endoscopically assisted intraoral surgical technique that uses a long-tip ultrasonic bone-cutting device to remove deeply impacted teeth.
Methods: This technique was applied in four patients. A 30 degree-angled, 4 mm-diameter endoscope (Karl Storz, Tuttlingen, Germany) and a Xenon light were used during the surgery. The endoscope was introduced into the surgical area from the ipsilateral corner of the mouth using a retractor attachment. A mucous elevator was used to detach and identify the crown, and an ultrasonic bone-cutting device (Variosurg 3; NSK, Tochigi, Japan) was used to remove the surrounding bone. A 64 mm long reciprocating tip (NSK) with a 3 mm cutting area was guided by the endoscope and used to make a groove in the overlying bone. The lingual root surface was then exposed and the reciprocating tip was used to widen the space surrounding the periodontal ligament.
Findings and Conclusion: This technique was advantageous because it minimised the risk of damaging the surrounding soft tissue and nerve. Moreover, avoidance of extraoral approach has reduced complications, including damage to the facial nerve and scarring.

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Head and Neck Oncology

Survival of cancer patients oral squamous cell treated for the first time in oncology centres in the period 2000–2011, Medellin Colombia

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Background: The goal of this study is to determine the survival rate of oral patients white oral squamous cell carcinoma (OSCC) who were treated for the first time in 9 cancer centres over a period of 12 years.
Methods: Analysis of survival rate based on a retrospective sample of 630 cases of oral squamous cell carcinoma (OSCC), according to individual and clinical variables. Relevant life tables were created in order to identify some of the characteristics related to patient survival time; the Kaplan-Meier method, the log Rank test, and the Cox proportional hazards model were used to assess survival significance in relation to relevant variables.
Results: Average patient age at the time of diagnosis was 63.5 years (SD = 13.6 years). 28.1% (177) of them died as a direct consequence of oral cancer, according to death certificates filled out by doctors on duty. Median survival rate was 6.1 years, and when discriminated by sex, age groups, and stage of disease, the median was higher in women, in patients aged below 50 years, and in those who were diagnosed with OSCC in stage I and received surgery as single treatment.
Conclusions: The survival rate of OSCC patients who were treated for the first time in nine cancer centres of the city of Medellín in a 12-year period was 6.1 years. The authors recommend implementing a surveillance program allowing early diagnosis in order to decrease the sequelae and mortality from this disease.

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Multidisciplinary team meetings frequently encounter potential medicolegal risks: an audit and consideration of the legal duties involved

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Objectives: To evaluate the potential medicolegal risks involved in the recording of head and neck oncology multidisciplinary team (MDT) evaluation and deliberation.
Methods: A retrospective audit of the standard proforma used by the Royal Adelaide Hospital Head and Neck Cancer MDT to record presented data and conclusions. The medicolegal risk categories examined were failure to diagnose, failure to treat, failure to advise and failure to document.
Findings: Of 308 patients presented, 280 were assessed and treated by the head and neck MDT and were analysed. The patients were typical of head and neck practice in Australia. Medicolegal issues were frequent. 4% had significant change in pathology between biopsy and surgical specimen, 8% were not re-presented to the MDT postoperatively or had inadequate data for decision making regarding postoperative adjuvant chemoradiotherapy. 6% of patients had apparent indications for adjuvant chemoradiotherapy but no recommendation was made for them to receive it.
Conclusion: We found multiple potential medicolegal issues, many of which were central to MDT function. We discuss the medicolegal risks to individuals and organisations as well as recommend future approaches to the management of MDT decision-making and documentation.

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Application of modified negative-pressure drainage nursing in neck dissection patients: a randomised controlled trial

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Drainage nursing is an important issue in oral and maxillofacial surgeries, a randomised controlled trial was conducted to evaluate the effect of a modified negative-pressure drainage nursing in neck dissection patients.

80 participants were included and randomly allocated to modified negative-pressure drainage nursing group (intervention group) and conventional drainage nursing group (control group) according to computer generated random table. The modified nursing method included a modified drainage device, periodical enhanced negative-pressure suction and laboratory examination on the drainage. Postoperative Day 1 drainage volume, facial swelling on Day 2, wound healing and drainage obstruction percentage were recorded. We found that the modified negative-pressure drainage nursing could significantly reduce Day 2 facial swelling (RR = 0.29, $P = 0.02$) and increase primary healing rate (RR = 1.98, $P < 0.0001$). The percentage of drainage obstruction was significantly attenuated by the application of the modified nursing ($P < 0.05$). However, Day 1 drainage volume did not differ in two groups.

In conclusion, the modified negative-pressure drainage nursing had positive impact on the wound swelling and wound healing.

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The role of cardiopulmonary exercise testing in major head and neck surgery

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Background: Radical treatment for head and neck cancer is often necessary although it has the potential to be highly morbid. Approximately 25% of patients with head and neck cancer are aged around 70 years, a figure that is expected to rise due to aging demographics. Although often assumed that older patients tolerate such extensive treatments far worse compared to their younger counterparts, fit elderly patients have been proven to tolerate radical cancer treatment just as well as younger patients. However, if complications occur, they do not only delay the postoperative adjuvant treatment but can also result in considerable morbidity. It is thus of major importance to be able to discriminate between fit and unfit patients. Cardiopulmonary exercise testing (CPET) is an objective method of evaluating exercise capacity. It provides a global assessment of pulmonary, cardiovascular, haematological and metabolic systems.
Objective: Our study evaluates the use of the CPET as a method for risk stratification in major head and neck surgery.
Methods: We performed a retrospective review of major head and neck cancer patients who underwent surgical treatment with free tissue transfer. All of these patients were underwent CPET prior to their surgery as part of routine preoperative assessment. Treatment outcomes have been evaluated by means of complication rate, duration of surgery, duration of stay, readmissions and speech and swallowing assessment at the time of discharge.
Results and Conclusion: 80 patients were included in our review. The results and conclusions will be discussed in our presentation.

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Patient-reported quality of life outcomes following treatment for oral cancer

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Background: Patient reported outcomes in terms of quality of life (QoL) are increasingly being used to determine treatment choices where multiple treatment modalities are available, with little difference between them in terms of overall survival and recurrence.
Objectives: The aim of this research was to determine if treatment options for oral cancer with similar clinician determined outcomes have differences in patient-reported QoL measures.
Methods: QoL assessments were prospectively collected for 168 consecutive patients treated for oral cancer between 1 January 2010 and 31 December 2014 using the University of Washington (UoW) QoL Questionnaire, with follow-up to 18 months post treatment. Sub-group analyses were made using paired t tests and analysis of variance (ANOVA) to compare the effects of adjunctive chemoradiotherapy, type of bone resection, and methods of soft and hard tissue flap reconstruction.
Findings: Floor of mouth tumours caused the greatest statistically significant reduction in QoL for all oral cavity subsites (-18.9%, $P = 0.0178$). Laser excision for matched patient cohorts resulted in improved resultant QoL than other excision techniques ($P = 0.0002$). No significant difference in QoL was found when radial forearm and anterolateral thigh flaps were matched, nor between fibula and scapula flaps.
Conclusions: We would recommend the use of the UoW questionnaire in the management of all oral cancer patients in the future. It is not only a research tool but a manner for clinicians to tailor treatment to anticipated resultant QoL when a number of different soft and hard tissue reconstructions are available.

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Analysis of patients diagnosed and treated for Merkel cell carcinoma

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Background: Merkel cell carcinoma is rare, aggressive, cutaneous malignancy with approximately 50% of cases arising in the head and neck. It occurs more frequently in older, light skinned individuals and tends to metastasise at an early stage. Merkel cell polyomavirus, ultra violet radiation exposure and immunosuppression have been associated with the pathogenesis of Merkel cell carcinoma. Merkel cell carcinoma arising in the head and neck has a worse prognosis compared to other sites. Management in the head and neck is challenging due to anatomic, functional

and cosmetic limitations for surgeons owing to positive surgical margins and increased locoregional recurrence rates.
Objective: The aim of this retrospective case series is to evaluate the outcomes of patients diagnosed and treated for Merkel cell carcinoma at the University of Florida, College of Medicine Jacksonville.
Methods: Patients treated for Merkel cell carcinoma were identified through retrospective chart review from January 2009 to September 2016. Patient demographics, tumour site, comorbidities, presence of positive margins, and treatment modalities were correlated with outcomes. Survival rates were calculated using the Kaplan-Meier method.
Findings and Conclusion: A total of seven patients were identified during this time period. Overall survival rate was 85.71%. The mean age was 76 years at time of initial treatment. 57% of patients experienced recurrent disease with a mean time to recurrence of 379.6 days. There was no significant association between disease-free survival time and age. While there was no correlation in this series with positive margins and those with recurrence, a larger prospective series may prove otherwise.

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Maxilla carcinoma and occult neck metastases: implications for management of the clinically node negative neck

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Background: The management of the clinically node negative (N0) neck in patients with squamous cell carcinoma of the maxilla (MSCC) is a matter of debate. In this retrospective cohort study the incidence, survival of, and factors associated with occult metastases was determined in patients with MSCC and clinically N0 neck.
Objective: To evaluate the management of the clinically N0 neck in MSCC.
Methods: 77 consecutive patients with MSCC and a 'watch and wait' strategy for the clinically N0 neck were included. Clinical and histopathological data were gathered from the patient records. The incidence of occult metastases was calculated. Survival was calculated using Kaplan-Meier survival analysis. Cox regression analysis was used to assess the predictive value of the clinical and histopathological parameters.
Findings: Occult metastases occurred in 14.3% (11/77). Patients with T4 showed the highest rate of occult metastases (24.1%). 45% (5/11) of the metastases were located in the contralateral neck while the MSCCs did not cross the midline in these five patients. Five year overall survival was 62.3% and five year disease-specific survival was 87.0%. The hazard ratio for perineural growth was 5.39 ($P = 0.017$) and for perivascular invasion 11.12 ($P = 0.003$).
Conclusion: Patients with T4 MSCC and clinically N0 neck showed a high rate of occult neck metastases. For these patients we recommend elective treatment of the neck. Sentinel node biopsy may improve the detection of occult metastases in the ipsilateral and contralateral neck while avoiding the drawbacks of bilateral elective neck dissection or radiotherapy.

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Proposal of preoperative nutrition index predict survival of elderly patients with oral cancer: the cumulative effect of preoperative anaemia, serum albumen and body mass index influences clinical outcome irrespective of comorbidity

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Background: The risk factors for elderly oral cancer patients' survival are multifarious.
Objectives: We developed a novel nutrition index to predict prognosis of these patients.
Methods: The data of patients with oral cancer (age >60 years) treated was collected. Clinicopathological parameters and the nutrition index along with comorbidity indexes were analysed for overall survival (OS), disease free survival (DFS) and disease specific survival (DSS).
Findings: Patients with age $\geq$75 years, palate site, recurrent tumours, advanced pathological T, pathological N positive, severe tumour grade, preoperative anaemia, low serum albumen and low BMI along with high-risk nutrition index instead of the comorbidity indexes, showed poorer OS, DFS and DSS. Multivariate Cox analysis showed the nutrition index was an independent indicator for OS ($P < 0.001$), DFS ($P < 0.001$) and DSS ($P < 0.001$).
Conclusion: We developed a novel nutrition index as an independent predictor for prognosis of elderly oral cancer patients.

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Ossifying fibroma of the maxilla: case report and review of the literature

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Background: Ossifying fibroma is a benign fibro-osseous lesion. The aetiology is still unknown. It tends to arise from the mesenchymal blast cells of the periodontal ligament. It presents as a progressively growing lesion, between 3rd and 4th decades of life with a female predilection, and can attain an enormous size with resultant deformity if left untreated. Radiologically, it shows features of radiolucency, mixed radiolucency and opacity and complete radiopacity depending on the degree of mineralisation. Management includes curettage or enucleation or resection of the lesion depending on the stage and extent.
Clinical case: A 45-year-old woman was referred to our department with a slow increasing mass in the left maxilla that provoke loosening of the second molar. We describe the history, diagnosis, radiologic studies and the treatment outcome.
Conclusions: This entity is one of the differential diagnosis that needs to be considered when a slow increasing mass appears in the facial skeleton. The differential diagnosis having radiopacities within a well-defined radiolucent mass includes chondrosarcoma, osteosarcoma, fibrous dysplasia, squamous cell carcinomas, calcifying odontogenic cysts, and calcifying epithelial odontogenic tumours. The well-defined border of the ossifying fibroma helps differentiate it from the aggressive sarcomas and carcinomas.

Early biopsy with characteristic histologic findings helps the diagnosis. Treatment of choice for small, well-circumscribed lesions is enucleation.

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We can save not only lives, but also quality of life: submandibular gland-sparing neck dissection

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Background: Saliva is important to oral health and submandibular gland provide 70% of daily production. Neck dissection with gland removal is the traditional guideline in oral squamous cell carcinoma (OSCC) patients. Reduction of saliva would be noted postoperatively and impairs quality of life (QoL) due to xerostomia. Survival rate of OSCC reaches a plateau and what we can do more is to improve QoL.
Objectives: According to some published papers and our own study. Almost no submandibular glands metastasis by pathology even in positive level Ib neck. Our idea is that why we don't try to preserve submandibular gland since it seems to be safe to keep in neck.
Methods: Preserve gland in ipsilateral or contralateral pathological N0 neck. Subjective test for function are saliva flow from orifice by digital pressure and patient's sensation. Saliva scintigraphy worked as objective test.
Findings and Conclusion: From 2004 to 2016, total 58 cases included 59 tumours and 63 necks and glands. Fail to complete functional tests in seven glands finally due to recurrence or radiotherapy. Four local recurrence and three neck recurrence in average 33 months follow-up. In 56 glands with tests, two cases without saliva flow from orifice were observed and three cases felt mild xerostomia. Saliva scintigraphy was done in 24 cases, seven cases showed normal function, 13 cases showed mild xerostomia. Others are moderate xerostomia. We conclude that our method not only preserve function but also no increasing risk to recurrence. In other words, we could save not only lives but also QoL.

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Clinical implication of discrepancy between overall survival and disease-specific survival rate in oral cavity squamous cell carcinoma

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Generally, two types of survival estimations, overall survival (OS) and disease-specific survival (DSS) rate, are commonly used to measure clinical prognosis and explore predictive factors as well. OS rate is commonly used by clinicians due to the patients survival status can be easily obtained but without any information about underlying causes of death. On the other hand, DSS rate is more sophisticated that counts death caused by specific disease; other causes of death were refereed as right-censored. Thus, it could be easy to find the discrepancy (gap or disparity) between two survival estimations. However, the most important argument is that this discrepancy (gap or disparity) could be representing the possibility to increase the bias (overestimation or/and underestimation).

The aim of this study was to investigate characteristics of this discrepancy between two survival curves to explore the clinical implications. We studied consecutive patients with oral cavity squamous cell carcinoma (1985–2013). In our primarily result showed, age of 60 years as a cut-off point to show discrepancy occurred significantly that increased by aged patients. In case of evaluation of outcomes by overall survival rate, it is significant amount of non-cancer death as a competitive risk might cause overestimation of mortality of elder patients. So we recommend that disease-specific survival rate could be an adequate estimation for elderly patients, especially over the age of 60 years.

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Induction chemotherapy with or without radical surgery for advanced stage-IVb oral cancer: seven-year experience of National Taiwan University Hospital

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Background: The strategy of clinical stage-IVb oral cancer is quite challenging. Especially when it involves the infratemporal region, the five-year survival rate is dismal and less than 20%.
Objectives: The purpose of this study was to explore the effect of induction chemotherapy (IC) and flexibility of proposed infratemporal resection method for advanced oral cancer.
Methods: 88 cases completed the full treatment protocol from 98 enrolled patients. 48 group one patients were administered for two cycles of bevacizumab 100 mg/vial on day one, cisplatin 75 mg/m^2 on day one, fluorouracil 1000 mg/m^2 on day 1, 2 (APF) followed by radical surgery and concurrent chemoradiotherapy (CCRT), mainly based on internal carotid artery spared, partial response (more than 30% tumour shrinkage), systemic consideration or patient's motivation. The IC regimen and CCRT were only applied to 40 subjects of group two not eligible for surgery. We proposed a surgical technique to undergo radical infratemporal resection with coronal approach to basal skull. The primary end point was overall survival (OS). Secondary end points comprised flexibility of proposed surgical method, IC effect and complication rate.
Findings: Neither unexpected toxicities nor mortality was documented during the first two months. No difference of complication rate was recorded. However, partial response of IC was favoured by surgical group as 54%. Furthermore, five-year OS had significantly shown longer for surgical group than the other (52% versus 22%, $P < 0.01$).
Conclusion: The study demonstrated the IC combined with proposed surgical technique could be employed for those advanced stage-IVb oral cancer patients.

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Single versus double venous anastomoses in head and neck reconstruction: systematic review and cumulative meta analysis

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Background: The most common flap complication that causes flap failure is mainly due to venous thrombosis. Double venous anastomoses have been advocated in reducing the risk of venous compromise and flap failure. However, this procedure still remains controversial.
Objective: The author conducted a cumulative meta-analysis to determine the benefits of double venous anastomoses in head and neck reconstruction.
Methods: A literature search was conducted in accordance to the PRISMA checklist. Odds ratio (OR) was used for comparison. Statistical heterogeneity evaluation was performed using I2. If heterogeneity was non-significant, the fixed-effects model was used; otherwise, the random-effects model was used.
Results: 24 articles with 6517 flaps were included in this cumulative meta-analysis. In view of venous compromise, single venous anastomoses group had a significant higher incidence compared to the double venous anastomoses (OR = 1.71; 95% CI = 1.19 to 2.45; $P = 0.004$). In view of flap failure, the single venous anastomoses group also tended to have a higher incidence compared to double venous anastomoses (OR = 1.69; 95% CI = 1.09 to 2.62; $P = 0.018$). The cumulative meta-analysis effectively demonstrates a significant increase in venous compromise at the single venous anastomoses after adding trials conducted in 2014 onwards, whilst for flap failure the significant increase in single venous anastomoses was identified after adding trials in 2015 onwards.
Conclusion: The cumulative meta-analysis supports the evidence that use of two venous anastomoses reduces the incidence of venous compromise and total flap failure in head and neck reconstruction.

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Improvement of appearance and function in benign symmetrical lipomatosis-Madelung disease

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Background: Madelung disease is associated with chronic alcoholism and it is related to disturbances of the lipid metabolism. The symmetrical progressive fat growth at specific sites of the body, predominantly in the head and neck, eventually leads to the development of facial deformity, but most importantly, to functional disturbances related to the compressed respiratory tract and vascular structures.
Objectives: We aim to present our experience regarding the staged treatment of benign symmetrical lipomatosis.
Methods: We evaluated 29 cases that underwent surgical procedures of lipectomy in staged sessions involving first the submental-submandibular, anterior and lateral neck regions (24 cases), followed by the parotid region (8 cases), and where necessary the posterior cervical region (17 cases). Proper excision of the submandibular and cervical fat may imposed also the en-bloc excision of the submandibular gland in order to ensure complete removal of the diffuse fatty extensions. A superficial parotidectomy was necessary due to the imprecise limits of the adipose tissue.
Results: Facial appearance and respiratory function significantly improved in all cases. There were no cases of permanent facial nerve weakness following parotid dissection. Postoperative seromas were frequent (14 cases) and treated conventionally. Related sequelae involved hollowing of the submandibular area in 15 cases.
Conclusions: Lipectomy for Madelung disease is not a simple procedure due to the fat insinuating between important anatomical structures, imposing extensive resections and careful dissection around major vessels associated in with an important bleeding during surgery. A staged approach will eventually lead to favourable outcomes regarding function and aesthetics.

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Non-smoking, non-drinking elderly females, a five-year follow-up of a clinically distinct cohort of oral squamous cell carcinoma patients

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Background: Tobacco use and alcohol intake are responsible for approximately 65–70% and 20–35% respectively of oral squamous cell carcinomas (OSCC). Currently non-smoking, non-drinking (NSND) patients represent approximately 13–35% of the OSCC population, which appears to be increasing. These patients are more likely to be young (mean age, 20–35 years) or elderly (>70 years) females with a predilection for tongue, gingivae and lower lip sites. Although approximately 24% of head and neck cancers occur in patients over 70 years old, there are few published reports of oral SCC in elderly patients. This group appears to be characterised by a higher proportion of NSND females. Our unit has previously reported poorer survival outcomes in this clinically distinct group after 2.5 years of follow-up with higher rates of disease specific mortality.
Objectives: This study aims to provide a direct follow-up of the original study cohort out to 5 years and retrospectively review a second cohort at 2.5 years to further inform our understanding of disease patterns in NSND patients with OSCC.
Methods: We performed a retrospective review of 287 consecutive patients who treated for OSCC between the 1st Jan 2007 and 31st Dec 2012. Only patients with oral subsite primaries as classified by the tenth edition of the International Classification of Diseases (ICD-10) were included. Carcinomas of the lip, tonsil, base of tongue and oropharyngeal subsites were excluded.
Findings and Conclusions: The results of this study suggest that NSND elderly females are a distinct patient population with poorer disease specific survival outcomes.

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The accuracy of radiological examination of bone invasion in oral squamous cell carcinoma

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Background: Bone invasion by oral squamous cell carcinoma (SCC) necessitates jaw resection. Even with free-flap reconstruction, segmental resection still results in cosmetic and functional deficits, donor site morbidity, increased risk, prolonged recovery and rehabilitation. Marginal resection aims to maintain bony continuity and is oncologically safe when performed for tumours with limited bone invasion. Currently the rate of non-invaded mandible resections ranges between 20 and 100%. Ideally preoperative imaging is able to provide accurate information regarding the degree of bone invasion to guide the required resection.
Objectives: The aim of this study is to determine the accuracy of computed tomography (CT) and magnetic resonance imaging (MRI) in the identification of bone invasion oral SCC by comparing the results obtained from imaging to those obtained from histological examination of maxillary and mandibular resection specimens.
Methods: We performed a retrospective review of 133 patients treated for oral SCC who underwent bony resection. 115 of these patients had preoperative CT imaging and 98 had MRI. The presence and depth of bone invasion on imaging was compared to that detected on histopathology.
Findings and Conclusions: Bone invasion was detected in 57 out of 133 (42.8%) resection specimens. Bone invasion was identified on CT imaging in 39 out of 115 cases (33.9%) and by MRI in 45 out of 98 cases (45.9%). The sensitivity and specificity of CT for detecting bone invasion was 50% and 78% respectively. The sensitivity and specificity of MRI for detecting bone invasion was 71% and 80% respectively.

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A rare case of high-grade chondrosarcoma involving the mandible and literature review

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Background: Chondrosarcoma is a locally aggressive, malignant tumour that rarely presents in the head and neck. We present a rare case and literature review.
Case Report: A 25-year-old male presented with a rapidly increasing and painful swelling in the right body of the mandible. The medical history was non-contributory.

Extraoral examination revealed a diffuse, poorly defined swelling on the right body of the mandible (≥30 mm). The swelling was hard, non-mobile and non-tender to palpation. The overlying skin was intact. No lymphadenopathy was noted. Intraorally there was a firm, diffuse, painful swelling extending from 44 to 48, obliterating the buccal and lingual vestibule. The overlying mucosa appeared normal. Teeth were non-mobile and responded normally to vitality tests. An ill-defined radiopacity was noted in the right body of the mandible. Computed tomography showed an expansile, osteolytic lesion causing destruction of the associated buccal and lingual bone cortices.

An incisional biopsy was performed and histopathology was suggestive of chondrosarcoma. Definitive management involved segmental mandibulectomy with wide margins. Histopathological examination showed a high-grade chondrosarcoma with clear margins. Surgery was complemented with a course of radiotherapy. Despite regular follow up, the patient presented at 6 months with back and radicular pain and weakness of both lower limbs. Metastasis to the lumbar vertebrae and liver was diagnosed. Unfortunately, 12 months after surgery the patient died.
Conclusion: Chondrosarcoma is a rare malignant tumour in the head and neck. High-grade lesions have a poor prognosis. Management is usually in a multidisciplinary setting.

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Operative techniques for the management of parapharyngeal space tumours: an experience in Asian Indian population

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Background: Parapharyngeal space tumours account for 0.5% of head and neck tumours. It is an enigma for maxillofacial surgeons to diagnose parapharyngeal space tumours because they have vague symptoms and are inaccessible.
Objective: To present different operative techniques for the treatment of 20 parapharyngeal space tumours and to describe and analyse symptoms and clinical signs, diagnostic procedures, histopathological findings, complications and outcome of the surgical treatment.
Methods: The following data were collected for each patient: age, sex, symptoms, histological diagnosis, physical examination findings, surgical approach, complications, follow up time and outcome. Data collected were analysed statistically.
Findings: The most common tumour encountered was of salivary origin (50%); followed by neurogenic neoplasms (30%) and others (chondrosarcomas, synovial sarcoma and branchial cleft cyst). Overall 65% of the cases were benign and rest 35% was malignant. Majority of tumours were excised through transcervical approach alone (six patients, 30%) and combination of transcervical approach with other approaches (transcervical plus mandibular swing in five patients [25%]; transcervical plus transoral in two patients [10%]; transcervical plus transparotid in four patients [20%]; transcervical plus mandibular swing plus transparotid in one patient [5%]; transcervical plus transmastoid in one patient [5%] and transcervical plus infratemporal fossa approach plus mandibular swing in one patient [5%]). Mandibulotomy and infratemporal fossa approach was performed to enhance exposure and facilitate complete resection of superiorly based malignant tumours.
Conclusion: Surgical approach to the parapharyngeal space tumours must be customised to the characteristics of the lesion and be as wide as necessary to achieve its complete removal with safety preserving the functional integrity of the patient.

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Changes in the field of osteoradionecrosis of the jaw over the past decades, concerning prevention and treatment

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Background: Osteoradionecrosis (ORN) of the jaw develops after treatment with radiotherapy for head and neck cancer. In this field many innovations and changes have occurred in the way radiotherapy is applied. New concepts about the pathogenesis and treatment have been introduced. Ongoing research refined existing treatment concepts.
Objectives: Does the way radiotherapy is applied nowadays reduce the number of ORN cases? How did treatment concepts change over time and which new concepts are likely to get more accepted in future?
Methods: Partially a review of the literature was used combined with own research data.
Findings: Developments in radiotherapy have reduced the number of ORN cases. Hyperbaric oxygen therapy is used more case specific and treatment with medication is used more often.
Conclusion: The incidence of ORN is reduced by ongoing developments in radiotherapy. Therapy for ORN has to become more patient specific.

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Oral cancer awareness in Sudan: assessment of knowledge, attitude and treatment seeking behaviour

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Background: Oral cancer is a health problem worldwide; it is the sixth most prevalent cancer in the world.[1] Early detection of oral cancer is important in decreasing morbidity and mortality rates.[2]
Objectives: To assess awareness, knowledge and attitude towards oral cancer in Sudan.
Methods: A questionnaire-based survey was performed on general population between 2015 and 2016 in different geographic areas of Sudan. Data were entered by Microsoft® Excel 2007 and analysed using SPSS (version 20) using Chi squared test with P value <0.05.
Findings: There were 1370 participants, 66.6% have heard about oral cancer and the media was the common source of information. Of all participants 45.3% mentioned that they don't have enough knowledge on oral cancer and 66.5% mentioned that it's treatable. More than 80% of the respondents were aware that smokeless tobacco (toombak) is a risk factor for oral cancer. While 60.1% were aware of alcohol as a risk factor and 66.2% were aware of smoking as a risk factor.
Conclusions: Counselling sessions should be conducted with further investigations to find out the reasons behind the continued practice of high-risk habits, despite knowledge.

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Tumour dimension and depth in T1 tongue squamous cell carcinoma: intraoral ultrasound scan and histological comparison

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Background: Ultrasound scan (USS) is a noninvasive portable assessment and a diagnostic radiological modality; which is commonly used in head and neck investigations. Despite the popularity of magnetic resonance imaging (MRI) in diagnosis and staging of squamous cell carcinoma (SCC) of the tongue, use of USS as a diagnostic adjunct is well established. Although dimensions of the tongue SCC are important in staging, tumour thickness is not part of it. Despite this it is an important predictive marker for lymph node metastases.
Methods: Retrospective study was carried out to examine the accuracy of intra oral USS in determining the dimensions and depth of SCC of the tongue. Total of 10 patients with a histologically confirmed T1 SCC of the tongue and had a preoperative USS were selected. Final histological dimensions and depth was compared to the preoperative USS values.
Results: Average age of patient was 58 years and 9 months (range, 30–87 years) and male to female ratio was 2:3. Most of the lesions were on the right side (right to left ratio, 3:2) and majority (70%) were moderately differentiated SCC. USS values for the depth of the SCC correlated well with the histological values (variation −1–1 mm). Although dimension values did correlate, the variation was not as cohesive (−3.5–8 mm) as noted for the depth.
Conclusion: USS is an ideal radiological tool to determine the dimension and depth of SCC of the tongue. This study confirms that tumour dimensions/depth can be assessed appropriately in T1 SCC of tongue.

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Energy metabolism of two kinds of stromal fibroblasts differently fuel the development of oral squamous cell carcinoma

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Background: Cancer is primarily a metabolic disease involving disturbances in cellular energy metabolism. "Reverse Warburg Effect" in adjacent stromal fibroblasts can be induced to feed cancer cells.
Objectives: Develop a novel co-culture system to compare energy metabolism between normal oral fibroblasts (NOFs) and cancer-

associated fibroblasts (CAFs), study their pathophysiological significance in microenvironment of oral squamous cell carcinoma (OSCC).
Methods: CAFs and NOFs were both monolayer-cultured and co-cultured, respectively with normal oral keratinocytes (NOKs) and OSCC. Stained and analysed them by luminescent reader, flow cytometry, confocal microscope and Western blot for adenosine triphosphate (ATP) production, mitochondrial volume, mitochondrial membrane potential (MMP), reactive oxygen species (ROS), lactate, caveolin-1 and monocarboxylate transporter 4 (MCT-4). Mean and standard deviation were plotted for 3 replicates from each condition.
Findings: After co-cultured with OSCC, CAFs showed decreased ATP production, ROS, caveolin-1 and lower MMP, but mitochondrial volume and MCT-4 expression were increased. Interestingly, NOFs showed increased ATP production, ROS, lactate, MCT-4, but decreased MMP, mitochondrial volume and caveolin-1 after co-cultured with OSCC. Confocal work showed that mitochondrial transfer more easily happened from NOFs to OSCC.
Conclusions: OSCC can induce "Reverse Warburg Effect" in both NOFs and CAFs, which present mitochondrial dysfunction and oxidative stress in different ways that fuel ATP production in OSCC. Interestingly, metabolic coupling and mitochondrial transfer occur between stromal fibroblasts and OSCC. As CAFs' precursor, NOFs play a more significant role in invasive tumour front than CAFs, which dramatically increase aggressive behaviour of OSCC and associate with early tumour recurrence and metastasis.

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Predictors of health-related quality of life in patients with head and neck cancer: a systematic review of papers 2006–2016

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Background: The number of papers reporting on health-related quality of life (HRQoL) following head and neck cancer (HNC) is increasing year on year. HRQoL is a crucial outcome parameter in survivorship, as cure rates improve and more patients are living with the consequences of their cancer and its treatment. When planning treatments, it is essential to have an understanding of those factors that predict HRQoL. It is hard to identity all the relevant papers hence this structured search of the literature is in collaboration with the 'Handle on QoL' web resource.[1]
Objectives: The aim of this systematic review is to summarise papers reporting on clinical factors predictive of HRQoL in patients with HNC.
Methods: A comprehensive literature search was performed, using MEDLINE, PubMed, PMC, EMBASE, CINAHL(Cumulative Index to Nursing and Allied Health Literature), and the Cochrane Database of Systematic Reviews. Papers were selected based on their use of a validated patient-completed questionnaire, then stratified into one of three core domains of HRQoL: physical and functional, psychological and social interaction.
Findings: We identified 2113 articles published during the 10-year period, of which 290 concerned clinical predictors. 234 articles meeting our eligibility criteria were reviewed. Patient age, tumour stage and site, recurrence and radiotherapy were consistent predictors of post-treatment HRQoL.
Conclusion: This review outlines predictors of HRQoL in patients with HNC and provides a conceptual basis for developing prediction models. Identification of patients at risk for HRQoL deterioration can be improved using these models to guide focused interventions specific to a patient, the disease or subsite.

Reference

[1] http://www.handle-on-qol.com.

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Clinicopathologic features of myofibroma presenting in head and neck region — literature review and summary of 22 cases

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Background: Myofibroma is a benign mesenchymal tumour, most of which were presented merely by case reports.
Objective: To evaluate the clinical and histopathologic features of myofibroma in head and neck region and explore the commonness and potential differences with literature review.
Methods: 22 cases of myofibroma in head and neck region were diagnosed from December 2012 to May 2016 in Department of Oral and Maxillofacial Surgery, School and Hospital of Stomatology, Peking University. All of the clinical, radiological, and histopathologic manifestations were collected and analysed. Literature reports until April 2016 were searched on PubMed using key word "myofibroma".
Findings: In our 22 cases, the sex ratio was 1:1 (M:F), with a median age of 6.5. Mandible, gingiva and subcutaneous tissue were the predilection sites (23%, 23%, 18%). All cases were treated by surgery including curettage, resection and extended resection. The immunochemical tests show vimentin (+), SMA (+), desmin (−), S-100 (−), CD-34 (−), Ki-67 (<10%). Tumour recurrence was found in 2 patients after 5–46 months follow-up. Cases from literature reports showed similar clinicopathologic features with our experience. Myofibroma is a benign mesenchymal tumour which can be locally aggressive. No distant metastasis was reported.
Conclusion: In head and neck region, myofibroma is a benign tumour mostly appears in mandible, gingiva and subcutaneous tissue and more often happened in infants or adolescents. Local invasion makes it possible to recur after conservative operation. Most myofibroma can be cured by resection radically. The correlation with the spectrum of related diseases remains controversial.

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Chairside microcirculation assessment of late irradiation injury of the oral mucosa in head and neck cancer patients

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Background: Radiotherapy is known to negatively affect tissue vascularisation and can ultimately lead to late adverse effects such as ulceration and osteoradionecrosis in the head and neck (HN)

region. The recently developed incident dark-field illumination-based CytoCam microscope system[1] is able to measure the oral microcirculation at the patient chairside.
Objectives: The aim of this study was to determine the clinical feasibility of examining and measuring *in vivo* late oral microcirculatory irradiation injury with the CytoCam handheld microscope.
Methods: In a case-control observational study images were obtained bilaterally from the mandibular gingiva and buccal mucosa in 14 HN cancer patients and 14 healthy age-matched controls. Tissue functional capillary density (FCD), vessel diameter (Øbv), and microvascular flow index (MFI) were analysed.
Findings: Mean gingival and buccal FCD in healthy controls was 66 ± 23 cpll/mm^2 and 19 ± 6 cpll/mm^2, respectively. Buccal mucosa mean Øbv in healthy controls was 15 ± 2 μm. A statistically significant decrease in mean FCD in irradiated mandibular gingiva was found ($P < 0.001$) and an increased mean Øbv in irradiated buccal mucosa ($P < 0.05$). No significant differences in mean buccal FCD was found and MFI was equal in both groups.
Conclusion: Noninvasive measurements of the oral microcirculation using CytoCam microscopy was feasible for detecting pathophysiological alterations in capillary density and vessel diameters between irradiated and healthy tissues.

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Major maxillofacial surgery in the over 80-year-old patient — a review of outcomes for East Kent 1997–2016

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Background: Elderly patients are generally frailer and carry a higher comorbidity burden than the general population, therefore major surgery holds significant risk of morbidity and mortality for them.
Objectives: Review outcomes of major maxillofacial surgeries in the over 80s.
Methods: The electronic theatre database (Theatreman) was used to identify all maxillofacial surgery procedures in patients over 80 years old with duration of surgery greater than 4 h between 1997 and 2016. Intensive care length of stay (LOS), hospital LOS, and date of death if known were established using our clinical database (iSOFT PAS) cross-referenced against care records. Median survival calculated using Kaplan–Meier.
Results: 107 patients were identified (60 male, 47 female) with a median age of 84 years (range, 80–94 years). 94 had malignant, and 13 locally invasive disease. All underwent local resection. 82 had neck dissections, 11 had free flaps, and 18 had local flap reconstruction. No flaps failed. The malignant cases median operation duration was 421 min (250–1170 min) compared to local disease cases 296 min (244–383 min). Malignant disease median ITU LOS was 1 day, five died in hospital, four within 30 days of surgery and one within 24 h. Their median hospital LOS was 11 days (1–132 days) and median survival 17 months. Local disease median survival was 63 months. None required ITU, median hospital LOS was 3 days (1–34), and none died in hospital or within 30 days.
Conclusion: 30 day and in hospital mortality is low and confined to malignant disease. Long-term survival is markedly impaired in malignant disease.

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^{125}I brachytherapy alone for recurrent or locally advanced salivary gland cancers of maxillary region

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Background: It is still a problem to treat unresectable recurrent or locally advanced salivary gland cancers of maxillary region, which had a low five-year local control of 35–46%.
Objectives: To present our treatment experiences and results, and to evaluate the feasibility and effectiveness of ^{125}I brachytherapy in recurrent and/or locally advanced salivary gland cancers of maxillary region.
Methods: 36 patients with recurrent and/or locally advanced salivary gland cancers of maxillary region completed ^{125}I implant brachytherapy in Stomatology School and Hospital of Peking University from 2010 to 2015. Eighteen cases were recurrent cases after prior surgeries and radiation. And other 18 cases were primary tumours. All patients received interstitial ^{125}I seeds implant alone under the three-dimensional individual template guide. The prescribed dose was 120–160 Gy. The activity of ^{125}I seeds were 18.5–33.3 MBq per seed. The number of seeds implanted was 16–125 (median, 55).
Findings and Conclusion: Followed 6–65 months (median, 38 months), the two-year and five-year local control rates were 86.5% and 60.2%, respectively. The two-year and five-year overall survival rates were 93.8% and 66.2%. Tumours >6 cm had significantly lower local control and survival rates. No severe complications (Radiation Therapy Oncology Group, 3–4) were observed during the follow-up. ^{125}I brachytherapy was an elective alternative to treat local advanced unresectable or recurrent salivary gland cancers of maxillary region with few complications.

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Evidence on role of chemotherapy in head neck osteosarcoma

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Background: Osteosarcoma is an aggressive bone malignancy rarely presenting in head and neck sites, the trials for extremity osteosarcoma show improved survival by chemotherapy. The head and neck osteosarcomas (HNOs) were excluded in these trials because of atypical presentation and disease course. Further, sufficient numbers were not possible for a trial.
Objectives: We present a largest retrospective study from single institute investigating the role of chemotherapy in the management of HNOs.

Methods: The retrospective cohort of HNOs treated from 2007 to 2015 of a tertiary hospital was charted. The therapeutic and prognostic factors were analysed for overall survival (OS), disease free survival, local control and metastasis in univariate and multivariate analysis. The minimum and median period of follow up was 12 months and 4.67 years.
Findings: There was a total of 157 patients definitively treated with surgery in the time period. 7 patients had positive margins and all were maxillary or skull base tumours. The multivariate Cox regression showed significance of tumour site ($P = 0.034$), margin status ($P = 0.006$), chemotherapy ($P = 0.025$), histological subtype ($P = 0.012$) as predictors of overall survival. The margin status ($P = 0.002$), radiotherapy ($P = 0.005$) were significant predictors for local recurrence. The age and histology subtype ($P = 0.058$) were borderline significant predictors of metastasis ($P = 0.065$). The Kaplan–Meier method for OS of different chemotherapy groups ($P = 0.013$), and survival with and without chemotherapy ($P = 0.007$) was significant. The OS was significantly better with adjuvant chemotherapy among various treatment plans ($P = 0.034$).
Conclusion: Chemotherapy improves OS of HNOs. A random multi-institute trial is needed to achieve better results.

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Postoperative pulmonary failure after oral oncologic surgery with simultaneous reconstruction

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Background: Postoperative pulmonary failure (PRF) is associated with significant morbidity and mortality in surgical patients, but few data exist on the incidence of PRF following oncologic surgery with simultaneous reconstruction.
Objectives: To determine the incidence of PRF after oral cancer resection with simultaneous reconstruction.
Methods: This retrospective study included who underwent oral cancer resection with simultaneous reconstruction at the Department of Oral and Maxillofacial Surgery, Kobe University Hospital, between 2007 April and 2015 December. PRF was defined as having mechanical ventilation longer than 48 h postoperatively, unplanned postoperative reintubation, or both. Epidemiological data were retrospectively gathered from electronic medical records including age, sex, smoking status, body mass index (BMI), diabetes mellitus (DM), duration of surgery, blood loss, intraoperative transfusion, pre-existent pulmonary diseases, pulmonary function test. Respiratory failure risk index (RFRI) were retrospectively obtained for each patient. Univariate test and multivariate analysis were used to determine statistical significance.
Findings and Conclusions: Of the 151 patients enrolled, the overall incidence of PRF was 9% (14/151 patients). BMI, DM, pre-existent pulmonary diseases, and RFRI are significant in univariate analysis. DM, pre-existent pulmonary diseases and RFRI are significant in multivariate analysis. We conclude that RFRI may be useful to detect postoperative PRF in oral major cancer surgery.

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Axillary nodal metastasis in patient with head and neck carcinoma — a case report

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Distant lymph nodes metastasis to axillary nodes in patients with head and neck squamous cell carcinoma is rare. We report a case of 62-year-old gentleman presented with right lateral border of tongue squamous cell carcinoma. Patient was cancer free for 26 years before developing second primary in right parotid. Patient completed chemotherapy and intensity-modulated radiation therapy prior to surgical resection of the tumour with radical neck dissection and reconstruction with pectoralis major myocutaneous flap. In this case report we will discuss regarding possibility of the axillary node metastasis in head and neck carcinoma and current review.

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Prostate-specific membrane antigen as a possible target for radionuclide treatment of adenoid cystic carcinoma

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Background: Adenoid cystic carcinoma (AdCC) is an uncommon malignant epithelial tumour of secretory glands. Many patients develop slow-growing local recurrences and/or distant metastasis within ten years, which are responsible for most long-term morbidity and mortality. Prostate-specific membrane antigen (PSMA), a transmembrane glycoprotein of prostate epithelial cells, was originally described as highly prostate-specific. However, radionuclide imaging using Gallium-68-labelled PSMA and positron emission tomography (PET)/computed tomography (CT) showed tracer uptake in several other organs and types of malignancies.
Objective: We present the results of 68Ga-PSMA-PET/CT imaging and immunohistochemical PSMA expression in patients with AdCC.
Methods: Eight patients with known or suspected local recurrent and/or distant metastatic AdCC underwent full-body 68Ga-PSMA-11-PET/CT. Standardised uptake values (SUVmax) were calculated of the regions of recurrent tumour and distant metastasis. Tumour specimens were revised from the pathology archives and immunohistochemically stained for PSMA expression.
Results: Four patients developed local recurrence, all suffered distant metastasis. 7/8 (88%) of the patients depicted PSMA-positive AdCC on PSMA-PET/CT. In these seven positive PET/CTs, mean SUVmax was 6.2 for local recurrence and 5.5 for distant metastasis. 6/8 (75%) of primary resection specimens were positive on PSMA immunohistochemistry. All available specimens of local recurrent and distant metastatic AdCC showed PSMA expression.
Conclusions: 68Ga-PSMA-PET/CT imaging is a promising and possibly better imaging modality in staging and follow-up of AdCC. Until now, curative treatment of deep recurrences or metastatic AdCC is often impossible. Due to high PSMA expression of many of these tumours, AdCC might be candidate for

targeted anti-tumour treatment with the beta-emitter Lutetium-177-PSMA-617.

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A novel black bone magnetic resonance imaging protocol for optimisation of three-dimensional head and neck resection margin planning

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Background: In current head and neck oncology practice, three-dimensional (3D) computed tomography (CT) based virtual planning of resection and reconstruction, followed by guided surgery, is standard of care. However, tumours are usually well visible on magnetic resonance imaging (MRI) while less clearly on CT.
Objectives: The aim of this study was to improve the current workflow by developing a method for obtaining 3D MRI-based mandible models, in order to plan the bony resection margins with MRI-based visualisation of the tumour.
Methods: A workflow for MRI based surgical planning and guided surgery was developed using a four-step approach, including a general exploration phase, test series, validation series and guided surgery. Key MRI parameters were defined in phase 1, followed by application of selected sequences on healthy volunteers in phase 2. The optimised MRI protocol was validated by application on a patient series ($n = 10$) and comparison to CT data of the same patient, phase 3. Phase 4 provided examination of the clinical value during surgery.
Findings: Three black bone sequences were applied for all cases. In comparison-analysis, mean deviation values between the MRI- and the CT-based models were found to be 0.56 mm, 0.50 mm and 0.58 mm. Guided surgery was performed in two cases resulting in a mean deviation of the resection planes of 2.3 mm, 3.8 mm for the fibula segments, and a mean axis deviation of the fibula segments of 1.9°.
Conclusion: This study provides a method for 3D virtual resection planning and guided surgery, based on solely MRI imaging. Therefore no additional CT data fusion is required.

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Effective elective neck dissection in oral carcinoma

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Selective neck dissection is a procedure that is primarily indicated in patients with clinically negative nodal disease in which there is a high risk of occult metastases. Some have advocated its use for patients with positive nodes, although under very specific circumstances and in combination with postoperative radiation therapy. The high incidence rate of occult cervical metastases (>20%) in tumours of the lower part of the oral cavity is the main argument in favour of elective treatment of the neck. The usual treatment of patients with clinically palpable metastatic lymph nodes has been radical neck dissection, which includes removal of sternocleidomastoid muscle, internal jugular vein and spinal accessory nerve resulting in morbidity. Aiming to reduce the morbidity like shoulder morbidity, selective neck dissection were performed. The use of selective supraomohyoid neck dissection as the elective treatment of the neck, in oral cancer patients, is now well established. The type of selective neck dissection performed varies according to the site of the primary, because the pattern of metastases is unique in each case. This paper critically reviews the philosophy on when, how, and why to employ the procedure, based on the location of primary cancers.

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Accuracy of sentinel lymph node biopsy in early oral squamous cell carcinoma

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Objective: This systematic review is performed to investigate and review the application of sentinel lymph node biopsy in early oral squamous cell carcinoma (OSCC), that is, clinical stage T1 and T2 with N0 neck, and no history of previously treated neck.
Methods: In order to answer the question "Whether sentinel lymph node biopsy is an accurate diagnostic staging tool for clinical N0 OSCC patients?" An electronic search on PubMed, Medline and the Cochrane Library database was carried out for all relevant articles using specific search keywords. All articles were classified by their level of evidence.
Results: A total of 34 studies were included in this review. The mean detection rate for sentinel lymph nodes ranged from 93 to 100%. A mean of 1.5 to 3.8 sentinel lymph nodes were detected per patient. The percentage of upstaging due to detection of occult metastasis present in the sentinel lymph nodes was 9–50% amongst the 34 studies. The mean sensitivity of the procedure is 60–100%, the negative predictive value is 80–100% and the false negative rate is 0–25%. The regional recurrence amongst the negative sentinel lymph node results were reported to be 0–12%. Centre and surgeon experience is crucial in order for the technique to be carried out with a higher sensitivity.
Conclusion: Sentinel lymph node biopsy can be an alternative diagnostic strategy to evaluate cT1-T2N0 early oral cancer. It should only be offered as an alternative when the two criteria are met. (1) The equipment for SLNB is available and (2) surgeons performing the SLNB procedure has received adequate training.

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Induction chemotherapy for squamous cell carcinomas of the oral cavity: a cumulative meta-analysis

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Background: Induction chemotherapy (ICT) is a controversial treatment for head and neck squamous cell carcinomas (HNSCC). Despite numerous randomised controlled trials (RCTs), a majority do not have enough statistical power alone to conclude ICT's treatment value among oral squamous carcinoma patients (OSCC) since many only address HNSCC as one entity instead of by subtypes.

Objectives: We aim to determine the benefits of ICT in OSCC therapy by performing a systematic review using the cumulative meta-analysis technique.
Methods: A literature search identified for RCTs comparing OSCC patients who received ICT against those without. Log-hazard ratio, and relative risk were used for comparison. Heterogeneity was determined using the I2 statistic package. Data analysis was performed for endpoints including overall survival (OS), disease-free survival (DFS), locoregional recurrence (LRR) and distant metastasis (DM).
Findings: 27 randomised trials were eligible for analysis ($n = 2872$ patients). The shortest median follow-up was 15 months whereas the longest was 11.5 years. ICT does not improve OS (HR = 0.947; 95% CI 0.85–1.05; $P = 0.318$), DFS (RR = 1.05; 95% CI 0.92–1.21; $P = 0.462$) and DM (RR = 0.626; CI 95% 0.361–1.086; $P = 0.096$) compared to locoregional treatment alone. However, there was a significant improvement to LRR (RR = 0.778; 95% CI 0.622–0.972; $P = 0.027$).
Conclusion: There is no evidence ICT improves survival outcomes for OSCC patients which can be effectively visualised through a cumulative meta-analysis approach. However, ICT reduces locoregional recurrence of OSCC, which may need further verification.

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Must we remove submandibular glands during neck dissection in oral squamous cell carcinoma patients?

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Background: During the past years, treatment of oral squamous cell carcinoma (OSCC) patients including ablative surgery of the tumour and neck dissection to remove possible metastatic lymph nodes. In the past, we usually removed submandibular glands at the same time during neck dissection procedure. Patient often suffered from xerostomia after the ablative surgery.
Objectives: However, in our experiences, submandibular gland metastasis was rare. We could not help asking: "Could we spare the gland during neck dissection procedure?" And if we plan to replace present treatment policy, we must have enough evidence to support our idea. But the true metastasis rate of submandibular gland is still lack of research evidence by now.
Methods: In this study, 146 OSCC patients treated in NCKU from 2013 to 2016 were included. All of them received neck dissection unilaterally or bilaterally during ablative surgery. The pathological reports of these patients were reviewed and statistic analysed.
Findings and Conclusion: Hardly any submandibular gland metastasis was recorded, even with level Ib neck lymph node metastasis. Only two patients with very advanced tumour were found with submandibular gland involvement. The result supports our idea that submandibular gland sparing during neck dissection in OSCC patients is feasible and may improve the life of quality of our patients after ablative surgery.

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A potential solution to immunosuppression of the tumour microenvironment: results of a phase 1 clinical trial of anti-OX-40 in head and neck squamous cell carcinoma

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Background: Cancer immunotherapy utilises the host immune system to attack tumour cells by an activated immune response. Head and neck SCC (HNSCC) release suppressive factors that impair the immune system. OX40 is a potent costimulatory pathway that when triggered can enhance T-cell memory, proliferation and antitumour activity in patients with metastatic cancer.
Objectives: To determine the maximum tolerated dose, toxicity, immunologic activity, and potential clinical activity following one cycle of anti-OX40 treatment.
Methods: Participants received a single cycle of anti-OX40 given intravenously on days one, three and five. There were three cohorts of 10 patients each. Patients in cohort 1 received one cycle of 0.1 mg/kg; cohort 2, 0.4 mg/kg; and cohort 3, 2 mg/kg of the mAb. Tumour tissues and peripheral blood are collected during resection for measurements of tumour infiltrating immune cell populations using flow cytometry and immunohistochemistry that may correlate with changes induced by anti-OX40 administration.
Results: The toxicity profile was mild. Of the 30 patients treated, 12 patients displayed regression of individual tumour deposits in lung, subcutaneous sites or lymph nodes; and six others had stable metastatic disease for up to one year after anti-OX40 treatment. Immunologic changes were observed at all dose levels with significant proliferation of CD4+ and CD8+ central and effector memory T-cell populations in both the tumour microenvironment and circulation.
Conclusion: There is significant expression of OX40 in the TIL of patients with HNSCC. Furthermore, we noted co-expression of OX40 with PD1 and CTLA-4 in a majority of tumour specimens, especially within the T-reg population.

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Global incidence of oral and oropharyngeal cancer in young adults: a systematic review

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Background: Oral and oropharyngeal squamous cell carcinoma (OOPSCC) is typically regarded as a disease of elderly people. However, increasing numbers of patients worldwide with OOPSCC at a younger age (40–45 years) have been reported recently.
Objectives: This systematic review brings together 77 studies conducted over four decades to look at geographical variations and trends worldwide in incidence of OOPSCC in young adults.
Methods: The authors searched PubMed and Google scholar databases from 1975 to June 2016. Studies were included if they reported incidence rate of oral and oropharynx cancer separately for age cut-off less than 45 years.

Findings: 21 population-based studies were available on incidence rate from 15 countries. These showed an increase over time except in The Netherlands and India. A rise in tongue cancer among white women and oropharyngeal cancer in white men was observed. Data suggest that cancer in young patients may be a distinct entity with unique biologic behaviour. Additionally, a pooled relative proportion of OOPSCC contributed by young adults to total incidence in several geographic locations revealed a significant variability in particular between estimates from North America (5.5%) and both Africa (17.2%) and Middle East (14.5%).
Conclusion: OOPSCC in young adults is rising worldwide. Highlighted are requirements for defining age cut-off for young adults, the need for more population-based studies in non-western regions of the world to get an accurate incidence in young subpopulations, and the urge to identify other etiological factors to understand and combat OOPSCC in these young patients.

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Vascularised fascia lata for prevention of postoperative parotid fistula after neck dissection

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Background: Parotid fistula could be resulted in by partial parotidectomy, which is routine to be performed during the neck dissection for some cancers close to oropharyngeal area. The aim of this study was to evaluate the reliability of vascularised fascia lata to prevent parotid fistula by sealing off parotid stump after neck dissection.
Methods: A cohort of consecutive patients with oral cancer indicated for the reconstruction of composite anterolateral thigh (ALT) flap with vascularised fascia lata were enrolled. Vascularised fascia lata paddle was used to seal off the parotid stump by tightly continuous suture in order to prevent parotid fistula after neck dissection.
Results: 23 patients (18 male and five female) with primary oral cancer close to oropharyngeal area were enrolled. The mean area of parotid defect was 16.7 cm^2 and the mean area of fascia lata was 21.8 cm^2. Flaps are all survival. No patient received pressure dressing and anticholinergic drugs postoperatively. No parotid fistula was found during both inpatient and follow-up period.
Conclusion: The composite ALT flap with vascularised fascia lata is a reliable option for both reconstruction of oral mucosa and prevention of parotid fistula after neck dissection of oral cancer.

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Internet-based mode for the follow-up of oral and maxillofacial malignancies

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Objectives: Lost to follow-up is quite common in Chinese patients with oral and maxillofacial malignancies. We developed an Internet-based mobile phone App to follow-up these patients and this trial aims to detect the effect of this internet-based mode in increasing the follow-up rate of oral malignancies patients.
Methods: We included 278 oral cancer patients. Patients were divided into Internet-based and telephone-based group according to their acceptance of the mobile phone App. Patients in the Internet-based group were asked to register on WeChat, and all the information could be collected by a follow-up App on the nurses' phone. The follow-up mission was assigned by the research nurse on the day of discharge. Patients and nurse were reminded by the mobile phone on the day of follow-up. Patients in the telephone-based group were followed up by traditional telephone contact. The follow-up rate was recorded on four time points — month one, three and six, and year one. 143 patients were allocated to the internet-based group while the other 135 patients were in the telephone-based group.
Results: The one-year follow-up rate was significantly higher in the internet-based group (RR = 1.77; $P < 0.0001$). Internet-based mode did not change month one follow-up rate (98% versus 93%; RR = 1.06; $P = 0.28$), however, it had 1.3-fold higher recall rate than telephone follow-up ($P < 0.0001$) on month three and 2.92-fold higher on month six ($P < 0.0001$).
Conclusions: In summary, with the development of Internet technology and change of Chinese mobile phone use habit, Internet-based mode could significantly increase patients' compliance and increase follow-up rate in oral and maxillofacial patients.

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Targeting rearranged during transfection sensitises oral squamous cell carcinoma to epidermal growth factor receptor inhibitor erlotinib

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Background: Aberrant activation of transmembrane receptor tyrosine kinase (RTK) signalling might mediate insensitive to EGFR inhibition in oral squamous cell carcinoma (OSCC).
Objectives: We investigated the expression and prognostic value of rearranged during transfection (RET) in OSCC, and found a novel mechanism to improve efficacy of epidermal growth factor receptor (EGFR) inhibitor erlotinib on OSCC.
Methods: Information regarding RET gene status was investigated via the TCGA. Immunohistochemistry was used to evaluate RET level in 145 OSCC samples, and the prognostic value of RET was analysed. The role of RET in OSCC was further investigated by *in vitro* and *in vivo* assays. Moreover, the interaction between RET and EGFR signalling was analysed by knockdown RET or EGFR, respectively. The role of RET in OSCC sensitivity to erlotinib was also investigated by *in vitro* and *in vivo* assays.
Findings: The elevated levels of RET are observed in OSCC and that high levels of RET correlate with increased tumour size, advanced tumour stage and decreased overall survival rate. In addition, the OSCC cell proliferation and invasion was inhibited by RET knockdown *in vitro* and *in vivo*. Moreover, the inhibition of RET expression markedly reduced EGFR signalling. The inhibition of RET signalling significantly increased the sensitivity of OSCC cells to the EGFR inhibitor erlotinib in both *in vitro* and *in vivo* models.

Conclusion: Our results offer a preclinical proof-of-concept supporting a role for RET signalling inhibition in a targeted therapeutic approach to improve the efficacy of EGFR inhibition in OSCC.

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Surgical determinants in the outcome of oral squamous cell carcinoma

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Background: In our recent study, we demonstrated the association between high-volume surgeons and larger surgical margins.[1] However, the translation of close margins to clinical outcomes remains to be an area of controversy in the current literature.
Objectives: To identify the surgical determinants that can improve the treatment of patients with oral squamous cell carcinoma (SCC).
Methods: All oral SCC patients treated at our institution between 2008 and 2013 with a minimum of two-year follow-up were included, while patients with contraindications for surgical management were excluded. A heterogeneous set of predictor variables was collected, including patient factors, surgeon factors and tumour factors. The outcomes of interest were disease-free survival (DFS) and disease-specific survival (DSS).
Findings: 307 patients were recruited. The mean DFS and DSS were 74.1% and 81.3%, respectively. Close and involved surgical margins were significantly correlated with surgeons who have operated 40 cases or less during the study period ($P = 0.0465$). On multivariate analysis, independent predictors for recurrences were poor tumour cell differentiation ($P = 0.0022$) and perineural invasion ($P = 0.0003$). Low-volume surgeon who operated fewer than 20 cases was the only independent predictor for poor DSS ($P = 0.0001$).
Conclusion: Overall, the outcomes of oral SCC are better compared to previous studies. The findings support the rationalisation of oral SCC management at high-volume centres and in the hands of experienced surgeons for better patient outcomes.

Reference

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Dysregulation of p63/miR-138 predicts poor prognosis in oral cancer

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Background: p63 is critical for the development of stratified epithelial tissues. The role of p63 in tumourigenesis remains poorly defined.
Objectives: We aim to determine p63 and miR-138 expression in oral cancers (OCs), and analyse their correlation with the clinicopathological parameters and prognosis in patients with OCs.
Methods: Levels of p63 and miR-138 in OCs and noncancerous adjacent tissues (NATs) were investigated by immunohistochemistry and *in situ* hybridisation, respectively. The correlations of p63 and miR-138 expression with the clinicopathological parameters and prognosis of patients with OC were analysed. p63 and miR-138 expression in OC cell lines was measured by immunoblot or quantitative reverse transcriptase-polymerase chain reaction. The effects of p63 on cell migration were evaluated by knock-in or knock-down.
Results: Elevated p63 and reduced miR-138 were detected in OC tissues compared with NATs ($P < 0.05$). A negative correlation between p63 and miR-138 expression can be observed in the OC tissues. We revealed that p63 and miR-138 expression are associated with cell differentiation, lymph metastasis status and clinical stages in patients with OCs. Cox regression analysis showed p63 overexpression was correlated with reduced overall survival. Moreover, a negative correlation between p63 and miR-138 expression was also found in OC cell lines ($P < 0.05$). Upregulation of p63 resulted in reduced miR-138 expression and increased cell invasion. On the contrary, knockdown of p63 enhanced miR-138 and suppressed cell migration.
Conclusion: The dysregulation of p63 and miR-138 are common molecular events in OC progression. These findings suggest that p63 and miR-138 may collaboratively play a role in oral carcinogenesis.

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Proposing a novel classification and staging system of mandible osteoradionecrosis: Chinese experience

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Background: Osteoradionecrosis (ORN) of the jaw is a common radiation-induced complication. Several classifications and staging systems have been proposed for ORN, however, none has been universally accepted because of their individual deficiencies.
Objectives: The aim of this study was to introduce a new clinical classification that can be applied to the treatment of ORN in an easier and more acceptable way.
Methods: A review was conducted of 99 ORN patients in our institution between 2000 and 2013. A novel classification was established on the basis of bone necrosis (with a cut point of 2 cm in radiographic image, or pathological fracture) and soft tissue defects (mucosa defect or skin fistula). A new staging system with four different stages (stage 0, stage I, stage II, and stage III) was proposed.
Findings: A total of 99 patients with ORN were ultimately analysed. Radiographic analysis showed that no distinct change in 8 patients, the maximal diameter of necrotic bone >2 cm in 65 patients and that <2 cm in 14 patients, the residual 12 patients were found with pathological fracture. Finally, 8 patients were defined as Stage 0, 14 were classified as Stage I, 65 were categorised as Stage II, and 12 were diagnosed as Stage III. Each stage presents the different severity of ORN and provides suitable therapeutic and reconstructive methods.

Conclusion: A detailed classification of patients with different degrees of disease severity may facilitate the selection of appropriate treatments, and may provide therapeutic guideline in some extent.

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Long non-coding RNA HOX transcript antisense RNA maintains cancer stemness in oral cancer

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Background: Increasing evidence indicates that long non-coding RNAs (lncRNAs) regulate diverse cellular processes, including cell growth, differentiation, apoptosis, and tumourigenesis. However, the functional roles of lncRNAs and the mechanistic analysis of their interplays with oncogenic pathways in oral squamous cell carcinomas (OSCCs) remain largely unknown.
Objectives: To investigate the role of lncRNAs and their mechanism in OSCC.
Methods: Initially, we identified HOTAIR (HOX transcript antisense RNA) lines and OSCC tissues. ALDH1 activity of OSCCs with silencing HOTAIR was assessed by the Aldefluor assay analysis. Self-renewal, migration, invasiveness and *in vivo* tumourigenicity of OSCCs was presented.
Findings: Silencing HOTAIR in OSCC cells significantly inhibited their cancer stemness, invasiveness, anchorage-independent growth, xenotransplantation tumourigenicity. In contrast, overexpression of HOTAIR in OSCC was found to enhance cancer stemness and metastasis. Kaplan–Meier analysis indicated increased HOTAIR expression correlated with poor survival in OSCC patients. Furthermore, HOTAIR has been shown to mediate epithelial–mesenchymal transition (EMT) process through EMT-associated transcription factors regulation.
Conclusion: HOTAIR-mediated cancer stemness is associated with the regulation of EMT and HOTAIR as therapeutic target in OSCC.

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An audit to assess cancer excision margins and prognosis of head and neck oncology patients — a surgeon's five-year experience

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Background: Incomplete resection margins in head and neck oncology has been known to increase the risk of local recurrence thus requiring consideration of adjuvant therapy. However, conservative surgical management and intraoperative assessment of excision margins also needs to be a factor when planning treatment.
Objectives: To identify the implications of an incomplete resection on recurrence rates with the aim to determine the prognosis of T1 cancer patients and improve future holistic management.
Methods: The histopathology reports of 122 oncology patients operated on by one consultant oral and maxillofacial surgeon from 2009 to 2013 were retrospectively assessed. Excision margins were defined using national guidelines.
Findings: The data included demographics, diagnosis, primary sites, pathology staging, excision details, frozen sections and follow up details. Different types of oral cancers were surgically treated with squamous cell carcinomas forming the bulk. The tongue made up 30% of primary sites and pT1 and pT4 were the most common stages. 81 (66%) patients had a complete excision; 90% of T1 cancers being completely excised however 50% of mandibular cancers were incompletely excised. 39% of patients with incomplete margins were managed with chemoradiotherapy however of the 53 patients that had a recurrence, 32 (60%) had complete excision margins.
Conclusion: Although only 41 (34%) patients had incomplete cancer excision margins, the audit showed that the majority of recurrences were in patients who had a complete excision which may be due to this group of patients being less likely to have adjuvant chemoradiotherapy.

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A psychological and oral cancer pain evaluation on oral squamous cell carcinoma patients with invasive treatment course

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Background: The significance of oral carcinoma lies on its mortality rate and treatment(s) course. Surgery, being the most invasive approach of the treatment courses, may cause some postsurgery physical changes that may lead to psychological effects that may affect the overall prognosis.
Objectives: The aim of the current study was to evaluate the psychological and pain effect on oral squamous cell carcinoma (OSCC) patients that were about to undergo surgery as one of the treatment courses for the elimination of OSCC.
Methods: 14 patients (eight males and six females) diagnosed with a stage 3 or 4 OSCC were recruited. At the start of the recruitment, all patients were about to undergo surgery for the removal of the OSCC. Interviews were performed seven days prior and after the surgery. The questionnaires used were the Distress Thermometer (DT), visual analogue scale (VAS), and the University of California San Francisco (UCSF) Oral Cancer Pain Questionnaire. All data were then analysed and compared to evaluate the pre- and postsurgery effect.
Findings: The current study revealed that there were significant decrease of the pre- and postsurgery mean DT score ($P < 0.01$) and mean VAS score ($P < 0.01$). The DT score also showed a significant ($P = 0.003$) pre- and post-correlation ($r = 0.727$). The total mean score of the UCSF Oral Cancer Pain Questionnaire also showed a significant decrease ($P < 0.01$) of oral cancer pain.
Conclusion: Despite of the post-procedure physical changes and invasiveness, in the current study, surgery was proven to be stress and pain-reducing for OSCC patients. Nevertheless, ongoing study is needed.

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Does the merger of two head and neck cancer services affect patient outcomes?

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Background: The paradigm shift to one of centralisation of specialist healthcare services across the United Kingdom has been advocated in numerous white papers. As such, in 2015 head and neck cancer services of the Royal London Hospital (RLH) Oral and Maxillofacial department merged with the University College London Hospital (UCLH).
Objective: To determine if there is a clinical difference in patient pathways and outcomes between the service which has moved to another site, when compared to the original home unit.
Methods: A retrospective analysis was conducted of all patients who underwent flap surgery for the treatment of head and neck cancers, between September 2015 and August 2016.
Findings: 57 flap cases were completed, 21 from the visiting team (RLH), 36 from the home unit (UCLH). Time from first clinic review to surgery was 44 days for RLH and 45 days from UCLH. Time from first MDT to surgery was 26 days for RLH and 27 days for UCLH. The mean intensive care unit stay was four days for RLH and three days for UCLH. The mean inpatient stay for RLH was 19 days while for UCLH was 17 days.
Conclusions: There is no clinically significant discrepancy between the times between clinical review, MDT, surgery and ultimately discharge. This suggests that the merger of one site into another does not lead to poor logistical outcomes or slower discharges for the visiting team compared to the home unit.

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A summary of the qualitative literature for the quality of life of patients following head and neck cancer

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Background: The diagnosis and treatment of head and neck cancer (HNC) can have a devastating impact on patients' quality of life. Although questionnaires are the main method to quantify this, qualitative research offers an opportunity to gain a greater depth of appreciation of the outcomes from the patient's perspective.
Objectives: To undertake a systematic review of the literature published in qualitative research in HNC. To summarise the studies in respect to: patient cohort, site, treatment, study design, hypothesis, qualitative method employed, key findings.
Methods: PubMed was used to search for papers using the terms; 'Qualitative, head and neck cancer', 'grounded theory', 'phenomenology', 'ethnography', 'focus groups', 'case studies', 'participation' and 'narratives'. This revealed 915 papers of which there were 83 on initial hand searching that fulfilled the criteria of English abstract, primary qualitative studies, focusing on head and neck cancer and quality of life. Reporting of the literature used PRISMA checklist methodology.
Findings: In this presentation a summary of the literature will be given to describe the cohort, study methodology and findings. There were articles that focused both on patients and carers experiences. Frequent themes included: dysphagia, psychological distress, intimacy and coping. There is a depth of narrative related to life and difficulties after treatment.
Conclusion: It is time consuming to collate and synthesise the literature. This structured review acts as a source of reference to which future papers can be added. The summary highlights areas of previous enquiry and identifies areas of knowledge gap for future service evaluation and research.

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Mandibular osteotomy for access improves the cancer outcome of tongue cancers

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Background: The surgical approach in the resection of oral tongue cancers can involve transoral resection (TOR) or temporary mandibular osteotomy (TMO); the method of choice many times depends on individual surgeon's preference in overall management of the patient. There are no guidelines and the oncological safety of TOR needs consideration.
Objective: To investigate TMO and TOR in pT2 oral tongue cancer surgery for cancer outcome.
Methods: Demographic, surgical and histology data of primary pT2 tongue cancers from a tertiary hospital was charted and evaluated in a multivariate Cox regression for local recurrence (LR), disease-free survival (DFS) and overall survival.
Findings: A total of 166 pT2 patients with primary oral squamous cell carcinoma of tongue treated from 2007 to 2013 fulfilled the inclusion criteria, of whom 95 patients underwent TOR and 71 TMA. The group comparison showed significantly higher patients with perineural spread and pN positive status in TMA group, involved margin on initial resection was significantly higher in TOR patients, adjuvant postoperative radiotherapy (PORT) was preferred in TMA group in line with high pN positive status. The multivariate Cox regression showed significantly high LR and low DFS in TOR group despite stratification of adjuvant PORT. The initial survival rate of 93.85% fell to 82.19% over 5 years in TOR group, while, the initial survival rate relatively remained constant in TMA group (94.39–93.04% over 5 years).
Conclusion: TMA provided superior local control and DFS compared to TOR in pT2 tongue cancers.

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Clinical study of tuberculosis in head and neck region

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Background: Tuberculosis is an infective disease and also is a major health concern. Extrapulmonary tuberculosis is a relatively rare disease, which can arise in many regions including head and neck region.
Objective: To investigate the clinical manifestation and features of head and neck tuberculosis.

Methods: We retrospectively reviewed the clinical records of 60 patients diagnosed with tuberculosis in head and neck region in our department between March 2005 and January 2016.
Findings: The subjects included 17 males and 43 females, and the male to female ratio was 1:2.53. The average age of the patients was 45 ± 14.67 years (range, 5–76 years). All the patients were confirmed by pathological diagnosis. The major clinical presentation is a lump or swelling (56 patients), followed by oral ulcer (three patients) and skin fistula (one patient). The most common site is cervical lymph node (71.67%). Three patients also suffer with malignant tumour in head and neck region. 95% of the patients received a chest X-ray and 19 patients (33.33%) showed old lesions in their lungs.
Conclusion: The majority of head and neck tuberculosis arise in lymph node of head and neck region. Early diagnosis and treatment can largely enhance the therapeutic effect and patients' quality of life.

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Metastasis to the jaws as a first manifestation of hepatocellular carcinoma: report of a case and analysis of 41 cases

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Background: Hepatocellular carcinoma (HCC) is one of the most common malignancies worldwide. Local metastasis is common but metastasis to the jaw is rare with 40 reported cases in the English language literature.
Objectives: We describe a case of a 54-year-old man who, for the past two months, had noticed a rapidly growing facial mass in the posterior mandibular area. The patient was known to be a hepatitis C virus carrier and suffered from liver cirrhosis, but the presence of HCC was unknown.
Methods: The English language literature was searched for documented cases of HCC metastasis to the jaw; applicable data was evaluated.
Findings: The literature analysis revealed 41 reported cases (including the present case). In most cases (81%) the jaw lesion was the only known metastasis at the time of HCC diagnosis. Clinical presentation occurred up to 2 years before discovery of the jaw metastasis. Patients with HCC jaw metastasis have a poor survival rate with an average of 6.1 months between diagnosis and death.
Conclusion: This study shows that an isolated jaw mass may be the initial presentation of HCC and therefore must be considered in the differential diagnosis, especially in the presence of known liver cirrhosis or chronic viral hepatitis.

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Chromosome instability in tumour resection margins of primary oral squamous cell cancer is a predictor of local recurrence

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Background: The local recurrence rate in oral squamous cell cancer (OSCC) hardly decreases. This is partly due to the presence of (pre)malignant cells in the remaining tissue after resection, that may lead to the development of a new tumour in time. Detection of histologically (pre)malignant cells in tumour resection margins should predict these patients at risk for recurrence, however this appears to be difficult in routine practice.
Objectives: Purpose of this study was to apply easy-to-use molecular tests for more accurate detection of (pre)malignant cells in histopathologically tumour-free margins, to improve diagnosis of patients at risk.
Methods: 42 patients with firstly diagnosed, radically resected primary OSCC with histopathologically confirmed tumour-free resection margins (treated between 1994 and 2003) were included. Inclusion criteria comprised of follow-up ≥5 years, and radical surgery without postoperative treatment. Formalin-fixed paraffin-embedded tissue sections of 42 tumours, 290 resection margins, and 11 recurrences were subjected to fluorescence *in situ* hybridisation (FISH) to examine chromosome 1 and 7 copy number variations (CNV), and to p53 immunohistochemistry (IHC).
Findings: 11 out of the 42 patients developed a local recurrence within five years. FISH analysis showed that nine of eleven recurrences exhibited chromosome instability (CI) in at least one of the resection margins (P 0.008). p53 overexpression and routine histopathologic classification were not correlated with recurrent disease. The presence of CI in the resection margins revealed a significantly worse progression-free survival (log-rank $P = 0.012$).
Conclusions: CI in the resection margins of OSCC can reliably identify patients at risk for developing a local recurrence.

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Functional and oncologic outcomes in patients undergoing total glossectomy

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Objectives: This is a prospective study evaluating the functional and oncologic outcomes in patients undergoing total glossectomy.
Methods: There are 60 patients in our series from 2012 onwards. The functional outcome analysed was the ability to restart an oral diet and decannulation which was analysed at 6 months after surgery. The oncologic outcome analysed was in terms of local disease control and overall survival. The oncologic outcome is to be analysed at 1 year after completion of surgery.
Results: The most commonly used flap for the design of the neotongue in our series is the anterolateral thigh flap followed by the pectoralis major myocutaneous flap. All patients had intraoperative tracheostomy tube and percutaneous endoscopic gastrostomy tube placement. 3 patients died before completion

of treatment due to unrelated causes. At a median follow-up of 11 months, 1 patient developed regional recurrence and 1 patient developed distant metastasis. 86% of patients in our study group are disease free. There have been no flap related complications. The mean time to decannulation in our study group was 2.6 months. All patients were able to resume a soft, pureed diet by a mean time period of 3.1 months. 95% patients could be decannulated however 1 patient had persistent aspiration necessitating tracheostomy continuation.
Conclusion: Our results indicate a reasonable functional outcome with most patients being decannulated and able to start an oral intake with oral volume and laryngeal elevation being significant determinants.

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Spleen tyrosine kinase promotes the migration and invasion of adenoid cystic carcinoma via long non-coding RNA H19

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Background: Adenoid cystic carcinoma (ACC) is common malignant tumour of the salivary glands, which characteristic is local invasion and distant metastasis. Recently, molecular targeted therapy has been attracted more and more attentions, especially the regulation of long non-coding RNA (lncRNA) for the invasion and metastasis of malignant tumour.
Objectives: The aim of this study was to investigate the correlation between spleen tyrosine kinase (SYK) and the invasion and metastasis of ACC, and further study to explore the molecular mechanism that SYK promotes the secretion of matrix metalloproteinase (MMP)-2/9, vascular endothelial growth factor (VEGF) by regulating lncRNA H19.
Methods: We analysed the clinical samples via reverse transcriptase-polymerase chain reaction (RT-PCR) to explore the relationship between the expression of lncRNA H19 and the prognosis of patients. *In vitro*, we inhibited SYK and lncRNA H19 respectively via SiRNA, and we also investigate the function and mechanism by using Transwell and Western blot. And finally we confirmed our results via *in vivo* study through nude mouse tumourigenicity assay.
Results and Conclusion: RT-PCR revealed that there are significant positive correlations between H19 expression level and prognosis of patients with ACC. Suppression SYK can inhibit H19 expression. When SYK and H19 were inhibited respectively, the migration and invasion ability of ACC were both decreased, and the expression of MMP-2/9, VEGF were downregulated. *In vivo*, when we inhibited the H19, the tumour volume and weight were both decreased. Thus, we can conclude that SYK can upregulate the expression of MMP-2/9 and VEGF via lncRNA H19, promoting the progression of ACC.

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An update on the use of Secondi Mapz to classify oncological defects of the midface

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A novel classification system, Secondi Mapz, was recently proposed to allow succinct and precise recording of oncological defects of the midface. Despite there being many midfacial defect classification systems in existence, there is no universally accepted standard. The lack of consensus stems from the deficiencies in the published classification systems — being class based, ambiguous, and based on retrospective data sets. In addition, different systems use imprecise terms such as 'extended maxillectomy' to include a wide variety of defects, which make it difficult to compare outcome. Secondi Mapz was designed to capture pertinent anatomical information of the midface and adjacent structures (i.e. skin, ethmoid, cranium, orbit, nose, dentition, infratemporal fossa, maxillary sinus, alveolus, palate, zygomatic complex, dura, periorbita, nasal mucoperiosteum, and maxillary sinus lining) in all three dimensions (superior-inferior, anterior-posterior, and lateral-medial). Secondi Mapz is designed to be used primarily in research to facilitate written communication, allow accurate data recording and comparison, and ultimately, lead to better patient care. It can also be used within our multidisciplinary team to facilitate treatment planning. We present data on the validation of the Secondi Mapz classification, as well as introducing a new web based portal to allow user-friendly access to a central database: www.secondimapz.com

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Case report: malignant melanoma of the left lateral rectus muscle and a review of the literature surrounding metastatic disease within extraocular muscles

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Melanoma, also known as malignant melanoma is a type of cancer, arising from pigment producing melanocytes. Melanoma is thought to typically originate in the skin, although it can metastasise to other parts of the body. However, the incidence of metastasis occurring within the extraocular muscles of the orbit is extremely low. Therefore, the case we present is of an unusual nature. The case is of a medically fit and well, 46-year-old gentleman who initially presented with diplopia, proptosis and unable to carry out lateral movements of his left eye.

The patient underwent several scans including magnetic resonance imaging of orbits and a computed tomography of the face, and was diagnosed as suffering from metastatic melanoma associated with the lateral rectus of the left eye with no known primary tumour. The patient underwent a resection of his left eye carried out but months later, the melanoma recurred and an exenteration of the patients' left orbit was carried out. The final histology report of the melanoma from the left orbit showed epitheloid, spindle and clear cells with focal pigmentation and positivity for S100 protein and Melan-A.

A review of the literature surrounding metastasis within extraocular muscles shows that metastases from other cancers

constitute 1–13% of orbital tumours and metastatic breast cancer is the most common type to metastasise to the orbit, followed by metastatic prostate carcinoma, melanoma, and lung cancer. However, to the best of the author's knowledge the nature of the pathology and the absence of a primary, make this case truly unique.

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Do preoperative anaemias predict outcomes in surgical head and neck oncology?

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Background: Anaemia is present in 5–78% of patients requiring surgical intervention. Preoperative anaemia is independently associated with adverse outcomes after general and cardiac surgery. It is an independent risk factor for adverse perioperative events and is associated with an increased transfusion requirement in patients undergoing oncology related gynaecological procedures. The incidence and impact of preoperative anaemia in major head and neck oncology surgery is not clearly defined, neither its utility as a surrogate marker for transfusion requirements. Recently published guidelines advocate correction of anaemia pre-elective surgery to improve outcomes.
Objectives: We aimed to explore the incidence and impact of preoperative anaemia in patients with head and neck cancer undergoing major resection and reconstruction.
Methods: We collected retrospective data over a 2-year period from the hospital dataset including patient demographics, preoperative haemoglobin, transfusion incidence, transfusion quantity, transfusion product type, ASA Grade, surgical procedures, the incidence of microvascular flap complication, length of stay and a record of neoadjuvant chemotherapy.
Findings and Conclusions: We will present the transfusion profile of head and neck cancer patients at our cancer centre, identifying the relationship between preoperative anaemia and the requirement for replacement with blood products. The authors will present the association between depleted levels and impact on patient outcomes as specified by the aforementioned measures.

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Can we rely on fine-needle aspiration result in the management of patient with Warthin's tumour?

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Background: Warthin's tumour usually managed nonsurgically with periodic clinical and radiological evaluation. Fine-needle aspiration (FNA) and cytology routinely performed in addition to magnetic resonance scan when assessing these tumours. We would like to determine if we can safely manage nonsurgically patient with FNA suggestive of Warthin's tumour.
Methods: We retrospectively audited all consecutive FNAs done for patients presenting with parotid tumour to maxillofacial clinic Royal Derby Hospital for the period of April 2010 to March 2015 who later underwent definitive surgical procedure. FNA results, type of surgical procedure and final histology results were analysed.
Results: 104 patients who had FNA performed for parotid mass were identified for this audit. 27 patients who had FNA reported as Warthin's tumour underwent superficial parotidectomy. 24 patients had final histology confirming the diagnosis of Warthin's tumour. The sensitivity of FNA in detecting Warthin's tumour was 100% as all patients who had confirmed diagnosis also had similar FNA result ($n = 24$). The specificity of FNA in confirming the diagnosis was 96.6%. 3 patients who had initial FNA suggestive of Warthin's tumour had final histology reported as mucoepidermoid carcinoma, acinic cell carcinoma and Schwannoma respectively. The positive predictive value for FNA in diagnosing Warthin's tumour was 88.9% and negative predictive value was 100%.
Discussion: FNA is a sensitive tool in assessing Warthin's tumour. However this audit clearly showed the limitation of FNA in detecting malignant tumours. 11% of patients ($n = 3$) had malignancy undetected and could be subjected to nonsurgical observation with devastating outcomes.

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Personalised treatment of paediatric mucoepidermoid carcinoma of the palate

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Background: In children, malignant minor palate salivary gland neoplasms are rare. Furthermore, a large, highly vascular tumour of the palate, with exception of true vascular lesion, has seldom been noticed. This report is to alert clinicians the phenomenon of palate mucoepidermoid carcinoma (MEC) in a male teenager and aims to stress the personalised treatment effect.
Methods: A tender vascular multinodular lump centralised in the left hard palate was shown in the presentation. The vascular nidus was verified by fine-needle aspiration (FNA), the subsequent digital subtraction angiography (DSA) and additional embolisation. After MEC was confirmed in the initial resection biopsy, the second margin ablation and brachytherapy was performed to acquire safety margin. The ablative palate defect was reconstructed, when recurrence and metastasis was excluded after the one-year comprehensive examination. The succeeding follow-up was uneventful, until the boy of eighteen had dental examinations. Computed tomography scan found four wisdom un-erupted teeth, maxillary mesodens and the obvious left maxilla hypoplasia. The mesodens and all the wisdom teeth were surgically extracted afterwards, the wounds was well healed.
Results: In the more than five-years follow-up, the teenager was without recurrence and metastasis. In addition, both contour and function of the palate were excellent.
Conclusions: Highly vascular MEC could be occurred in the palate of teenage. Personalised therapy, including the comprehensive vascular intervention, tumour ablation, brachytherapy and the reconstruction, remains a potentially successful strategy in the management of the large, highly vascular paediatric palate mass, unless malignant could be excluded.

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Outcomes of transoral robotic surgery and simultaneous therapeutic selective level II-IV neck dissection for treatment of human papilloma virus-positive oropharyngeal squamous cell carcinoma

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Background: Transoral robotic surgery (TORS) has impacted the contemporary management of human papilloma virus-positive (HPV+) oropharyngeal squamous cell carcinoma (OPSCC) by eliminating or de-escalating adjuvant therapy in selected patients. There is currently limited data surrounding the optimal timing or extent of therapeutic neck dissection in HPV+ OPSCC.
Objectives: To assess outcomes of a cohort of patients with T1/T2 HPV+ OPSCC who were treated with TORS plus simultaneous therapeutic SND clearing levels II-IV, followed by risk-adapted radiation therapy or chemoradiation therapy and compare them to a matched cohort of patients treated with comprehensive neck dissection.
Methods: The study group consisted of a cohort of 105 consecutive patients with previously untreated, HPV-related T1-T2 OPSCC who underwent TORS with simultaneous neck dissection followed by risk-adapted adjuvant therapy from February 2011 to December 2015. Patients were divided into two groups based upon the type of neck dissection they received (Group 1 = CND; Group 2 = SND).
Results: The two-year disease free survival during the study period was 96%. Two patients developed distant metastasis and died within one year of treatment. Most patients were treated for pN2 disease and all but seven patients underwent adjuvant radiation therapy with intensity-modulated radiotherapy technique following TORS. Negative resection margins were achieved in 92% of the patients. Extracapsular extension was common, having occurred in approximately 40% of the cases and, with only three exceptions, these patients underwent concomitant chemoradiation.
Conclusion: Simultaneous, therapeutic level II-IV SND appears to be safe and efficacious in the N+ve setting but larger prospective cohorts are needed to validate these findings.

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The gingivolabial cancer: a disease of toombak dippers, a breach in the international classification of diseases and a challenge in surgery

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Background: Gingivolabial cancer is associated with toombak dipping and affecting both gum and lip at the same time. The basic concept of International Classification of Diseases (ICD) is founded on the standardisation of the nomenclature for the names of diseases and their basic systemisation in a hierarchically structured manner. However, it is not always possible to find appropriate code for some diseases as the case in gingivolabial cancer.
Objectives: (1) To study the frequency, and site distribution of oral cancer managed at Khartoum Teaching Dental Hospital (KTDH). (2) To study the association between oral cancer and toombak (local snuff) dipping
Methods: Records of patients were studied in relation to gender, site of oral cancer and habit.
Results: 1690 cases of oral cancer cases were managed at KTDH. Males are more than females with a male to female ratio of 1.9:1. Of the series 331 were cancer of the lower gum/inner aspect of the lower lip. 71% were toombak dippers had cancer at the site where toombak was dipped.
Conclusion: Gingivolabial cancer accounts for 71% of cancer of the lower gum and lip, and for 14% of all oral cancer in general. It is not justifiable to code gingivolabial cancer either as gum or as lip or even as an overlapping lesion. This situation reflects one of the limitations of the ICD. Its clinical implication as a midline cancer entails bilateral management of the neck. It involves the anterior mandible, always accompanied by wide field changes, needs wide excision and not easy to reconstruct.

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The drawer-like resection and reconstruction with titanium mesh: a novel surgical technique for treatment of giant ossifying fibroma in the maxilla

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Objectives: The aim was to introduce a new surgical method for treatment of ossifying fibroma (OF) in the maxilla with dislocation of eyeball and evaluate the postoperative outcomes and prognosis.
Methods: The study included six patients of maxillary OF who were treated with the "drawer-like" resection from 2013 through to 2015. The surgical procedure was total removal of the orbital floor and majority of the maxilla with the preservation of alveolar ridge and reconstruction with titanium mesh. Postoperative appearance and function were assessed and recurrence rate was statistically observed.
Findings: Good appearance and reduction of eyeball have been well achieved in all the patients. Long-term follow-up showed that the recurrence rate was low. It needs to be emphasised that the original occlusal relationship and the masticatory function have been preserved.
Conclusions: With this new method, the original occlusal relationship can be well preserved, meanwhile, bulging of maxilla and eyeball displacement have been corrected.

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Clinical appliance of maxillofacial defect repaired by anteromedial thigh flap temporarily replacing anterolateral thigh flap

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Background: Anterolateral thigh flap is perfect for reconstructing maxillofacial soft tissue defects. This flap has been widely used by

clinicians, but often causes operation difficulties because of vascular variation. Thus sometimes anteromedial thigh was used as new donor site temporarily when the vascular anatomic variation of anterolateral thigh perforator flap induced a failure in the flap harvest.
Objectives: To discuss the anatomy and application of anteromedial thigh flap in 13 cases.
Methods: We collect 13 cases of the anteromedial thigh flap transplantation during 2009 to 2015. Seven of them were elected due to the error of the ultrasonic test, three of them were elected because of the diameter being too small, other three cases were elected due to the failure of iatrogenic behaviours.
Findings and Conclusions: Seven of the cases had vessels directly to the skin, six of them were intramuscular perforators. 10 of the cases were bilobate flaps, and three of them were folding flaps. All of the 13 cases survived with no vascular crisis occurring. The follow-up results after three to six months were satisfactory.

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The role of molecular targeted therapy in the management of oral cavity squamous cell carcinoma

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Oral cavity squamous cell carcinoma (OC-SCC) is a common malignancy of the head and neck region and a major cause of morbidity and mortality worldwide. It is an aggressive condition associated with a poor survival rate for late-stage disease, and a high rate of reoccurrence. The carcinogenesis of OC-SCC involves a complex sequence of molecular events, and gene studies have aided in the development of a genetic progression model for the condition.

Treatment options are multimodal, with surgery, radiation and chemotherapy, depending on the TNM cancer staging. Molecular targeted therapy is an emerging treatment for advanced OC-SCC involving targeting specific molecular alterations of a cancer cell that contributes to the neoplastic phenotype. These include growth factors and their receptors, signal transduction molecules, oncogenes, apoptosis-related molecules, angiogenesis-related factors, as well as inhibitors of cell motility, invasion, and proteolysis. The treatment offers a higher therapeutic index and is associated with less toxicity than cytotoxic drugs.

This presentation will review potential molecular targets in OC-SCC, include those related to growth regulation (epidermal growth factor receptor), angiogenesis (vascular endothelial growth factor), and inflammation (cyclooxygenase-2). It will also analyse current and emerging agents for molecular targeted therapy with evidence based data and statistic results. A better understanding of the molecular basis of OC-SCC aids in the selection of a targeted treatment, and ultimately improves outcomes of patients with advanced disease.

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Access to the infratemporal and pterygopalatine fossae — a new modified transfacial technique combined with mandibular ramus osteotomy

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Background: Access to the infratemporal and pterygopalatine fossae has been historically described by the Fisch approaches (A, B, C, D). Other authors have reported modifications of those techniques with the aim to balance aesthetics and sacrifice of important structures such as the facial nerve. Recently less invasive endoscopic techniques have been proposed, but the surgical objective is of palliation rather than curative intent.
Objectives: The authors attempted to identify a method that would provide a generous surgical access to the area for the purposes of an oncological procedure while ensuring a good cosmetic result with preservation of the important structures such as the facial nerve.
Methods: We report a new technique that combines a Weber-Ferguson transfacial approach and a vertical osteotomy or ostectomy of the anterior part of the ramus of the mandible. We use the experience from two patients that presented with malignancy of the infratemporal and pterygopalatine fossae.
Findings: The implementation of this new approach has achieved the primary objectives set by the authors during the planning stage of the procedure; complete clearance of the malignancy was established, an acceptable aesthetic result was acknowledged and the facial nerve was preserved.
Conclusion: The nature of the surgical practice is to pursuit new techniques that will offer to our patients a good quality of life; especially in this modern era any salvage surgery must account for an acceptable aesthetic and functional outcome for the patients. This new technique has shown promising results in that perspective.

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Bone invasion by oral squamous cell carcinoma: essential molecular alterations

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Oral squamous cell carcinoma (OSCC) is a globally growing problem with 300,000 new cases each year. The close anatomical relation of the oral mucosa to the jaws often leads to invasion of the bone, implicating extensive resections with major implications on function, aesthetics and quality of life.

Planning of bony resections depends on two staging methods: (1) clinical estimation by the surgeon and (2) radiological imaging. Unfortunately both methods have their shortcomings. Most important step in bone invasion is activation of osteoclasts. A better understanding on molecular alterations leading to osteoclastogenesis is of great importance. The presence of teeth and infections in the oral cavity, and hypoxia in the tumour microenvironment could have a key role.

We propose that reprogramming energy metabolism and tumour promoting inflammation also play an important role in detecting molecular biomarkers associated with bone invasion by OSCC. Improvement in the understanding of these molecular pro-

cesses will lead to a better staging protocol and a more tailor-made treatment for the patient. On this topic we did a review of literature and we will propose a hypothesis that might lead to a better understanding of OSCC invading bone.

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Treatment of advanced-stage squamous cell carcinoma of the head and neck

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Background: The treatment of advanced oral cancer is always a difficult point.
Objectives: The aim of this study was to evaluate the usefulness of salvage surgery by survival rates and life quality in patients with advanced oral squamous cell carcinoma (OSCC).
Methods: 32 patients with advanced OSCC at stage III or IV who had received radiotherapy and regular follow-up after salvage combined radical surgery and simultaneous repair between January 2014 and November 2015 were included in the study. All patients underwent an interview survey and self-assessment based on the Chinese version of the University of Washington Quality of Life Questionnaire (4th edition). Pain, appearance, action, recreation, swallow, chew, language, shoulder function, taste, saliva, emotion and anxiety were included in this questionnaire.
Findings: No severe complications occurred and median follow-up time was 12 months with 100% overall survival, one case with cervical metastatic, one case with relapses were included. The quality of life after surgery was pretty much lower, mostly in swallow, chew, the production of saliva, taste alteration and defects which made an enormously negative impact on the physiology, emotion, social function and postoperative quality of life of patients. Simultaneous functional reconstruction improved the appearance, communication, general condition of patients, which assisted other treatments like radiotherapy.
Conclusion: Salvage and radical surgery based sequential combined treatment is an effective treatment program, make a significant sense to increase the survival rates and functional reconstruction also improve the quality of life.

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Oral propranolol combined with topical timolol maleate for the treatment of severe infantile mixed haemangioma in parotid region

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Objective: To investigate the clinical results and safety of oral propranolol combined with topical timolol maleate for the management of severe infantile mixed haemangioma in parotid region.
Methods: Between October 2012 and June 2014, 52 infants with severe parotid mixed haemangiomas were treated with a combination of oral propranolol and topical timolol maleate. All lesions were also administrated using topically timolol maleate in every 12 h. The therapy duration was planned for 6–8 months or the two drugs were stopped when complete regression of lesions was obtained. The blood pressure, heart rate values, and adverse events were recorded during hospitalisation. The electrocardiogram was reviewed one month after discharge. The therapeutic outcomes and safety were assessed by the changes of color, size of tumour, and adverse effects throughout the course of treatment.
Results: The mean therapy duration was 5.3 months (range, 3–8 months). Of 52 patients, 37 demonstrated excellent response, 15 showed good response. There was no significant decrease respectively in the mean systolic and diastolic blood pressures and the mean heart rate from pretreatment to post-treatment (all $P > 0.05$). The decrease of cardiovascular parameters were not commonly associated with observable clinical symptoms. No major collateral effects were observed.
Conclusions: Oral propranolol combined with topical timolol maleate are highly effective in the treatment of infantile parotid mixed haemangioma with minor side effects, and might be used as the first-line treatment selection.

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An alternative management of the pathological fracture in osteoradionecrosis

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Background: Osteoradionecrosis (ORN) is a known complication following therapeutic radiotherapy (RT) in head and neck patients. ORN was first described by Marx in 1983 as hypovascularity, hypocellularity, and local tissue hypoxia as a result of radiation injury.[1]
Methods: A case report of a 63-year-old male patient with an ulcerative lesion in the left floor of the mouth. Clinically, histologically and radiographically the lesion represented a T4 N0 M0 SCC. In light of the histological grading of the tumour, and his immunosuppressed status, adjuvant radiotherapy was instigated postoperatively.

The patient received implants in the mandible for oral rehabilitation. Three years following RT, he developed a pathological fracture in the left body of mandible. The patient was on the Delanian regime and no surgery was planned due to risks of poor healing. Instead the implants previously placed in the mandible were used as external fixation holding the fractured mandible in a stable position to aid healing.
Results: The mandibular implants, which coincidentally were on either side of the fracture, were used to support a splint (kept out of occlusion) spanning over the fracture site. This stabilised the fracture site and allowed for complete healing of the fracture.
Conclusion: This case shows an alternative management of a pathological fracture. This allowed a medically compromised, immunosuppressed patient with Grade III ORN to avoid hard tissue graft surgery, and allowed for bony healing of a pathological fracture.

Reference

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Transforming growth factor-beta 1 and TbetaRII/Smad3 signalling pathway regulates the vascular endothelial growth factor expression of tumour-associated macrophages in oral squamous cell carcinoma

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Objectives: In this study, we aim to investigate the correlation between macrophages and several prognosis-associated clinicpathological indicators and more importantly, how transforming growth factor-beta 1 (TGF-β1) acts on the vascular endothelial growth factor (VEGF) expression of macrophages.
Methods: 72 paraffin-embedded oral squamous cell carcinoma (OSCC) samples were randomly selected for CD68 and CD31 immunohistochemical staining to study the relationship of macrophages quantity, microvascular density (MVD) and clinicopathological features. Fresh OSCC tissues, metastatic lymph nodes and non-metastatic lymph nodes were collected during the surgery for CD68, CD206, iNOS and VEGF staining as well as VEGF quantitative analysis. Macrophages induced from C57BL/6J mouse bone marrow cells were stimulated by Cal 27 cells condition medium (CM) with or without neutralising antibodies for TGF-β1 and TβRII. Western blot, enzyme-linked immunosorbent assay and quantitative real-time polymerase chain reaction were applied to assess the expression of vascular endothelial growth factor (VEGF) indifferent conditions.
Results: High number of macrophages was directly correlated to lower pathological differentiation degree, later of clinical stage and lower survival rate. MVD also has positive correlation with clinical stage and macrophages number. What's more, OSCC-associated macrophages expressed more VEGF than macrophages in health lymph nodes. But when the TGF-β1 in Cal 27 cells CM and the TβRII in macrophages were neutralised or the Smad3 was inhibited, the VEGF expression was down regulated too.
Conclusion: Via the TβRII/Smad3 signalling pathway, TGF-β1 can promote the OSCC-associated macrophages to secrete more VEGF, an angiogenic factor of great importance.

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Surgical management and follow-up of lateral skull base tumours — an eight-year review

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Background: Lateral skull base tumour is a challenge for oral and maxillofacial surgeons.
Objectives: The purpose of this article is to describe the diagnostic evaluation and surgical approaches to lateral skull base tumours (LSBTs).
Methods: The study is a retrospective review of 21 patients diagnosed with tumours involving the lateral skull base (8 with malignant diseases and 13 with benign lesions) and surgically treated over an eight-year period.
Findings: The transparotid-transmandibular (38%) was the most commonly performed surgical procedures followed by the transmandibular (24%), the transmaxillary (24%), the transcervical approach (10%) and the combined approach (4%). The surgical procedures were uneventful and there were no postoperative mortalities. Complications were encountered in eight cases, and morbidity was not remarkable during perioperative stages. After an average follow-up of 46 months, only 1 of 14 patients with benign diseases had a recurrence following the resection of a pleomorphic adenoma. Of seven patients with malignant tumours, five are alive with no evidence of disease.
Conclusion: Most of benign lateral skull base tumours can be removed surgically with a low rate of complications and recurrence. However, malignant neoplasms carry a poor prognosis and a low rate of disease-free survival.

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Low-dose prophylaxis for Chinese haemophilia children involving maxillary haemophilic pseudotumours

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Background: The incident of haemophilic pseudotumour in patients with haemophilia is estimated to be 1–2%, ~5–10% among them occurring in maxilla. Patients with maxillary haemophilic pseudotumour often visit dental clinics with complaints of orofacial swelling and/or gingival bleeding and most of them were misdiagnosed to be malignant tumours — they then undergo repeated biopsies and invasive surgeries that is harmful to children's craniofacial upgrowth. Therefore, it is important to improve diagnostic accuracy and provide timely treatment.
Methods: There were seven cases of maxillary haemophilic pseudotumour at our hospital between 2006 and 2014, with 6 cases of haemophilia A and 1 case of haemophilia B. We retrospectively analysed patients' medical histories, physical examinations and laboratory and image information. We treated the patients with replacement therapy, most of them we choose the low-dose prophylaxis (10–20 U/kg, QW), swelling and pain subsided in six patients and one patient underwent surgery without replacement therapy. We then observed the evolution of replacement treatment, clinical and image observations.
Results:
(1) Diagnosis: five patients initially presented at other hospitals were misdiagnosed as malignant tumours.
(2) After short-term (three to six months) low-dose prophylaxis, recovery rate was 86% patients (assessed by clinicians and radiologists).

Conclusion: The oral surgeons should know more about haemophilic pseudotumours, low-dose prophylaxis will be prescribed for paediatric patients because of its clinical success, noninvasive and effective for the haemophilic pseudotumours involving the maxilla.

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Development of a dual-modally traceable nanoplatform for cancer theranostics using natural circulating microparticles in oral cancer patients

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Background: Circulating microparticles (CMPs), which are nano-sized (100–1000 nm) membrane vesicles shed into circulation by various cell types, have been recently recognised as natural conveyors of molecular information and exhibit great potential to serve as therapeutic platforms.
Objectives: The present study aims to transform the CMPs into multifunctional therapeutic nanovectors.
Methods: CMPs, which were freshly purified from the peripheral blood of oral squamous cell carcinoma (OSCC) patients, were embedded with ultrasmall near infrared-fluorescent magnetic quantum dots (Ag2Se@Mn QDs) via electroporation. The tissue distribution and natural tumour-targeting behaviour of CMPs were evaluated in living mice with *in vivo* magnetic resonance imaging (MRI) system and 7.0 T small animal MRI scanner. To develop a dual-modally traceable nanoplatform for cancer theranostics, siRNA and Ag2Se@Mn QDs were simultaneously loaded into CMPs via electroporation.
Findings: CMPs were efficiently labeled with Ag2Se QDs through electroporation with favourable biocompatibility. Due to the favourable biocompatibility and superior dual-mode traceability of Ag2Se@Mn QD-labeled CMPs, we investigated the *in vivo* biodistribution patterns of CMPs and revealed the excellent natural tumour-targeting activity of CMPs in living mice. Importantly, the siRNA/Ag2Se QDs-loaded CMPs exhibited excellent therapeutic effects in an oral cancer-bearing mouse model.
Conclusions: This study not only realised the first efficient labelling and *in vivo* dual-mode tracking of CMPs that were directly isolated from human body fluids but also transformed these naturally occurring MPs into multifunctional nanovectors, opening new avenues for the development of real natural theranostic nanoplatforms.

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CXCL12 via recruiting regulatory CD4(+) T cells promote tumour progression in tumour microenvironment

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Background: Signals mediated by CXCL12 (SDF1) and its receptor CXCR4 are centrally involved in cancer progression, both directly by activating cancer cells and indirectly by inducing angiogenesis plus recruiting regulatory T cells. FoxP3+ T cells, a marker for regulatory CD4(+) T cells (Tregs), populate tumours and regulate antitumour immunity.
Objective: To explore the antitumour immunity role of SDF1 in tumour microenvironment, we stained and counted the number of Tregs in 72 oral squamous cell carcinoma (OSCC) patients via immunohistochemistry staining of FoxP3+.
Findings and Conclusions: The results indicated that a positive correlation between CXCL12 expression levels and Tregs number. In this series of 72 OSCC patients, the SDF-1 expression level correlated significantly with overall survival. Our findings elucidate a central role for SDF1 recruiting Tregs in tumour microenvironment promoting tumour progression. The prognostic value of SDF1 was confirmed by a multivariate analysis.

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Overexpression of stathmin 1 leads to docetaxel based induction chemotherapy resistance via mutant p53 in oral squamous cell carcinoma

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Background: A phase 3 trial (NCT01542931) demonstrated failure to improve survival when docetaxel, cisplatin, 5-fluorouracil (TPF) induction chemotherapy was added to standard therapy compared to standard therapy alone in patients with locally advanced oral squamous cell carcinoma (OSCC).
Objectives: To investigate the predictive value of stathmin expression and its role in tumourigenesis and chemoresistance as well as its transcriptional regulation by mutant p53 in OSCC.
Methods: Expression of stathmin was evaluated by immunohistochemistry in pretreatment biopsies from 256 OSCC patients in the phase 3 trial. Tumourigenicity and chemoresistance regulated by stathmin was investigated using *in vitro* and *in vivo* OSCC models. Regulation of mutant p53 on stathmin was detected by ChIP and dual-luciferase reporter assays.
Findings and Conclusion: OSCC patients with low stathmin expression benefited from TPF induction chemotherapy, which was associated with increased overall survival ($P = 0.028$), disease-free survival ($P = 0.010$), locoregional recurrence-free survival ($P = 0.010$), and distant metastasis-free survival ($P = 0.027$). Overexpression of stathmin was identified and confirmed in OSCC tissues and lines. Downregulation of stathmin expression in OSCC lines significantly inhibited cell proliferation, colony formation, migration and tumourigenesis, and enhanced sensitivity to docetaxel and cisplatin *in vitro* and *in vivo*. Mutant p53 (R175H, G245C, and R282W) bound to the stathmin promoter and transcriptionally regulated stathmin expression. These results suggest that low stathmin expression is a predictive biomarker, identifying those patients with locally advanced OSCC who may benefit from TPF induction chemotherapy. Overexpression of stathmin promotes tumour progression and chemoresistance to docetaxel and cisplatin, and it is transcriptionally activated by mutant p53 in OSCC.

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CD19+IL-10+ regulatory B cells affect survival of tongue squamous cell carcinoma patients and induce resting CD4+ T cells to CD4+Foxp3+ regulatory T cells

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Objectives: Increase of regulatory T cells (Tregs) in the tumour microenvironment predicts worse survival of patients with various types of cancer including tongue squamous cell carcinoma (TSCC). Recently, the cross-talk between Tregs and regulatory B cells (Bregs) has been shown in several tumour models. However the relevance of Bregs to tumour immunity in humans remains elusive. Our objective was to investigate the distribution and function of Bregs in TSCC microenvironment.
Methods: Double staining (Bregs: IL10/CD19 and Tregs: Foxp3/CD4) was performed on tissue sections of 46 TSCC, 20 metastasis lymph nodes, and tumour adjacent normal tissue. Flow cytometry analysis was used to detect the Bregs from magnetic bead-sorted B cells after co-culture with TSCC cell lines, and Tregs from sorted CD4 + CD25-T cells after co-culture with stimulated B cells.
Results: The immunohistochemical results showed that the frequency of Bregs/CD19+ B in TSCC ($0.80\% \pm 0.08\%$) was significantly higher than adjacent normal tissue ($0.52\% \pm 0.04\%$; $P < 0.01$). And the increase of Bregs in TSCC microenvironment was related to Tregs and predicts worse survival in patients. Cytological experiments indicated that frequency of Bregs increased after co-culture with TSCC cell line and that the induced B cells converted CD4 + CD25-T cells into Tregs.
Conclusion: The increased expression of Bregs in the TSCC microenvironment plays a significant role in the differentiation of resting CD4 + T cells and influenced the prognosis of TSCC patients.

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Long non-coding RNA UCA1 increases chemoresistance of tongue cancer cells by regulating autophagy signaling

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Background: Intrinsic and acquired resistance to cisplatin is a big challenge for cancer treatment. Long non-coding RNA (lncRNA) and cytoprotective autophagy have been suggested as a potential mechanism for chemoresistance. However, whether lncRNA regulate autophagy and induce cisplatin-resistance in tongue squamous cell carcinomas (TSCCs) remains obscure.
Methods: We used two TSCC cell lines and matched cisplatin-resistant cell as a cell model to study autophagic flux, cisplatin sensitivity *in vitro*, and used nude mice xenografts model to evaluate proliferation of TSCC cells. Finally, we evaluated the level of UCA1 and ATG7 expression in TSCC clinical samples.
Findings: Cisplatin induces autophagic flux in cisplatin-resistant TSCC cells. A serial chemoresistance or tongue related lncRNAs were detected between cisplatin-resistant cells and parental cells, and found that UCA1 was dramatically increased in the cisplatin-resistant cells, as well as TSCC cells treated with cisplatin. UCA1 knockdown sensitised cisplatin-resistant TSCC cells, enhancing cisplatin-induced apoptosis and inhibition of proliferation. Furthermore, UCA1 knockdown inhibited cisplatin-induced autophagy in cisplatin-resistant cells, decreased tumour growth response to cisplatin in mouse subcutaneous xenograft tumour model. A serial autophagy related proteins were further examined and identified that ATG7 was correlatively relevant to UCA1. ATG7 knockdown inhibited basal autophagy and promoted cisplatin-induced inhibition of cell proliferation and cell death. Both UCA1 and ATG7 levels were significantly higher in TSCC tissues and correlated with poor patient prognosis.
Conclusion: Inhibition of UCA1 and ATG7 may be a useful therapeutic strategy to overcome cisplatin-resistance by preventing cytoprotective autophagy in tongue cancer.

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Expression pattern of dickkopf WNT signaling pathway inhibitor 3 in the malignant progression of oral submucous fibrosis

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Background: Oral squamous cell carcinoma (OSCC) is a common malignant neoplasm of head and neck. Oral submucous fibrosis (OSF) is one of its pre-cancerous lesions, however, the key molecular events in OSF tumourigenesis remain elusive. As one of the Wnt antagonists, dickkopf WNT signalling pathway inhibitor 3 (DKK3) downregulation and methylation have been reported in multiple malignancies, while no report of its expression in the carcinogenesis of OSF.
Objectives: The purpose of this study was to investigate DKK3 expression in normal oral, OSF and OSCC tissues, and to preliminarily clarify the function of DKK3 in the carcinogenesis of OSF.
Methods: DKK3 expression at protein level and mRNA level were examined by immunochemistry staining and semi-quantitative reverse transcriptase-polymerase chain reaction in normal oral, OSF and OSCC tissues. Genetic mutation and co-expression genes of DKK3 in OSCC were analysed using online database.
Findings: We found that DKK3 was readily expressed in normal oral mucous tissues, but gradually increased in OSF early, moderately advanced and advanced tissues, and strongly expressed in OSCC tissues. DKK3 is localised in the cytoplasm in OSF progression. Rare mutation of DKK3 was observed in OSCC, together with increased copy numbers. Furthermore, through analysis of its co-expressed genes, DDK3 may deregulate Wnt signalling pathway, p53 signalling pathway, apoptosis pathway, Ca2+ signalling pathway and mitochondrial signalling pathway in OSCC pathogenesis.
Conclusion: Our results demonstrate that DKK3 is upregulated in the carcinogenesis of OSF, due to gain of copy number, which could be a potential tumour marker for OSCC early detection.

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A retrospective review of patients with metastatic tumours in oral and maxillofacial region

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Background: Metastatic tumour consists of about 1% of all oral and maxillofacial (OMF) region malignant tumours. Patients usually have a poor prognosis with multi-metastases and leaving no choice than palliation. Here we reported a retrospective study of patients with OMF metastasis in our hospital.
Methods: We retrospectively reviewed all patients who had diagnosed an OMF metastasis from the period January 2000 to December 2015 at Guangdong General Hospital. The role of medical imaging in differential diagnosis and some distinct clinical manifestations were further discussed.
Results: 12 patients (nine males and three females) were confirmed OMF metastasis. Most common primary site was lung (six cases), followed by thyroid (four cases) and most common involved site was mandible (six cases), followed by parotid (three cases); common symptom were nonspecific, including localised swelling, pain, bleeding and ulceration. Imaging of enhanced computed tomography showed a hypervascular lesion in involved sites in all thyroid metastatic cancers patients. Follow-up varied from one month to 3.5 years and six patients followed-up less than six months died due to multi-metastasis. Patients with the solitary metastases of thyroid cancer had a better prognosis.
Conclusions: Clinical and radiographic manifestations of metastases to the OMF region are usually quite variable and nonspecific. Thyroid metastatic tumour often shows a rich vascularity lesion in involved sites and a better prognosis is companied with simultaneous resection of the solitary metastases along with total thyroidectomy followed by radioiodine therapy.

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Oral and Maxillofacial Pathology

Pattern of salivary gland tumours in Sudan

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Background: Salivary gland tumours (SGT) are rare, representing approximately 2% of all tumours of the head and neck region. The aim of this study was to establish the frequencies and distribution of benign and malignant SGT in Sudanese population.
Methods: The records of all patients with histopathologically confirmed SGT were reviewed retrospectively from January 2004 to May 2010. A total number of 143 records of patients with SGT were found. The parameters reviewed included gender, age, location and histopathology of the tumour.
Results: There were 84 females and 59 males with a mean age of 44.2 years for all SGT cases. The frequency of benign tumours was 51.7% and that of the malignant tumours was 48.3%. Tumours of the minor salivary glands accounted for 65.7% of the series. The most common benign tumour was pleomorphic adenoma accounting for 47.6%, and the most common malignant SGT was adenoid cystic carcinoma accounting for 19.6% of the cases.
Conclusion: SGT showed a high frequency of malignancy in Sudan, adenoid cystic carcinoma was the commonest malignant SGT. Despite similarities to other frequencies reported in the literature, this study suggests slight different demographic features of SGT in African population.

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Pseudoaneurysm of the facial artery following bilateral temporomandibular joint replacement: a case report

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Background: Pseudoaneurysm of the facial artery is a rare event. Rupture of the arterial wall leads to extravasation of blood into the surrounding tissue, followed by tamponade and clot formation. Left untreated this has the potential to cause catastrophic haemorrhage.
Case report: A 59-year-old male presented to our department with bony ankylosis of his temporomandibular joints bilaterally as a result of previous osteomyelitis. He underwent bilateral temporomandibular joint replacements in a two-stage procedure. Following his discharge he presented to the emergency department six weeks later in haemorrhagic shock, having lost significant blood volume from a pulsatile lesion over his right mandible. Computed tomography angiography revealed a pseudoaneurysm of the right facial artery. He proceeded to emergent embolisation with resolution of the pseudoaneurysm.

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Evaluation of bone resorption amongst solid ameloblastoma subtypes

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Background: Ameloblastoma is a benign odontogenic tumour with locally aggressive behaviour that causes resorption of adjacent bone. Previous studies have shown ameloblastoma induces osteoclastogenesis. Matrix metalloproteinase (MMP)-9 and receptor activator of nuclear factor kappa B ligand (RANKL) are known to involve in bone-resorption process and related to ameloblastoma osteoclastogenesis.
Objectives: The aim of this study was to evaluate bone resorption expression amongst solid ameloblastoma histopathological subtypes.
Methods: 40 ameloblastoma samples were retrieved from the Department of Pathological Anatomy, Universitas Indonesia and divided into three histopathological groups: (1) Follicular group, (2) Plexiform group, and (3) Mixed type group. Each group was immunohistochemically stained with MMP-9, RANKL, and osteoprotogerin (OPG) and the expression of each sample was scored than statistically analysed.
Findings: All samples showed positive expression of MMP-9, RANKL, and OPG with different intensity. Plexiform type significantly showed higher MMP-9 immunoexpression than mixed and

follicular type ($P < 0.05$). Plexiform type showed higher RANKL expression than OPG expression while follicular and mixed type showed higher OPG expression than RANKL expression.
Conclusion: Bone resorption amongst solid ameloblastoma histopathological subtypes is not the same. Plexiform type ameloblastoma has higher bone resorption compare to follicular and mixed type ameloblastoma but further investigation is advisable.

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Comparison of detectability and extent of antiresorptive drug-related osteonecrosis of the jaw in magnetic resonance imaging at 1.5-Tesla and 3-Tesla

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Background: Magnetic resonance imaging (MRI) is a valuable tool for the evaluation of antiresorptive drug-related osteonecrosis of the jaw (ARONJ). High-field MRI offers high spatial resolution with excellent image quality and soft tissue contrast.
Objective: Evaluation of the potential benefit of the application of 3-Tesla (3T)-MRI compared to 1.5-Tesla (1.5T) with respect to pitfalls and disadvantages related to higher field strength.
Methods: 12 patients with ARONJ received dental 1.5T and 3T-MRI. The protocol for both scanners consisted of fsT2w, T1w and fsT1w-scan after gadolinium-administration. All 1.5T scans featured a slice thickness of 3 mm, while 3T scans were designated by an isotropic resolution of 0.8 mm with corresponding offline panoramic view reconstructions. All necrosis related findings were evaluated. Additionally, the maximal diameter of necrosis characterised by hypointense signal on T1w and concomitant hyperintensity on fsT2w images was measured on 1.5T and 3T scans respectively.
Results: 15 lesions were identified on images of both field strengths. 3T images and panoramic view reconstructions provided more detailed information on the extent and involvement of surrounding tissues, detection of focal loss of cortical continuity, cortical thickening and the visualisation of sequesters. Further, we found a significant correlation ($P < 0.01$; $r = 0.83$) between measurements derived from 1.5T and 3T images.
Conclusion: 3T high-resolution images provide better quality compared to 1.5T MRI images, especially when panoramic view reconstruction is used. More detailed information on involvement of adjacent tissue and severity of osteonecrosis is gathered. Nevertheless, the mere extent of osteonecrosis can be assessed equally at both field strengths.

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Is there a role for enucleation of ameloblastomas?

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Objective: Resections of solid ameloblastomas have the lowest recurrence rate.[1] Also, resection of mural unicystic amleoblastomas has been recommended due to high recurrence rate with enucleation.[2] The philosophy at the University of Maryland is to treat these aggressive tumours in this manner. Is there a role for enucleation? In which anatomical locations is this a viable option?
Methods: We retrospectively reviewed the management of ameloblastomas at the University of Maryland from 1990 to 2016. Of the 186 ameloblastomas identified, 6 were treated with enucleation. Commonality was the location of the tumour: the mandibular symphysis.
Results: Age ranged from 12–58 years. Pathology included solid ameloblastomas (two) and unicystic (four). Recurrences were noted in four cases (range, 2–30 years), treated with additional enucleation. Four patients are tumour-free and one is living with recurrence. Follow-up time is 12–33 years (average, 22.5 years). Modality of treatment was chosen due to patient refusal and/or overall health.
Conclusion: We propose a role for enucleation of Ameloblastomas in unique circumstances. Reconstruction of the symphysis is difficult without free flaps, often sacrificing vital structures (inferior alveolar nerve). The mandibular symphysis lies away from areas (skull base) where invasion of this tumour is life threatening. In selected symphyseal tumours, enucleation of ameloblastomas can be considered.

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Expression of the interleukin-21 and phosphorylated extracellular signal regulated kinase 1/2 in Kimura disease

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Background: Kimura disease (KD) is a rare, chronic inflammatory disease, clinically characterised by painless subcutaneous lump, infiltrative eosinophil in tissue and blood and elevated serum immunoglobulin E. Although the precise pathogenesis of KD might be multi-faceted and obscure, immune dysregulation was one of its characteristics.
Objectives: Aims of this study were to investigate the expressions of interleukin (IL)-21 and phosphorylated extracellular signal regulated kinase 1/2 (pERK1/2) in KD patients and to correlate the findings with clinical and prognostic variables.
Methods: Immunohistochemical analysis of IL-21 and pERK1/2 was performed in eighteen cases of KD and five gender and age

matched control samples. Retrieval of clinical data and patients followed a mean period of 32.1 months.
Findings: After a mean follow-up period of 32.1 months (range, 1–102 months), recurrence was diagnosed as end point for seven patients, with 43.75% (7/16) of cumulative recurrence rate. Comparing to gender and age matched controls, patients showed strong *in situ* expressions of IL-21 and pERK1/2 respectively ($P < 0.05$). Patients with strong IL-21 staining intensity and overexpression of pERK1/2 had a lower recurrence rate than those with moderate staining intensity ($P = 0.049$ and $P = 0.019$, respectively). However, differences were not statistically significant by gender, age, eosinophils, location, multiplicity, laterality, size, duration and primary outbreak. pERK1/2 was the independent prognostic factor ($P = 0.020$), while age, gender, eosinophils, multiplicity, laterality, size, duration, primary outbreak and expression of IL-21 were not.
Conclusion: Our data suggested that IL-21/pERK1/2 pathway is activated in KD and pERK1/2 might be considered as a potential prognostic indicator in KD.

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Ameloblastoma: a review of biological profile and management over a 17-year period

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Background: Ameloblastoma is one of the most common benign odontogenic tumour of the maxillofacial region. Treatment modalities become critical and controversy.
Objective: To discuss about the clinical, imaging, treatment and prognostic characteristics of these tumours in patients who were diagnosed and treated at Faculty of Dentistry, Chiang Mai University.
Methods: This was a retrospective study and comprised of patients who presented with ameloblastoma at the Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, Chiang Mai University between 1999 and 2016. This study analysed clinical, imaging, treatment and prognostic characteristics of these tumours.
Findings: 36 patients (87.80%) were adult and five patients (12.20%) were young. The mean age was 38.25 years. The distribution ratio of male and female was 1.55:1. It mostly occurred in body-ramus areas (95.12%). Radiographic appearance showed multilocular radiolucency (78.05%). Plexiform type was predominated histological finding (41.46%). The management were resection (65.85%) and conservative treatment (34.15%). Recurrence was found in six patients (14.63%) who received conservative treatment. One of them was atypical multiple episodes of soft tissue recurrence.
Conclusions: In our centre, solid multicystic ameloblastoma is most common. To prevent the recurrence, treatment should be resection involved one anatomical barrier. In young patients, surgeon should concern about growth and psychological factor. When conservative treatment was done, patient compliance and long-term follow-up treatment are necessary.

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Association between the maxillary sinus mucosal thickening and periapical lesions using cone-beam computed tomography

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Objective: Odontogenic infections are a common cause of maxillary sinusitis. This retrospective cross-sectional study evaluated the association between periapical lesions and sinus mucosal thickening using cone-beam computed tomography (CBCT) imaging.
Methods: CBCT images of 696 maxillary sinuses were inspected retrospectively for the presence of periapical lesions, relation of the periapical lesions to the sinus floor and periodontal bone loss in posterior maxillary teeth and associated sinus mucosal thickening. Thickening >2 mm was considered pathological and was categorised by degree (2–5 mm, 5–10 mm, >10 mm) and type (flat or polypoid). Relations of the periapical lesion and sinus floor were; a space between the lesion and sinus floor, the lesion was in contact with the sinus floor and the lesion entered the sinus floor. Data were analysed using Chi squared tests.
Results: Mucosal thickening >2 mm was observed in 522 (75%) of the sinuses. Mucosal thickening that are >2 mm was more frequently found in relation to teeth with periapical lesions (94.3%) Significant association was found between mucosal thickening and periapical lesions. Polypoid type thickening was frequently observed when the periapical lesion is in contact with (50%) or entered the sinus floor (46.6%). Flat-type thickening was mostly observed when there is a space between the periapical lesion and sinus floor (43.4%) or the lesion is in contact with the sinus floor (47.8%).
Conclusion: Teeth with periapical lesions were 16.5 times more likely to be associated with mucosal thickening than those without. The anatomic relationship between periapical lesions and maxillary sinus floor could affect the mucosal sinus development.

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Methotrexate-related lymphoproliferative disorder in patients with osteonecrosis of the jaw

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Patients who are immunodeficient or immunosuppressed are at risk of developing lymphoproliferative disorder (LPD). Methotrexate (MTX) is an iatrogenic cause of LPD. However, the occurrence of MTX-related LPD causing osteonecrosis of the jaw (ONJ) has rarely been reported.

We report a series of three cases of MTX-related LPD in patients with longstanding rheumatoid arthritis who presented with ONJ. A 74-year-old man with rheumatoid arthritis (RA) had received treatment with MTX for seven years before presenting with ONJ and submental lymphadenopathy following dental extraction. The second patient was a 79-year-old woman who had been treated for 21 years with MTX and who presented with ONJ. The third patient in our series was a 67-year-old man who had been treated with MTX for more than 15 years. In all three cases, biopsy,

histology, and immunohistochemistry using a panel of lymphoid markers (EBV, CD79a, CD20, PAX-5, CD3, and CD30) resulted in the diagnosis of EBV driven T-cell, B-cell, and Hodgkin-like LPD. All three patients recovered following cessation of MTX and surgical debridement.

Although LPD as a cause of ONJ is rare, due to the rise in immunodeficiency disorders and immunosuppressive treatments, the prevalence of this condition may be expected to increase. For this reason, clinicians should be aware of the diagnosis. As this case series has shown, biopsy and diagnostic immunohistochemistry will ensure the correct diagnosis. Because the diagnostic approach used in this case series will distinguish MTX-related LPD from the more familiar condition of Medication-related osteonecrosis of the jaw.

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Preventive effect of dental pulp-derived mesenchymal stem cells in experimental medication-related osteonecrosis of the jaw

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Background: Medication-related osteonecrosis of the jaw (MRONJ) has been a complication and the treatment still has been main challenge of this complication.
Objectives: The aim of this study was to investigate a prevention strategy for MRONJ development in rat model.
Methods: Dental pulp-derived mesenchymal stem cells (DP-MSCs) were isolated and characterised. Green fluorescent protein (GFP) was transfected to cells. 40 rats were divided into four groups (Group 1: tooth extraction; Group 2: tooth extraction after bisphosphonate therapy; Group 3: DP-MSCs application simultaneously with tooth extraction after bisphosphonate therapy; Group 4: DP-MSCs application one day before of tooth extraction after bisphosphonate therapy). The bisphosphonate therapy was 0.1 mg/kg zoledronic acid intraperitoneally once per every three days for 9 weeks. The lower molar tooth of all animals extracted under general anaesthesia. The animals were sacrificed after six weeks of healing. Histologic and immunohistochemical analysis were performed. Expression of osteocalcin, bone morphogenetic protein 2, and Runt-related transcription factor 2 was assessed by quantitative polymerase chain reaction analysis.
Findings: Phenotype characterisation of the DP-MSCs demonstrated a homogeneous population of cells negative for CD11b, CD45 and positive for CD44, CD29, CD90, and CD105. The alveolar sockets were complete (70%) and partial (10%) healed in group 3 whereas the exposed necrotic bone remained in group 2. Preventive DP-MSCs treatment enhanced the expression of osteogenic related genes. Immunohistochemical staining showed the higher staining for those markers and GFP positivity in group 3. Histological analysis showed new bone formation and vascularisation in the DP-MSCs groups.
Conclusion: Simultaneously DP-MSCs with tooth extraction showed preventive effects for MRONJ development.

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Conservative treatment option for large odontogenic cystic lesions/tumours — a single centre experience in Karachi, Pakistan

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Background and Objectives: Keratocystic odontogenic tumour (KCOT) is known for its unusual behaviour, different origin, debatable development, controversial and disputed treatment modalities. This study aims to present a case series of KCOT emphasising its solvability without surgical intervention or invasive procedures, and comparing its clinical, radiological and histopathological characteristics and therapeutic alternatives to those described in the literature.
Methods: Our series of 7 patients with histologically proven KCOTs were treated by marsupialisation surgery from 2003 to 2014. Radiological evaluation done in terms of reduction in lesion size and, therefore, easy and complete removal become possible with lower recurrence rate. Patient was followed for years with radiology and clinical examination to detect recurrence. Good bone integrity, less morbidity, improved quality of life and better aesthetics were the primary.
Findings and Conclusions: KCOT treatment is still debatable and there is no consensus about it. In our cases bone integrity, morbidity and functional defect related to surgical intervention was taken into consideration so that marsupialisation was performed to reduce the tumour size and followed by enucleation gives good results. Our treatment offers long-term follow-up with clinical examination and radiology to control the disease.

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Vascular malformations of the maxillofacial skeleton — an overview of presentation and management

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Background: Vascular disorders of the maxillofacial skeleton vary from benign localised lesions to aggressive, proliferative high-flow malformations that present enormous challenges for the clinician.
Objectives: This presentation will describe the classification of vascular malformations within the maxillofacial complex, their characteristics and management. The distinction between arteriovenous malformations (AVM) and haemangiomas will also be highlighted to emphasise that these lesions are separate pathological entities.
Methods: A retrospective review of patients (adults and paediatric patients) with a diagnosis of a vascular lesion of the facial skeleton was undertaken in an attempt to classify the main categories. The implications for elective and curative surgery were to be considered and treatment protocols outlined.
Findings: Of 13 patients with AVM's, 6 were syndromic low-flow arteriovenous malformations, 4 were nonsyndromic low-flow lesions and 3 were high-flow malformations. Sturge-Weber syndrome is a phakomatosis due to an embryonal developmental anomaly (mutations in the GNAQ gene) with several subtypes.

Nonsyndromic low-flow intraosseous lesions can be incidentally diagnosed on routine imaging and some may present with contour deformities or the displacement of teeth. However, high-flow lesions are rare and potentially life threatening. They may present with a pulsatile, expanding bony cortex, interdental bleeding or massive socket haemorrhage. For low-flow lesions, resection with a small margin may be sufficient for resolution of the lesion. However, high-flow lesions may require embolisation, sclerosing solutions, surgical resection or a combination of these interventions. A number of cases will be presented to illustrate the presentation of AVM's and the approach to management.

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Prevention and treatment of oral mucositis caused by chemo- and radiotherapy in head and neck cancer patient

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Background: Oral mucositis is one of the most common complications of chemo- and radiotherapy for treatment of cancer. This condition is prevalent in up to 40% of individuals who are undergoing cancer therapy. Adverse reactions include but not limited to malnutrition, prolonged hospital stays, increased risk of infection and negative impact in quality of life.
Objectives: The purpose of this study was to examine and compare current evidence on treatment modalities for oral mucositis by performing a systemic review. A literature search identified for randomised controlled trials (RCTs) for preventive and therapeutic intervention of oral mucositis in head and neck cancer patients undergoing radiation therapy and/or chemotherapy.
Methods: This systematic review followed the Cochrane Collaboration Handbook of Interventions Systematic Reviews and the PRISMA statement checklist and flowchart. A sensitive search protocol was developed to retrieve RCTs published in peer-reviewed journals from 1980 to September 2016 using MEDLINE via PubMed (1970–September 2016), EMBASE via Ovid (1980–September 2016).

Search queries included MeSH terms for: oral mucositis; chemotherapy; radiotherapy; head and neck cancer

Identification of randomised trials was done according to CONSORT statement. 11 articles on laser therapy; 10 articles on topical treatment and 8 articles on medical therapy were included into the final review.
Findings and Conclusion: The outcome of this study has identified effective medical and surgical interventions for prevention and treatment of oral mucositis. Further trials will be necessary to identify a superior modality or protocol as a standard therapy of radio- and chemotherapy-induced oral mucositis.

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Efficacy of contrast computed tomography scan over clinical palpation and ultrasonogram for the evaluation of neck nodes metastasis in case of oral squamous cell carcinoma

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Background: Cervical metastasis has a tremendous impact on the prognosis in patients with carcinomas of the head and neck and the frequency of such spread is greater than 20% for most squamous cell carcinomas. It is possible to reduce the risk of undiagnosed metastasis with accurate contrast computed tomography (CT) imaging techniques and thus probably reduce the number of elective neck treatments.
Objective: Aim of the study was to assess the accuracy of contrast CT scan over clinical palpation and ultrasound in prediction of lymph node metastasis in oral squamous cell carcinoma.
Methods: 26 patients with oral squamous cell carcinoma who underwent 26 neck dissections (6RND, 20 SOND) were included. All the patients underwent examination of neck preoperatively by palpation, ultrasound and CT with contrast CT for number detection.
Results: Clinical palpation for cervical lymph nodes had a sensitivity of 80%, specificity 28% and accuracy 58%. The sensitivity for ultrasound scanning was 80%, while the specificity was 72% and the accuracy was 52%. CT scan was found to be the best modality in assessment of metastases in cervical lymph nodes. The sensitivity was 93%, the specificity was 82% and the accuracy was 88%. The positive predictive value for CT scan was 88% and the negative predictive value was 90%.
Conclusion: Contrast CT scan is the most accurate technique in assessing metastatic lymph nodes in neck in patients with oral squamous cell carcinoma.

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Extramedullary plasmacytoma of the gingiva. A case report and review of the literature

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Background: Extramedullary plasmacytoma (EMP) is a rare disease that represents less than 3% of all plasma cell neoplasms, and it has been reported that 80% of EMPs are localised in the head and neck region. 10–20% of patients develop multiple myeloma within two years of treatment.
Objectives and Methods: We report a case of 58-year-old male with rheumatic arthritis receiving long-term steroid, he suffered from a painful mass over left upper gingiva for two weeks. A dome-shaped mass with ulcerative surface over left upper gingiva was noted. Computer tomography scan showed a 6 cm × 5 cm × 4 cm solid tumour over left maxillary sinus extending to oral cavity. Biopsy reported mucocele and epulis with chronic inflammation in separate trial. Partial maxillectomy with tumour excision was performed due to highly suspect malignancy and pathologist reported extramedullary plasmacytoma. Bone-scan showed no active bony lesion. The diagnosis was asymptomatic multiple myeloma ISS

stage II. He is now under regular follow up and no evidence of recurrence at 28 months of follow-up.
Findings and Conclusion: According to NCCN guideline, solitary extraosseous tumour should be treated with >45 Gy radiotherapy or surgery. Meanwhile, in literature review radiotherapy in tumours larger than 5 cm showed higher risk of local failure. However, compared to other sites, head and neck EMPs had a significantly higher 5-year overall survival, and they had a higher 10-year overall survival when treated with surgery or combination therapy than with radiation alone. Thus, upfront surgery may be the choice for plasmacytoma in head and neck region.

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Reviewing the keratocyst: an institutional experience of 10 years

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Background: The odontogenic keratocyst (OKC), first described by Philipsen in 1956 has been under review for many years. The silent aggressiveness and recurrence of this lesion has posed a challenge to the maxillofacial surgeons. Over the years, surgical modalities like marsupialisation, curettage, enucleation and resection, as well as, thermal and chemical cauterisation has also been used to counter recurrence. Due to the locally destructive and highly recurrent nature of the lesion, budding of the basal layer, presence of mitotic figures in the suprabasal layer, and the mutation of the PTCH gene in case of syndromic lesions; the World Health Organization in 2005 classified OKC as a benign tumour with the name keratocystic odontogenic tumour (KCOT).[1]
Objectives: This paper aims to study available data through 10 years to determine the characteristics of the KCOT and various treatment modalities used over the years.
Methods: A retrospective review of records of 112 patients diagnosed with KCOT between 2005 and 2015 was carried out. Demographic data, along with location, symptoms, surgical treatment rendered, length of follow-up and incidence of recurrence was recorded.
Findings: A review of cases showed that the most common treatment was enucleation, followed by thermal or chemical cauterisation. Overall recurrence rate was around 4%
Conclusion: Aggressive treatment and periodic follow-up are essential for the treatment of the KCOT.

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Corset sutures in the management of vascular lesions of the head and neck — our experience

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Vascular lesions of the head and neck pose a challenge to surgeons across the globe in terms of management with the least amount of comorbidities. Various methods and procedures to minimise blood loss and disfigurement have been documented in literature. Corset sutures to strangulate the lesion and restore facial symmetry is a widely accepted technique. Our experience with this technique and its application to the site of lesion, the material used and the surgical morbidity with long-term follow-up in 15 patients will be discussed in this presentation.

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Aggressive central giant cell granuloma of the maxilla in a patient with neurofibromatosis type 1 — case report and review of literature

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Background: Central giant cell granuloma (CGCG) is a benign osseous lesion that predominantly involves jaws with variably aggressive behaviour. It characterised by accumulation of multinucleated giant cells in a background of cellular vascular fibrous tissue and spindle-shaped stromal cells. Neurofibromatosis type 1 (NF-1) is an autosomal dominant trait associated with multiple neurofibromas, cafe-au-lait pigmented skin lesions, optic nerve glioma, Lisch nodules and distinct osseous dysplasia. In 1971 Kerl reported multiple giant cell granulomas in a patient with Recklinghausen's neurofibromatosis, few literatures showed this rare coincidence.
Objectives: We report a case of NF-1 with aggressive maxillary CGCG and reviewed on the proposed coincidental association or true genetic linkage.
Methods: A complete search on the web was done and all the related articles studied and concluded.
Findings and Conclusion: In NF-1 patients genetic drawbacks such as NF-1 haploinsufficiency or underling mechanisms that cause decreased neurofibromin function, may result in decreased bone ability to respond to functional demands, thus the skeleton is more prone to develop intraosseous defects.

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Introduction of application of quality and safety management group in oral and maxillofacial surgery recovery room

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Objective: To explore the role of quality and safety management team in the normal operation of departments and medical safety management.
Methods: Establishment of 13 management teams, and the specific requirements for a clear division of labour, regulatory responsibilities refinement, annual plan, inspection records, assessment records, a continuous improvement.
Results: The establishment of quality and safety management team over the past year, there were 44 security risks, a variety of maintenance 25 items, and 15 adverse events reported. 6485 cases of postoperative recovery of general anaesthesia, no errors occurred.
Conclusion: The establishment of the quality and safety management group improves the quality supervision consciousness

of the department staff and the enthusiasm of participating in the management. The awareness of everything was beneficial, everyone is involved in the management of departments. Through the group management continue to find work problems and security risks. Take timely corrective and preventive measures to ensure the nursing quality and nursing safety.

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Rare tumours of the tongue — strategy and management

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The tongue is a complex organ involved in speech and expression as well as gustation, mastication and deglutition. It is the space for neoplasms, reactive processes, infections and manifestations of systemic diseases. We describe two rare diseases that occur on the tongue — osteochondroma and localised amyloidosis of the tongue.

Osteochondroma generally develops in osseous tissue and is frequently found near the end of long bones. Relatively rare in the craniofacial region, osteochondroma is common in the mandibular condyle and coronoid process. Osteochondroma arising in the soft tissues on maxillofacial region is extremely rare.

Amyloidosis is difficult to identify due to its nonspecific symptoms and manifestations. Amyloidosis of the tongue, either isolated or part of the systemic disease, is rare and its features resemble those of a tumour.

The aim is to emphasise that combination of clinical, laboratory and imaging findings along with the histopathological examination and immunohistochemical tests have important diagnostic and prognostic value for the tumours or tumour-like lesions of the tongue.

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The ideal biological cover in oral submucous fibrosis

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Objectives: To study the efficacy of fibrin glue, atelocollagen silicone bilayer and conventional collagen membrane along with tulle gras as a dressing material used postsurgically in Grade III and Grade IVa oral submucous fibrosis patients [as per Khanna and Andrade, 1995].
Methods: 30 patients were randomly divided into 3 groups of 10 each. Bilateral intra oral fibrous bands release with bilateral coronoidectomy was performed in all patients. Dressing materials were applied on to the postsurgical defect, as per the group. The parameters recorded were: time for preparation and application, biocompatibility, granulation tissue, epithelialisation, postoperative pain and wound contracture. Patients were then followed up after two weeks, one, two, three and six months.
Findings: Ease of preparation and application, lesser postoperative pain and excellent healing were observed in the fibrin glue group ($P < 0.05$). Furthermore, fibrin glue does not need a secondary operative procedure for removal unlike the atelocollagen silicone bilayer and the collagen membrane tulle gras groups. The only disadvantage of fibrin glue lies in its pricing.
Conclusions: The above dressing materials can be considered to be viable alternatives to local and pedicled autogenous flaps for postsurgical defects in oral and maxillofacial patients with fibrin glue being most ideal.

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Medication-related osteonecrosis of the jaws: three-dimensional analysis of a surgical technique of 125 successfully treated stage II/III medication-related osteonecrosis of the jaw patients

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Background: Medication-related osteonecrosis of the jaw (MRONJ) is a side-effect of antiresorptive mediation which can be difficult to treat. Three-dimensional (3D) analysis of our previously reported surgical technique may give more insight in possible causes of failure of the surgical treatment of MRONJ.
Objectives: The aim of our study was to evaluate our surgical technique with 3D technology. The patients were retrospectively analysed and followed at the Leiden University Medical Center.
Methods: 125 patients with therapy-resistant MRONJ were treated between 2003 and 2016 with a previously reported surgical approach. The postoperative panoramic radiographs were analysed. The scans from not successful surgeries were 3D printed and compared to those of cured patients.
Findings: 125 patients were followed-up for 6–96 months. This surgical approach was successful in more than 90% of the patients. Scans from 10 unsuccessful patients were 3D printed and compared to 3D prints from successful patients. Insufficient saucerisation and sharp edges were the most common features seen in unsuccessful patients.
Conclusion: 3D analysis of the surgical technique gives insight in possible causes of failure of treatment. We conclude that the surgical technique with high success rate in all stages of MRONJ was based on relatively aggressive surgery with extensive saucerisation and rounding off in combination with primary closure.

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A case report of massive zygomatic angiofibroma: our clinical experience

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Objective: In this study, we would describe our encounter with a rare and exceptionally massive facial angiofibroma. The diagnostic evaluation and surgical method will be outlined for further discussion. We will also elaborate the importance of strict continuous follow-up in this case.
Methods: This is a case report on a 20-year-old male who presented with a large and bony hard swelling on the left zygomatic body. The lesion was incisionally biopsied in outpatient clinic with an eventful result of postoperative bleeding that ended with hospital admission. The histological result was analysed and the patient is finally treated with an angiography, and left external

carotid artery embolisation prior to the surgical removal of the lesion. Weber-Ferguson approach was adopted to achieve satisfactory exposure, and the defect on the facial region was restored with a monocortical cancellous iliac graft.
Results: The lesion had been successfully removed, and aesthetically acceptable. Currently, six-months postoperatively, there is minimal scar of the flap incision, normal sensory and motor functions and no signs of recurrence.
Conclusion: The presentation of the lesion is distinct from the conventional facial angiofibroma because of its single rather than multiple and enormous in spite of tiny size. Thus, a differential diagnosis of juvenile nasopharyngeal angiofibroma should not be excluded. The lesion warrants regular follow-up due to inability to surgically remove tumour wholly due to deep invasion of the sphenoid or high tumour growth rate of 10–36%.

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Ludwig's angina: an analysis of sixteen cases at Hasan Sadikin Hospital, Bandung, Indonesia

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Background: Ludwig's angina is an infectious process involving the submental, sublingual, and submandibular spaces that can rapidly progress to haemodynamic instability and airway obstruction. When these infections are not promptly managed, serious, even life-threatening complications can arise. Treatment involves antibiotics, surgical procedures with incision, drainage and extraction of involved tooth as a source control, and placement of extraoral drains.
Objectives: To analyse the prevalence and management of Ludwig's angina at the Hasan Sadikin Hospital, Bandung, Indonesia.
Methods: Retrospective analysis of patients presenting with Ludwig's angina seen and managed at Hasan Sadikin Hospital, Bandung, Indonesia between 2015 and 2016.
Findings: There were 16 cases (13 males and 3 females) whose age ranged from 24 to 71 years. Duration of symptoms ranged from four days to three weeks of the onset of illness. Odontogenic infection was the most etiologic factor in all cases. Eleven patients were sepsis and twelve patients had underlying disease such as diabetes mellitus and hypertension. Microbiological investigations showed a polymicrobial nature of the infection with *Streptococcus viridans* in eight cases. Treatment involved maximum doses of broad-spectrum intravenous antibiotics, immediate surgical drainage under local anaesthesia, including extraction of involved tooth/teeth as a source control. The complications recorded in three cases were necrotising fasciitis and renal failure. Mortality occurred in two cases.
Conclusion: Ludwig's angina is a serious disease. In most cases, immediate treatment is obviously needed. Prompt clinical evaluation and definitive care will considerably improve its prognosis and reduce the high-risk mortality.

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What is important for confirming negative margins when resecting ameloblastomas?

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Objective: The purpose of this study was to compare the utility of intraoperative radiographs and frozen sections in achieving negative margins and preventing recurrence of mandibular ameloblastomas.
Methods: This was a retrospective cohort study of patients who underwent en bloc resection of mandibular ameloblastomas between 2005 and 2015. Subjects were included with ≥1-year follow-up and complete records. Demographic variables include age, gender, and type of resection (segmental versus marginal). The predictor variables were type of margin assessment: (1) frozen section, (2) intraoperative *ex vivo* specimen radiograph, (3) both or (4) none. The outcome variables were intraoperative margin status and recurrence rate. We also determined the accuracy of intraoperative radiographic margins by comparing to histologic margin distance. Descriptive statistics were conducted with Fisher's exact test.
Results: The study sample consisted of 40 subjects (48.0 ± 20.0 years, 17 males) who underwent 28 segmental and 12 marginal resections. Ten had frozen sections only, four had ex vivo specimen radiographs only, 10 had no intraoperative measures, and 16 had both. There were no positive frozen sections. One subject had a positive posterior bony margin on final pathology. There was no difference in recurrence rate at latest follow-up between cohorts.

The anterior radiographic margin was 10.5 ± 5.7 mm compared to 11.1 ± 7.2 mm by histology ($P = 0.124$). The posterior radiographic margin was 11.5 ± 4.7 mm compared to 10.2 ± 7.5 mm histologically ($P = 0.546$). Margin distances that were >5 mm when measured with specimen radiographs had histologic margin distances >5 mm in 27/35 (77.1%) resection margins.
Conclusion: Resection of ameloblastoma with planned ≥1 cm margins is sufficient to prevent recurrence of ameloblastoma. Achieving a radiographic margin of ≥5 mm is associated with histologic margins of ≥5 mm.

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Medication-related osteonecrosis of the jaw: cone-beam computed tomography findings of denosumab patients versus bisphosphonate patients

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Background: Radiological findings on cone-beam computed tomography (CBCT) for bisphosphonate-related osteonecrosis of the jaw (BRONJ) are well known. Clinically a difference seems present between denosumab and bisphosphonate osteonecrosis.
Objectives: The purpose of this retrospective study is to compare the radiological findings on CBCT between patients with medication-related osteonecrosis of the jaw (MRONJ) due to denosumab versus bisphosphonates.
Methods: Consecutive MRONJ patients who presented between January 2007 and January 2016 at the Department of Oral and Maxillofacial Surgery and had a CBCT scan for determination of the extent of the disease were compared. The lamina dura,

sclerosis, presence or absence of subperiosteal bone formation, sequestra, the visibility of the mandibular canal, cortical border were scored. Differences between outcomes of denosumab-related osteonecrosis (DRONJ) of the jaw and BRONJ patients were studied.
Findings: In denosumab cases predominantly sclerosis was seen. Bisphosphonates more sclerosis depending on the duration of the use or the potency of the bisphosphonates. Sequestra were rare with denosumab necrosis compared to bisphosphonate necrosis. Subperiosteal bone formation was predominantly seen in patients using bisphosphonates. Prominent lamina dura, the visibility of the mandibular canal and cortical border were seen in both denosumab and bisphosphonates.
Conclusions: This study shows a difference in radiological aspects between denosumab and bisphosphonate cases. In denosumab a sclerosis is seen which is visible only in long-term bisphosphonate cases. Sequestra were rare in denosumab. These effects are possibly caused by a difference in the remaining functioning amount of osteoclasts. Further research is mandatory.

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Surgical treatment of a cohort of 150 patients with stage II/III medication-related osteonecrosis of the jaw

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Background: A side effect of antiresorptive medication such as bisphosphonates and denosumab is medication-related osteonecrosis of the jaw (MRONJ). This can be difficult to treat.
Objectives: The aim of this study was to evaluate the surgical treatment protocol used in our hospital for MRONJ patients. The patients were analysed and followed at the Leiden University Medical Center.
Methods: 150 patients who were seen with therapy-resistant MRONJ between 2003 and 2016 were analysed. Clinical features, medical and dental history, antiresorptive use, and the use of other medications were recorded. The thorough surgical intervention was combined with antimicrobial treatment and only performed by senior surgeons, following the principles of our previously reported protocol.
Findings: 125 patients were surgically treated and followed for 6–105 months with a mean of 18 months. The surgical approach was successful in 92% of the patients.
Conclusion: More than 90% of the patients were cured with our surgical protocol. We conclude that this combined antimicrobial and surgical treatment protocol has a high success rate in all stages of MRONJ.

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Study on outcomes of oral squamous cell carcinoma after treatment for two years follow-up at Bangabandhu Sheikh Mujib Medical University

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Objective: To evaluate the treatment outcome of oral squamous cell carcinoma patients by routine follow-up visit and by this efficacy of institutional management.
Methods: In the study 56 patients, aged 26–75 years treated at BSMMU for squamous cell carcinoma of oral cavity were included. Patients were treated by different modality such as surgery with incomplete/delayed/no radiotherapy (32.14%), surgery with radiotherapy (53.57%), surgery with concomitant radiochemotherapy (10.71%) and neoadjuvant therapy then surgery and adjuvant therapy (3.57%). By routine follow-up, suspected new tumour growth was determined and fine-needle aspiration cytology and histopathology was done. Residual tumour growth, local recurrence, lymph node metastasis and second primary tumour growth were detected and by this overall outcome measured.
Results: The majority of patients were female and the male to female ratio was 1:1.4. Tumours of different sites of oral cavity were treated of which stage I, 23.21%; stage II, 62.5%; stage III, 14.21%; and stage IV patients were not included. Overall outcome of treatment was 50.0% for two years follow-up. Residual tumour growth was 9.09%, local recurrence was 36.36%, lymph node metastasis was 2.27% and second primary tumour was 2.27% within two years. Outcome for two years in stage I 100%, in stage II 43.3% and in stage III 28.5%. Statistical analysis with SPSS version 10 showed *P* value for one-year follow-up.
Conclusion: Our results suggest that to evaluate the treatment outcome routine follow-up is necessary. Also efficacy and failure of treatment can be measured.

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Bisphosphonate-related osteonecrosis of the jaws: our experience in up to 120 cases

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Osteonecrosis of the jaw has been related to the use of bisphosphonates for more than a decade, with numerous attempts of different treatments and even the presentation protocols by surgeons associations. We aim to present a series of clinical cases with various complexities, presenting forms of treatment adopted by our service. We collected clinical data from 120 patients, considering the type of bisphosphonate treatment, time of use, location and extent of osteonecrosis and the treatment performed in our hospital. We have adopted the protocol to perform surgical removal of necrosis, associated with pentoxifylline and tocopherol, and hyperbaric chamber therapy for indicated cases. We resumed the treatment of overall shape necrosis in 90% of cases, and significant improvement of signs and symptoms in 10%. We conclude that the combined use of surgery to other therapies may be indicated

in all cases of osteonecrosis of the jaw, provided that the systemic condition of the patient permits the surgical approach.

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Palatal hyperpigmentation associated with imatinib mesylate therapy: a report of 2 rare cases

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Background: Imatinib mesylate (Glivec®, Gleevec®, STI-571) is a tyrosine kinase inhibitor currently used as the first-line medication for a number of malignant and haematological conditions. One major indication of its use is for chronic myeloid leukaemia to increase survival rates of these patients.[1] A number of minor side effects are commonly reported including dermatological hypopigmentation. Comparatively, reports of mucosal hyperpigmentation are rare.[2]
Case report: We report two rare cases of hyperpigmentation of the palatal mucosa associated with imatinib mesylate therapy to treat chronic myeloid leukaemia. A diffuse, bluish-grey lesion located at the hard palate was observed in both patients. Incisional biopsies were performed and histological features of benign hyperpigmentation were described.
Discussion: c-Kit signalling may have a role to play in hyperpigmentation of the oral mucosa. It is important for clinicians to recognise hyperpigmentation of the palatal mucosa associated with imatinib mesylate therapy and distinct them from melanoma. They need to consider it in their differential diagnoses of oral melanosis.
Conclusion: Clinicians should be cognisant that hyperpigmentation of the palatal mucosa is a rare side effect of imatinib mesylate therapy.

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Adolescence noma with facial defect and trismus (case report)

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Noma is described as gangrenous infection of the oral and maxillofacial region. Patients with noma are mostly children with malnutrition and immunocompromised. Since the development on health care in Indonesia and the availability of antibiotics, noma cases become very rare.

This paper report 2 cases of adolescence noma with orofacial defect and trismus.

Case 1: A 30-year-old male was referred to the oral and maxillofacial surgery clinic at Dr. Hasan Sadikin Hospital from ETT Department. The chief complaint was large defect of right lip with restricted mouth opening. The examination revealed tuberculosis (TB) infection with pseudomembrane at larynx. A further check on human immunodeficiency virus (HIV) infection correlated with clinical symptoms.

Case 2: A 38-year-old female presented to the oncology department with orofacial defect and trismus. Patient showed features of malnutrition. The oncology department has had the diagnosis of inflammatory pseudotumour upon the biopsy. Dental examination showed the impacted teeth of 38 and massive periodontal infection from 33 to 38.

Treatment to both cases proceeded with regional flap for defect closure, muscular release for contracture area. The surgical treatment followed with nutritional care and physiotherapy. The patient with TB and suspected HIV, was referred to the internal medicine department.

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Aetiology of oral health problems in Crohn's disease

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Background: Inflammatory bowel disease (IBD) not only affects the intestinal tract but may also have oral manifestations. The aetiology of these oral manifestations is not exactly known.
Objectives: To investigate whether inflammation of the intestine is an aetiological factor of the oral manifestations or that there is another aetiological factor that causes both the intestinal and oral manifestations.
Methods: To exclude the inflamed intestine as an aetiological factor, this study was conducted in association with the Stoma Association Netherlands. A validated oral health questionnaire was distributed by email to the members of this association. The self-reported oral health from patients with a stoma due to IBD was compared with age-and gender-matched patients with a stoma due to colon cancer.
Findings: The questionnaire was completed by 773 patients. 12% had a stoma as a result of Crohn's disease, 18% due to ulcerative colitis and 43% due to colon cancer. Patients with Crohn's disease reported significantly more oral health problems than patients with a stoma due to colon cancer or ulcerative colitis. Crohn patients with a stoma especially suffered more frequently from aphthae and discolorations of the oral mucosa. The increased incidence of oral problems in Crohn's patients was not related to differences in tooth brushing frequency or interdental space cleaning.
Conclusion: Patients with Crohn's disease have an increased risk for oral health problems, which remains after removal of the affected part of the intestine, suggesting a general increased susceptibility of Crohn's disease patients for oral health problems.

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Distraction osteogenesis for the correction of severe mandibular deficiency

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Background: Distraction osteogenesis (DO) is a biologic process of new bone formation between the surfaces of bone segments that are gradually separated by incremental traction. In this research, we intended to present the treatment of patients who have severe mandibular deficiency. An intraoral monoplanar distractor was used to achieve independent horizontal distraction of the body of mandible. Amount of lengthening was determined with cephalograms and clinical observation. Moreover, alterations at the posterior airway space due to elongation of mandible was also researched. As lots of patients in Pakistan get reported for mandibular hypoplasia due to both congenital reasons and temporomandibular joint (TMJ) ankylosis, patients with such problems were included.
Objective: To assess the effectiveness of monoplanar mandibular distractor by evaluating the treatment effect and one-year stability, measuring changes on the affected and non-affected sides, and evaluating correction of the occlusal plane and oral commissural cant.
Methods: Study design — longitudinal interventional study. Setting — Oral and Maxillofacial Surgery Department, King Edward Medical University/Mayo Hospital Lahore. Sample size – was 15 patients meeting the inclusion criteria. Sampling technique — non-probability purposive sampling.
Results: The patient's mandible was elongated successfully. Cephalometric analysis revealed that ANB angle decreased from 13–6°, overjet of 15 mm decreased to 4 mm, corpus length increased from 49–67 mm. Posterior airway space also increased due to advancement of the mandible.
Conclusion: Satisfactory results from both aesthetic and functional standpoints were obtained by distraction osteogenesis of the body of mandible.

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A clinicopathological study on keratocystic odontogenic tumours related to Gorlin-Goltz syndrome

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Background and Objectives: To assess clinicopathological features and recurrence rate after treatment of keratocystic odontogenic tumour (KCOT) related to Gorlin-Goltz syndrome in our institution from 2004 to 2014.
Methods: The 17 KCOTs related to Gorlin-Goltz syndrome in 7 patients were assessed for age, gender, number of KCOT, location, size, signs, symptoms, radiographic features, treatment and recurrence rate.
Findings: All patients presented multiple KCOT, 13 (77%) lesions were located in mandible and 4 (23%) in maxilla — so most involving mandible. Most of the tumours presented a unilocular pattern (71%) and had tooth association (88%). Four patients (57%) were in age group of 10–19 years and three patients (43%) were in age group of 20–29 years. The peak prevalence was in second and third decades of life. The four patients had two lesions (57%) and there were three lesions in three patients (43%). There were four male and three female patients thus a slight male predilection. Recurrence was observed in two KCOTs which corresponded to 12%. KCOT does appear to respond successfully to marsupialisation and can resolve totally following marsupialisation often to a period of 6–12 months.
Conclusion: Recurrences usually manifest within the first 5–7 years, but in our present study it was after 10 years. Persistence and recurrences occur possibly from daughter cysts around the lining. So long follow-up periods are important.

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The role of microorganisms in medication-related osteonecrosis of the jaw, using methods to identify relevant microorganisms and treatment — a systematic literature review

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Medication-related osteonecrosis of the jaw (MRONJ) is a serious oral complication associated with antiresorptive and antiangiogenic therapies; it results in progressive bone and soft tissue destruction in the maxillofacial region.

MRONJ etiopathogenesis has not been completely understood, although there are many theories trying to clarify it. Theories pointing to bone turnover and angiogenesis inhibition, and the role of microorganisms have been reported. According to previous studies *Actinomyces* species is the most frequent microorganism found in MRONJ lesions. There are many other bacterial and fungal species that are also found in the affected bone and can cause bone destruction through various direct and indirect mechanisms.

These conditionally pathogenic oral microorganisms were identified in these patients using real-time polymerase chain reaction in saliva, wound and bone samples, direct visualisation methods with advanced microscopy or DNA- and RNA-based techniques and traditional culturing and antibiotic sensitivity testing studies.

The objective of the study is to present a literature review focusing on the role of microorganisms in MRONJ developments, methods to identify relevant microorganisms and the treatment of the infections that are caused by these microorganisms.

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Mandibular osteomyelitis in SAPHO syndrome, is surgery necessary? A four cases report and literature review

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Background: The treatment of mandible lesions in synovitis, acne, pustulosis, hyperostosis, osteitis (SAPHO) has not been concluded, and surgical interventions like partial or radical dissection are controversial.
Objectives: To find clinical features and surgical prognosis of mandibular osteomyelitis in SAPHO syndrome, and introduce a combination therapy regimen of corticosteroids, Tripterygium wilfordii Hook F (TwHF) and minocycline for SAPHO treatment.

Methods: Four SAPHO patients who had mandibular non-suppurative osteomyelitis with skin and osteoarticular lesions were included in the study. Medical history, surgical treatment, laboratory tests and imaging data were collected. Treatments and the effects were also recorded.
Findings: All patients had teeth extraction history, then they had surgical interventions and repeated recurrence of mandibular symptoms postoperation. Computed tomography scan showed solid-type periosteal reaction, external bone resorption and bone enlargement. Scintigraphy showed increased uptake in mandible and sternoclavicular joint. After corticosteroids, TwHF and minocycline were applied, erythrocyte sedimentation rate, C-reactive protein and visual analogue scale score decreased significantly. Remission of mandibular and skin symptoms was achieved and the disease was long-term controlled in our follow-up.
Conclusions: Mandibular osteomyelitis of SAPHO syndrome may be induced by dental extraction and root canal therapy. Surgical treatment for mandibular lesion is not recommended. Combination therapy regimen of corticosteroid, TwHF and minocycline is effective.

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Evaluation of minor salivary gland biopsy in the diagnosis of Sjögren's syndrome

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Background: Sjögren's syndrome (SS) is one of the most common autoimmune diseases. In addition to xerostomia and xeropthalmia, patients often present with extraglandular manifestations making diagnosis difficult. The two leading diagnostic classification systems both include positive minor salivary gland biopsy (MSGB) as a major inclusion criteria.[1] However, diagnosis can be made without histopathology if other criteria are met.
Objective: To evaluate the role of the MSGB in establishing a firm diagnosis of SS in a cohort of referred patients.
Methods: This is a retrospective review of patients referred to the MGH Department of Oral and Maxillofacial Surgery to rule in/out SS over five years. Inclusion criteria were: complete information regarding presenting symptoms, reason for referral and findings on MSGB. Incomplete records and referral for reasons other than presumptive SS resulted in exclusion. A total of 87 patients were identified. Both diagnostic systems were evaluated to determine the role of MSGB in diagnosis.
Findings: Of 87 MSGB performed, 17 (19.5%) were positive based on the histologic criteria of Chisholm and Mason.[2] In 14 cases, it was the positive MSGB that allowed for the definitive diagnosis (82.3%). In three cases, other criteria allowed diagnosis without the contribution of the MSGB (sensitivity of MSGB = 82.3%; specificity = 90.0%; positive predictive value = 66.6%; negative predictive value = 95.4%)
Conclusion: The MSGB is an important contributor to a diagnosis of SS. When serology was negative (anti-SSA/Ro and anti-SSB/La), the MSGB was often the criteria that allowed the diagnosis to be established.

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The role of pentoxifylline on the medication-related osteonecrosis of the jaw via expression of vascular endothelial growth factor in a rat model

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Objectives: Bisphosphonates (BPs) cause alterations in angiogenesis and neovascularisation on bone and it might be one of the factors causing medication-related osteonecrosis of the jaw (MRONJ). It is presented that pamidronate and zoledronic acid (ZA) therapy reduces vascular endothelial growth factor (VEGF) levels in serum. The aim of this experimental study is to investigate VEGF expression in the BP- and pentoxifylline (PTX)-affected jaw bone.
Methods: Female Sprague-Dawley rats ($n = 33$) received ZA for 8 weeks to create osteonecrosis model. The left mandibular second molar teeth were extracted and the recovery period lasted 8 weeks before sacrifice. PTX was intraperitoneally administered to prevent MRONJ. Tissue samples were fixed in 10% neutral formaldehyde. Samples were decalcified in the Morse's solution for 4–5 weeks, dehydrated in alcohol series and embedded in paraffin. VEGF immunoreactivities incorporated both intensity and distribution of staining (H Score).
Results: The VEGF expression was significantly higher in the bone of ZA group compared to control (26 ± 5.65 versus 3.40 ± 1.51, respectively; $P < 0.001$). PTX treatment significantly decreased the VEGF expression in ZA/PTX/PTX group as compared to ZA/PTX (respectively 11.20 ± 4.03 versus 18.60 ± 2.88; $P < 0.05$). This is the first experimental study showing VEGF levels in the BP-affected jaw. The results showed ZA is increasing VEGF levels in the bone and this may have a negative effect on bone healing. PTX is a strong vasodilator and are being used for peripheral vascular diseases and microcirculatory disorders. It reduces VEGF levels in the bone and it might prevent MRONJ via optimising vascular effects of ZA.

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The role of ATF4 in M2-polarised macrophage infiltration of infantile haemangioma

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Background: Previous studies have demonstrated the effects of hypoxia in the distinctive progression of infantile haemangioma (IH), the most common benign tumour in infancy. Meanwhile, the activating transcription factor 4 (ATF4) mediated anti-stress

responses in many hypoxic situations have caught a great deal of attentions.
Objectives: To explore the role of hypoxia mediated ATF4 expression in the progression of infantile haemangioma.
Methods: The hypoxic situation in IH was determined by the immunohistochemical analysis of hypoxia-inducible factor-1alpha (HIF-1α) expression firstly. Then, the expression level of ATF4 and macrophage colony-stimulating factor (M-CSF) in different IH phases was detected by immunohistochemistry. The Spearman rank correlation test and triple-labelling immunofluorescence was applied to confirm the correlation. Further, the effect of this presumptive signalling pathway was explored by studying the correlation between them and M2-polarised macrophage infiltration in IH which was determined by the double-labelling immunohistochemistry.
Findings: HIF-1α was significantly upregulated in proliferating IH, and accompanied by synchronously increased expression of ATF4 and M-CSF when compared with the involuting phase. Correlation analyses showed that the expression of ATF4 was positively correlated with that of HIF-1α and M-CSF. Triple-labelling immunofluorescence also confirmed their colocalisation and expression differences in the evolution process. What's more, any one of the three factors was positively correlated with M2-polarised macrophage infiltration in IH.
Conclusion: ATF4 was significantly upregulated in proliferating IH when compared with the involuting phase, and this hypoxia-mediated regulation contributes to the progression of IH through the modulation of M2-polarised macrophage infiltration which was induced by the M-CSF secretion.

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Prevention of jaw osteonecrosis after teeth extractions in patients with malignant tumours of various localisation

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Background: Osteonecrosis of the jaw (ONJ) is the most common complication after teeth extraction surgery in patients with history of antiresorptive therapy (bisphosphonates, denosumab) due to the presence of bone metastases of malignant tumours.
Objectives: Development of a protocol for prevention of ONJ after teeth extraction in patients, received bisphosphonates and denosumab. Teeth extractions were performed in 50 patients with a history of antiresorptive therapy due to bone metastases of malignant tumours of different localisation (breast cancer, prostate cancer, kidney cancer, multiple myeloma). 30 patients received bisphosphonates, 20 patients received denosumab.
Methods: Teeth extractions were performed under the local anaesthesia. Postextraction socket filled with patients own plasma-enriched with growth factors obtained by centrifuging the patient's blood (technology BTI). A course of antibiotic therapy was prescribed for a total duration of seven days. From the first day after the surgery was performed the rate of local ozone therapy consisting of 10 daily sessions, lasting 2 min. Visual inspection was performed on days 3, 5, 7, 10 and 14. Control radiological examinations were performed six months, one and 3 years after surgery.
Findings: There was no evidence of ONJ in any of the cases during three years of follow-up.
Conclusion: This study demonstrated the efficacy of the proposed protocol of ONJ prevention as complication after oral surgical procedures in patients receiving antiresorptive therapy.

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Orthognathic and Aesthetic Surgery

Skeletal and airway stability after mandibular setback in patients with mandibular prognathism: a systematic review

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Background: The effect of the longitudinal skeletal and the airway change/relapse after mandibular setback procedures are unclear.
Objective: To perform systematic review to answering clinical question "What are the longitudinal skeletal relapse and airway changes after mandibular setback orthognathic procedures".
Methods: A systematic search including computer search of different databases with specific keywords, manual search through three international journals and reference list search was performed. Articles that were reporting the skeletal and airway changes after mandibular setback orthognathic procedures were evaluated with five predetermined criteria. Eligible articles included in the final review were rated for the risk of bias level.
Findings: Six articles (four retrospective studies and two prospective studies) reported either two-dimensional (2D) or three-dimensional (3D) imaging with a total of 217 patients entered the final review after three rounds of searches and evaluation. All were rated to be of moderate bias risk. The skeletal relapse of T1 (postoperative 1–6 months)-T0 (immediate postoperative) and T2 (postoperative 1 year)-T1 were −2.14 to 0.3 mm and −0.9 to 1.23 mm, respectively. There was no significant skeletal relapse. The airway changes at T1-T0 and T2-T1 were −0.7 to −1.63 mm and 0.11–0.6 mm, respectively. There were contradicting airway changes between the two 3D studies in T2-T1.
Conclusion: There was insignificant skeletal relapse after mandibular setback orthognathic procedures. There was significant airway reduction in the early postoperative period. A small increase of the airway over the first postoperative year was noted in 2D imaging but volumetric change was inconsistent in 3D studies.

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Mandibular orthognathic surgery neurosensory recovery: a longitudinal study

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Objectives: To study the neurosensory recovery and to investigate the possible risk factors that might contribute to neurosensory disturbance following mandibular orthognathic surgeries.[1,2]
Methods: A prospective longitudinal observational study was conducted on patients planned for orthognathic surgery. Standardised subjective and objective neurosensory tests were performed before the procedures as baseline, and at different postoperative

visits. Risk factors including patients' age, gender, surgeon's experience and specific mandibular procedures were analysed.
Findings: 66 patients recruited in this study. Incidences of neurosensory disturbance at postoperative two weeks, six weeks, three months, six months, one year and two years were 78.8%, 64.4%, 55.3%, 34.8%, 19.7% and 9.8%, respectively. Combinations of ramus surgery and anterior mandibular surgery increased the risk of neurosensory disturbance at the first three postoperative months ($P < 0.05$). Patients' age, gender, and surgeons' experience were not found to be risk factors of neurosensory disturbance after mandibular orthognathic surgery.
Conclusion: The incidence of neurosensory disturbance after mandibular orthognathic procedures recovered from 78.8% to 9.8% over two years postoperatively. An increased risk of neurosensory disturbance is associated with the combination of mandibular ramus surgery and anterior mandibular surgery in the early postoperative period.

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Condylar bone remodelling in orthognathic surgery: proposed risk rating

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Objectives: To analyse the possible variations of the condylar anato-morphology after orthognathic surgery and, accordingly, establish a predictive pattern of morphological changes, with the aim of proposing a risk classification of condylar resorption in orthognathic surgery.
Methods: Using a prospective study, an evaluation was made of cone-beam computed tomography in subjects who underwent orthodontic-surgical treatment in Santiago de Chile. The predictor variable was the time, grouped in presurgical (T0) and mediate postsurgical stages (T1). The dependent variables were radiographic signs of the joint's anato-morphology, recorded in an ad hoc assessment. For statistical analysis, we used Chi squared test.
Findings: The sample composed of 20 patients, corresponding to 40 condyles. The condyle tends to move to posterior-concentric positions in T1 ($P < 0.05$). A trend toward increased condylar cortical occurs after orthognathic surgery ($P < 0.05$). A positive correlation in the presence of cysts and osteophytes between T0 and T1 ($P < 0.05$) is observed.
Conclusion: Compared to T0, there was an alteration of the normal condylar anato-morphology in T1. There were quantitative and qualitative changes in the immediate postoperative assessment that projected an associated risk for the temporomandibular joint. Accordingly, a risk classification of condylar resorption in orthognathic surgery is proposed.

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Effects of surgical correction of class III malocclusion on the pharyngeal airway and its influence on sleep apnoea

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Objectives: The objective of this study was to evaluate, through cone-beam computed tomography the immediate changes in pharyngeal airway space (PAS) after orthognathic surgery in class III patients, and to determine the influence of surgery on the development of obstructive sleep apnoea hypopnoea syndrome (OSAHS).
Methods: A prospective study was conducted; 33 patients were divided into three groups: mandibular setback surgery (nine patients), bimaxillary surgery (18 patients), and maxillary advancement surgery (six patients). PAS measurements obtained pre- and postoperatively were compared using the *t* test. All patients were assessed clinically for OSAHS before surgery and at 6 months postoperative using the Berlin questionnaire and a combined clinical assessment, which included the assessment of OSAHS symptoms, Epworth Sleepiness Scale score, and body mass index.
Findings and Conclusion: Patients undergoing isolated mandibular setback surgery demonstrated a decrease in total PAS volume, in hypopharynx volume, and in minimum cross-sectional area of the pharynx immediately after surgery ($P < 0.05$). The clinical analysis did not reveal signs or symptoms of OSAHS in any of the 33 patients. Although patients who underwent mandibular setback surgery alone demonstrated a volume reduction in the PAS and a decrease in minimum cross-sectional area, these reductions were not accompanied by signs or symptoms of OSAHS.

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Study of stability of soft-tissue profile following mandibular setback using bilateral sagittal split osteotomy

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Background: Prediction of patients profile following orthognathic surgery is a matter of ambiguity. Since the relative movements of hard and soft tissues are different.
Objectives: Aim of the study was to examine the stability of soft-tissue profile changes as compared to hard-tissue profile changes following mandibular setback using bilateral sagittal split osteotomy by cephalometric tracings.
Methods: This study was based on 10 Class III patients who were treated by bilateral mandibular sagittal split osteotomy and mandibular retropositioning. Preoperatively as well as one-year postoperatively, a standardised lateral skull radiograph was used. The sagittal and vertical translations in the region of hard tissues such as pogonion and menton were recorded. Changes in soft-tissue stability references were compared to two hard-tissue references such as oss. Po and oss. men. In sagittal and vertical plane.

Conclusion: There was stability of soft-tissue profile of patients even after one year who were treated by bilateral sagittal split osteotomy with mandibular set back.

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Posttraumatic closed rhinoplasty in North African patients

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Background: The application of rhinoplasty in the treatment of traumatic nasal deformity remains one of the most challenging problems in plastic surgery.
Objectives: This study presents our experiences in the reconstruction of traumatic nasal deformities using the internal rhinoplasty approach.
Methods: We conducted a retrospective study from January 2001 to December 2013. We included in this study all patients operated for nasal posttraumatic deformity using closed approach. Each patient chart was reviewed with regard to: age and gender, circumstances and date of nasal trauma, timing of the rhinoplasty as well as for the functional and aesthetic outcomes.
Findings: 172 of these patients (115 males and 57 females) underwent the internal approach. The patients were on average 26 years old at the time of reconstruction and were followed up for an average period of 16 months. The interval from injury to the rhinoplasty procedure was 4.5 years, on average. The outcome was assessed by (an independent investigator and the patients themselves). The overall aesthetic-improvement rate was 88%, and the patient-satisfaction rate was 95%. There was no complication.
Conclusions: Not only is the skeletal structure severely deformed, but the soft tissue may also be disfigured by a previous injury. The closed rhinoplasty technique provides great predictability and minimal postoperative discomfort, with no aesthetic damage.

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Piezosurgery versus saw for sagittal split osteotomy: a prospective split-mouth randomised, controlled clinical study

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Background: The use of piezosurgery reduces injuries to the inferior alveolar nerve, visual analogue scale (VAS) and swelling compared with conventional saw technique.
Objectives: The aim of this paper is to compare the use of Piezosurgery and traditional saw in the mandibular sagittal split osteotomy.
Methods: This prospective split-mouth clinical study was initiated in January 2015 and included a total of 15 patients with skeletal facial dysmorphia who subsequently underwent to orthognathic surgery. We performed the osteotomy of mandibular on one side with piezosurgery and with conventional saw on the other side; sides were randomly decided. The following parameters were recorded for both sides: VAS, pharmacological therapy, facial swelling, time, postoperative infection and wound dehiscence, postoperative neurosensory deficit. Patients were evaluated from every day during hospitalisation to six months after surgery.
Findings and Conclusion: VAS difference between two sides operated with lower values for the side operated with Piezosurgery appeared during hospitalisation ($P < 0.0001$) and at one week after surgery (T1, $P = 0.0001$). With regards to facial swelling measured on both sides, we recorded a significant difference with lower values for the side operated with piezosurgery. Unfortunately time needed for sagittal split osteotomy with piezosurgery was significantly higher. Neurosensory deficits appeared more frequently on the sides operated with saw. On the basis of our results, the use of piezosurgery allows the surgeon to perform mandibular osteotomy with minor injury to the inferior alveolar nerve; lesser VAS and swelling values were present on sides operated with piezosurgery.

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Relationship between the quantity of nerve exposure during bilateral sagittal split osteotomy surgery and sensitive recovery: our experience on 127 patients

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Background: The incidence of neurosensory disturbance of V3 nerve is related to intraoperative quantity of nerve exposure.
Objectives: The purpose of this study was to evaluate the correlation between differences V3 nerve's exposure during orthognathic surgery and the neurosensory disturbance.
Methods: The study included 127 patients who have undergone orthognathic surgery with sagittal split osteotomy. They were divided into six groups identified by the quantity of exposure. All patients were examined in a preoperative time and postsurgery after 1, 3, 6 months according to standardised test to clarify the objective and subjective neurosensory status of the exposed nerve. Neurosensory evaluation, pin prick test, the two points discriminator, light touch, warm and cold test, and blunt discrimination were used bilaterally to the lower lip area.
Findings and Conclusion: In 10.2% of patients the nerve was not visible, in 25.2% of patients' nerve was seen in lower-vestibular segment, in 22.8% of patients lower and upper vestibular segment was exposed, in 20.5% of patients' nerve was seen in lower-lingual and vestibular part, in 14.2% of patients it was seen in total segments, and in 7.1% of patients the nerve had a total exposure. In the estimated time there was 100% recovery in those patients whose nerve was not exposed. Considering the other cases, we had a variable number of patients who had not a completely recover. We estimated a correlation between the time of recovery and the quantity of nerve's exposure.

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Retrospective comparison study between SPECT bone scintigraphy and serial radiograph tracing for assessment of growth in patients with condylar hyperplasia

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Background: Condylar hyperplasia is a pathological condition that is often treated with orthognathic surgery. Surgery should only be done after cessation of growth, so as to avoid relapse. The com-

parison of serial radiographs for growth is the gold standard, but is time consuming. Recently, single-photon emission computed tomography (SPECT) has been touted as the alternative method.[1]
Objectives: The objective of this first-of-its-kind study is to evaluate the sensitivity and specificity of SPECT scans as compared to the gold standard.
Methods: SPECT values of condylar uptakes against the clivus bone as a reference were evaluated and growth statuses calculated using three reported methods: absolute difference, uptake ratio, and condylar activity percentage. Serial tracings were done for radiographs taken at time of SPECT and a year later, and compared using stable reference points like the base of skull and orbital rims to determine if growth has occurred. Any growth detected was measured in the horizontal and vertical directions from the pogonion (most anterior point) and the menton (most inferior point) of the chin respectively.
Findings: Based on preliminary data of 61 scans, the sensitivity and specificity was between 50–80% and 41.1–76.5%, respectively. The most sensitive is the uptake ratio, while the most specific is the absolute difference in uptake. The average growth was 1.2 mm and 0.45 mm in horizontal and vertical directions, respectively.

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Two-dimensional and three-dimensional postsurgical temporomandibular joint condylar remodelling following vertical subsigmoid osteotomy setback surgery

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Background: Vertical subsigmoid osteotomy (VSSO) for ramus setback has been suggested to exert less stress onto the condylar head causing more positive bone remodelling changes in the postoperative phase. However, it is unclear if the setback amount has any effect on the remodelling pattern.
Objectives: This study aims to compare the postsurgical quantitative and qualitative condylar remodelling changes in various setback magnitudes using two-dimensional (2D) and three-dimensional (3D) radiography.
Methods: Retrospective pre- and postoperative radiographic data of patients with mandibular prognathism that had undergone VSSO from 2007 to 2012 at the Prince Philip Dental Hospital were traced. 130 postero-anterior and lateral cephalographs, along with 174 cone-beam computed tomography (CBCT) scans were retrieved. 2D and 3D radiographic tracing were performed to measure the condyle-ramal morphometric values. Pre- and postoperative CBCT rendered condyle ramus segments were superimposed based on stable growth registration points to observe zonal and topographic changes.
Findings and Conclusion: 2D radiographic tracing did not show significant condyle-ramal changes in different setback magnitudes. 3D radiographic tracing showed significant changes in axial condylar depth with more setback. Topography analysis also showed that in the postero-superior condylar surface, more bone deposition was found in larger setback. In the axial plane, the bone formation proportion at the condylar head was significantly increased in mid-anterior and posteromedial zones with larger setback except in the group with setback between 4.1–6 mm. In general the condylar remodelling pattern after VSSO for mandibular setback was considered to be stable despite various setback magnitudes.

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Condylar bone remodelling in orthognathic surgery: descriptive analysis of the pre- and postsurgical stages

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Objectives: To determine changes in condylar remodelling or resorption, position and joint space between the preoperative and the immediate postoperative stage of orthognathic surgery.
Methods: Through a prospective study, cone-beam computed tomography was used to evaluate subjects who underwent orthodontic-surgical treatment in Santiago de Chile. The predictor variable was time, grouped in presurgical (T0) and mediate postsurgical stages (T1). The dependent variables were remodelling linear measurements of the mandibular condyles and its relationship to the glenoid fossa. For statistical analysis was used paired *t* test and Wilcoxon test, were used which were made from results obtained of the metric analysis of the condyle anato-morphology's two-dimensional changes and its distribution. $P < 0.05$ was considered significant.
Findings: The sample composed of 20 patients, corresponding to 40 condyles. It was categorised in: Group 1, class II skeletal; Group 2, class III skeletal. Condylar height in the sagittal plane decreased after surgery. The condyle tends to move postero-inferiorly to concentric and posterior positions in T1.
Conclusions: Compared to T0, in the T1 stage occurs alteration of the normal condylar anato-morphology. The condyle tends to move at concentric and posterior positions in T1. In T1 exists a tendency to reduce height condyle in the sagittal plane.

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Soft and hard tissue changes after bimaxillary surgery in class III patient

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Background: In the modern society, most people are concerned about beauty and more especially with the face if the patient has malformation of jaws. One of the most serious malformations of jaws is the class III. The process of treating this malformation is relative to bone and hard tissue. However, after surgery, the patient is not interested in hard tissue which change or not, they are only concerned about the changing of soft tissue. We do this study to estimate the changing of hard tissue and soft tissue, as well as correlations of hard tissue to soft tissue after orthognathic surgery in Vietnamese community.
Objectives: Assess the results of bimaxillary surgery on the class III patients and to evaluate the correlation between soft and hard tissue change.

Methods: Soft and hard tissue changes were recorded by measurements of presurgical and postsurgical lateral cephalograms. 30 lateral cephalograms (15 patients) were selected, which satisfied the sample selection. Pearson correlation coefficient was used to assess the degree of correlation in terms of soft to hard tissue changes.
Results: Maxillary hard and soft tissue move forward. Otherwise, mandibular soft and hard tissue moves backward. The changing of position showed a moderate correlation at two positions Sn, A and Si, B in the horizontal direction.
Conclusions: The hard tissue was changed from class III to class I after surgery. The movement of soft tissue follows the changing position of hard tissue but this movement cannot be predicted.

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Comparison of symmetry of rapid maxillary expansion using a tooth-borne or a bone-borne distractor

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Background: There are differences in the distraction pattern of tooth-borne versus bone-borne rapid maxillary expansion. However, patients suffer especially from visible asymmetric distraction of the two maxillary segments. These have not yet been described.
Objectives: We investigate the asymmetry in distraction of the two maxillary segments before and after expansion.
Methods: We measured dental landmarks on 21 study casts preoperatively and directly after expansion with tooth-borne or bone-borne rapid maxillary distraction. The three-dimensional differences in distraction between the two maxillary segments were calculated.
Findings: In this study group, there was no significant difference in the symmetry/asymmetry of rapid maxillary expansion using a tooth-borne the two maxillary segments seem to have another cause i.e. the operation technique than the device used for distraction. The study group is continuously increased to gain further results.

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Expectations and experiences of patients undergoing orthognathic surgery — a retrospective survey of 115 patients

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Background: Orthognathic surgery is performed to correct dentofacial improve facial aesthetics, occlusal relations, and functionality of the stomagnathic apparatus.
Objectives: The study was to evaluate the number of patients undergoing orthognathic surgery in last five years (between 2009 and 2014) and to determine patients' motivations for undergoing orthognathic surgery as well as their experiences before and after surgery.
Methods: 115 patients who underwent orthognathic surgery during the period 1 January 2009 to 30 July 2014 were included. The study excluded patients with cleft lip and palate, reconstructive Le Fort with bone graft and syndromic deformity. A telephonic assessment was done based on a questionnaire which included domains like presurgical reasons and expectations, pain, swelling, temporomandibular joint symptoms in the recovery period, and aesthetic and functional changes as a final result. The data was collected and tabulated.
Results: The study showed that the most common reason to undergo orthognathic surgery was facial aesthetics. Parasthesia of the lower lip was the commonest complication with patients undergoing sagittal split osteotomy. Average score of six was rated on visual analogue scale for pain by patients in immediate postoperative period of surgery. Swelling resolved completely over a period of one to two months. Aesthetic and functional changes were satisfactory.
Conclusion: There has been significant rise in patients undergoing orthognathic surgery. Most of the patients were satisfied with the facial and functional changes post surgery. However, presurgical planning of the case is essential for good postoperative results.

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Effectiveness of the one-stage orthognathic surgery and rhinoplasty

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Background: To improve the aesthetic outcome of surgical treatment of patients with malocclusion, along with orthognathic surgery, we use whole range of additional surgical procedures, such as osteotomy of the zygomatic bone and chin department, liposuction or lipofilling. But particular interest is the possibility to perform the one-stage orthognathic surgery and rhinoplasty.
Objectives: To evaluate the effectiveness of one-stage orthognathic surgery and rhinoplasty in patients with malocclusion.
Methods: The study involved 54 patients with different types of malocclusion. 28 patients were treated within one-stage orthognathic surgery and rhinoplasty (25 patients rhinoplasty is performed simultaneously with orthognathic surgery, three patients rhinoplasty was performed delayed). The remaining 26 patients rhinoplasty was not carried out for various reasons. In the case of rhinoplasty, after the orthognathic surgery it was reintubation with subsequent rhinoplasty. Only closed rhinoplasty was performed. In order to evaluate the effectiveness of the treatment all patients underwent photo registration in the stages before and after surgical treatment.
Results: All patient's noses were changed after orthognathic surgery (intraoperative). Seven patients have improving of the nose shape and was performed minor correction. Thirteen patients have slight change in nose shape. Five patients have significant change of the nose shape, which required a change the surgical protocol for further rhinoplasty.
Conclusions: One stage orthognathic surgery and rhinoplasty is an effective method for the full rehabilitation of patients with malocclusion.

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Can overall facial attractiveness be estimated by the aesthetic score of its single components? A retrospective data analysis

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Background: Photographic documentation is an important tool for the assessment of baseline facial aesthetics and monitoring treatment results in orthognathic patients.
Objectives: The aim of this study was to quantify the influence of the aesthetics of single components of the face on overall facial attractiveness.
Methods: Four independent raters (two female, two male) evaluated the pre- and postoperative frontal and lateral facial photographs of 213 patients who had undergone orthognathic surgery at the Department of Cranio-, Maxillofacial and Oral Surgery, Vienna General Hospital between 2007 and 2015. The raters used a 7-point Likert scale (1 = lowest score, 7 = highest score) to assess the aesthetics of each patient's nose, lips/mouth, eyes, skin, hair as well as the slenderness of the face and the overall facial attractiveness.
Findings: 23,856 ratings were recorded. The mean aesthetic score for the nose was 4 ± 1 (95% CI, 1.2–6.2), the lips/mouth 3.9 ± 1 (95% CI, 1.5–6.5), the eyes 4.2 ± 0.9 (95% CI, 1.5–6.5), the skin 4.6 ± 1.2 (95% CI, 1–7), the hair 3.8 ± 1 (95% CI, 1–6.8), the slenderness of the face 4.2 ± 1.1 (95% CI, 1.2–6.5) and for overall attractiveness 3.6 ± 1.1 (95% CI, 1–6.2). It was possible to estimate overall attractiveness by combining the aesthetic scores of the single components with a coefficient of determination (R^2) of 0.72.
Conclusion: The findings of this study emphasise the influence of the single components on overall facial attractiveness.

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Sagittal and vertical bone remodelling after functional genioplasty: tridimensional retrospective study about 36 cases

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Background: Decrease of clinical results after functional genioplasty is frequently associated with bone remodelling of the mandibular symphysis. Its assessment is inaccurate on conventional cephalograms. This study aimed to assess the postoperative bone remodelling on genioplasties through a three-dimensional (3D) analysis using cone-beam computed tomography.
Methods: This retrospective study included 36 patients who received a functional genioplasty. They were divided in two groups depending on either an early or late postoperative follow-up. Differences between sliding genioplasties and jumping genioplasties were targeted. Sagittal and vertical variations at pogonion and menton points were collected through a 3D analysis model.
Results: Bone resorption was statistically significant, and positively correlated with the amount of advancement ($P < 0.05$). It was found to be equivalent between sliding and jumping genioplasties. (21.4% versus 24.4% at pogonion in the late postoperative follow-up, $P = 0.47$). Resorption was still occurring between early and late postoperative times (14.9% versus 27.3% at pogonion, 18.5% versus 29.6% at menton, $P = 0.031$). A significant correlation between the amount of height reduction and anterior vertical excess relapse was observed. The anterior vertical excess relapse was statistically higher for jumping genioplasties (47% versus 24.3%, $P = 0.02$).
Discussion: This study allowed an accurate assessment of sagittal and vertical bone remodelling along with the factors involved. The choice of surgical procedure has to account for the degree of sagittal or vertical corrections along with the relapse of different the techniques. A minimal of one year of radiographic and clinical follow-up is highly recommended.

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Endoscopically assisted intraoral modified Le Fort II type midfacial advancement using piezoelectric surgery and an intraoperative red system

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Background: The Le Fort II midfacial advancement appears to be an effective surgical method for the treatment of severe midfacial-nose hypoplasia with a skeletal class III malocclusion, which is usually combined with syndromic midfacial anomalies. However, the conventional surgical method requires the coronal approach, including a coronal incision, together with other surgical approaches, such as an intraoral incision. Therefore, surgeons often hesitate to propose this type of osteotomy, even for patients who develop severe nonsyndromic midfacial-nose hypoplasia.
Objectives: This report presents a new surgical approach for performing a safe Le Fort II osteotomy for nasomaxillary, midfacial corrective advancement via a solely intraoral approach.
Methods: Surgery was performed with endoscopically assisted piezoelectric surgery. The osteotomised nasomaxillary Le Fort II segment was successfully protracted without aggressive down-fracture procedures with the sole intraoperative use of a rigid external distraction (RED) system, followed by internal rigid fixation, and the subsequent removal of the RED system. Seven patients (average age, 19.9 years) were included in this study.
Findings: The degrees of midfacial advancement at the base of nasal bone (the top edge of the modified Le Fort II segment) that was osteotomised and at maxillary point A was 8.3 mm (range, 5.8–10.5 mm) and 8.5 mm (range, 5.9–9.8 mm), respectively.
Conclusion: This new method less invasively facilitates safe, secure, and ideal nasomaxillary midfacial protraction to yield a satisfactory resultant facial profile and favourable occlusion in patients with severe midfacial-nose hypoplasia and skeletal class III malocclusions.

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Variation of plate fixation for mandibular advancement with intraoral vertical ramus osteotomy using endoscopically-assisted intraoral rigid or semi-rigid internal fixation: postoperative condylar seating control for mandibular advancement

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Background: We have recently controlled intraoperative condylar seating, with adjustable holes such plates as a sliding plate or MOJ plate. However, even when using such plates, postoperative passive condylar seating cannot be done.
Objectives: The purpose of the present study was to evaluate the safety and efficacy associated with mandibular advancement by intraoral vertical ramus osteotomy (IVRO) with endoscopically-assisted intraoral rigid or semi-rigid internal fixation.
Methods: The study sample included all patients who had undergone a mandibular advancement by IVRO procedure with endoscopically-assisted intraoral plate fixation from September 2008 to May 2012. A mandibular advancement by IVRO with endoscopically assisted intraoral rigid or semi-rigid internal fixation was used for mandibular advancement. The patients were analysed prospectively, with more than two years of follow-up, and were evaluated in terms of functional results, postoperative complications, and skeletal stability.
Findings: A total of 14 patients (bilateral, seven patients with class II; unilateral, seven patients with asymmetry) were included in the present study. The average degree of mandibular advancement was 5.5 ± 1.9 mm (range, 3–9 mm). Both the occlusal relationship and facial appearance in all patients were significantly improved by the surgical-orthodontic treatment, with no major harmful clinical symptoms. In addition, one-screw semi-rigid fixation could control postoperative passive condylar seating.
Conclusion: This study showed that mandibular advancement by IVRO with endoscopically assisted, intraoral semi-rigid internal fixation offers a promising treatment alternative for patients with skeletal class II malocclusion or facial asymmetry.

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The novel use of customised rapid prototyped osteotomy template in correction of severe mandibular asymmetry: a case report

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Severe mandibular asymmetry causes both functional and aesthetic disturbance in patient. Managing it can be challenging as the complexity of the bony geometry and other facial structures. Complications such as undercorrection, overcorrection and injury to the inferior dental nerve may arise as it is difficult to control the osteotomy line, shape and amount of osteotomy. Therefore, correct method should be explored to produce the same osteotomy designed cut pre- and postoperatively.

In this report, a case of severe mandibular asymmetry which was corrected by using customised rapid prototyped (RP) osteotomy template is described. The measurement of the volume, shape, osteotomy line and distance from inferior dental canal was established by using computer-aided design (3D Slicer and Autodesk Meshmixer Software) and further osteotomy cut was performed using the fabricated osteotomy template. Intraoperatively, the template was fitted well to the contour of the mandible. Postoperative cone-beam computed tomography revealed that both lower border of mandible has become symmetric and the results were comparable with preoperative planning. In addition, inferior dental nerve was preserved and good aesthetic result was achieved. This report suggested that customised RP osteotomy template could give better accuracy, efficiency and avoid complications in guiding osteotomy in mandibular asymmetry.

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Accuracy of orthognathic surgery — a retrospective service evaluation

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Background: 2700 orthognathic procedures are carried out in England per annum. The multidisciplinary nature of treatment and potential for variations in planning and surgical method means limited data exists on the accuracy of surgery. Inaccurate surgery adversely affects length of treatment, inconveniencing patients as well as detrimentally affecting service provision, finances and allocation of hospital resources. Analysis of surgical accuracy helps identify areas to address to improve outcomes.
Objectives: To assess the accuracy of orthognathic surgical process, including presurgical orthodontics, presurgical work-up, laboratory model surgery and surgery itself.
Methods: Between 1st January and 31st December 2014, 27 patients underwent maxillary osteotomies at East Kent University Hospital Foundation Trust. A retrospective service evaluation was performed using pre- and postoperative digital lateral cephalometric radiographs. These were superimposed by computer software (Opal, 2010) and a custom analysis used to identify the difference between the pre- and postoperative maxillary positions. Maxillary anterior-posterior movement, along with posterior and anterior impaction were assessed. It was not possible to measure cant or horizontal movements using this method.
Results: The mean difference between actual and planned surgical movement of the maxilla in anterior-posterior, posterior impaction and anterior impaction movements was 0.57 mm, 0.96 mm and 0.55 mm respectively. No statistical difference was demonstrated between any of the planned and actual movements ($P > 0.05$).
Conclusion: Surgical maxillary movements can on average be achieved within 1 mm of the planned movement, with anterior-posterior movement being the most accurate. This accuracy is comparable to similar studies using alternative planning and surgical techniques.

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The position of the condyles and functional results after bilateral sagittal split osteotomy

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Background: The goal of this retrospective study was to evaluate the influence of manual condylar positioning technique and bicortical fixation after bilateral sagittal split osteotomy (BSSO) on postoperative condylar position and temporomandibular joint (TMJ) function after setback and advancement of the mandible.
Methods: The condylar position and joint function of 32 patients (64 joints) who underwent BSSO (setback/advancement of the mandible) at the Department of Oral and Maxillofacial Surgery, University Hospital in Bratislava between 2010 and 2014 was analysed on computed tomography (CT) scans in three dimensions (axial, coronal, sagittal plane) preoperatively and 1 year postoperatively. Evaluation of the joint function was focused on measuring the extent of maximal range of motion, propulsion and lateropulsions and sounds presence.
Results: CT scans evaluation revealed minimal changes of condylar position in all three dimensions. There were no significant changes in TMJ function in one-year follow-up equally after setback or advancement of the mandible. Manual condylar repositioning technique and bicortical fixation using positional screws created stable occlusion results.
Conclusion: Manual condylar positioning after bilateral sagittal split osteotomy and bicortical fixation creates an unimpaired condylar position, good postoperative TMJ function and stable occlusion.

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Anterior open bite correction by Le Fort I osteotomies with or without anterior segmentation: which is more stable?

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Background: Anterior open bite (AOB) is one of the indications for anterior segmentation of Le Fort I osteotomies. The stability of the segmentation in AOB cases has not been widely reported.
Objectives: A retrospective cohort study was conducted to analyse the relapse rate of AOB correction comparing Le Fort I osteotomies with or without anterior segmentation, and to assess the risk factors that might contribute to relapse.
Methods: Lateral cephalograms at six different times were analysed. A total of 85 patients with AOB were recruited. 39 patients had Le Fort I osteotomy without anterior segmentation and 46 patients had anterior segmentation.
Findings: Le Fort I osteotomy with anterior segmentation had significantly more AOB relapse when compared to those without anterior segmentation at postoperative seven weeks (15.3% versus 0%, $P = 0.012$). During early postoperative period, factors that contributed to AOB relapse in Le Fort I osteotomy with anterior segmentation were AOB closure more than 4 mm, inferior positioning of the anterior segment more than 2 mm and the maxillary occlusal plane rotated in clockwise direction by 2°. In long-term, AOB closure more than 4 mm was the only identifiable factor that caused more AOB relapse when treated by Le Fort I osteotomy with anterior segmentation.
Conclusion: Le Fort I osteotomies without anterior segmentation was more stable in the surgical correction of anterior open bite at early and late postoperative period.

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Splintless surgery: do patient-specific computer-aided design/computer-aided manufacturing osteosynthesis improve the accuracy of Le Fort I osteotomies?

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Background: Three-dimensional (3D) planning of orthognathic surgery is widely applied, in particular for treatment of patients with asymmetrical maxillofacial deformities. Good surgical outcome depends on careful virtual planning and adequate translation to the actual surgical intervention. Correct positioning of the maxilla after Le Fort I osteotomy in the transverse and sagittal planes is usually guided by an intermediate splint while the vertical dimension is generally measured using intraoral or extraoral reference points. Mismatch between the planned and realised maxillary position can be caused by condylar sag.
Objectives: This study aimed to develop and evaluate a new method for positioning the maxilla that is independent of condylar sag.
Methods: Patient-specific computer-aided design/computer-aided manufacturing drilling guides and osteosynthesis plates were produced for positioning and fixation of the maxilla in three cases (mean age, 40 years; range, 21–60 years) as part of a bimaxillary osteotomy. Virtual surgical planning in each case was based on cone-beam computed tomography. To analyse the accuracy of maxillary positioning after Le Fort I osteotomy, a surface match with the postoperative imaging was made.
Findings: The area of the upper dentition in the postoperative analysis showed a mean deviation of 1.3 mm (standard deviation, 1.4 mm) from the preoperative plan.
Conclusion: This method enables accurate placement of the maxilla, independent of the condyles or mandible, without the need for extra oral reference points. The promising outcome of this pilot study has led to the start of a large randomised controlled trial ($n = 60$) in which the study methods are systematically compared with conventional 3D-based splint surgery.

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Time-course changes of the mandibular position after mandibular setback surgery in surgery-first approach depending on the increase of vertical dimension and amount of mandibular setback

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Background: In surgery-first surgical orthodontic treatment, transient malocclusion can occur both due to occlusal interferences immediately after surgery and increase in vertical dimension (VD). As occlusal settling by removal occlusal interferences during the

postoperative orthodontic treatment results in decrease of VD, mandible rotates anticlockwise and shows greater forward movement compared to the immediate postoperative position.
Objectives: The aims of this study were to compare preoperatively estimated rotational relapse with actual post-treatment mandibular position after surgery-first surgical-orthodontic treatment, and to evaluate the effect of the increase VD on surgical occlusion and amount of mandibular setback on the changes of postoperative mandibular position.
Methods: This study included 29 patients with mandibular prognathism who received bilateral sagittal split ramus osteotomy. Lateral cephalograms, taken preoperatively, immediately postoperatively, and immediately after debonding, were evaluated. Increase of VD on surgical occlusion was measured preoperatively. We estimated the postoperative mandibular forward movement due to the mandibular anticlockwise rotation during postoperative orthodontic treatment and compare it to actual post-treatment mandibular position.
Findings: The actual postoperative mandibular forward movement (2.1 mm) was significantly greater than the forward movement (1.0 mm) estimated preoperatively ($P < 0.01$). The postoperative mandibular forward movement was greater in the groups with greater VD increase (>1.5 mm) or greater mandibular setback (>10 mm), even though there was no statistically significant difference.
Conclusion: These results suggested that additional postoperative relapse may occur with mandibular rotational relapse, and VD increase and amount of mandibular setback may affect post-treatment mandibular position in surgery-first surgical orthodontic treatment.

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Stability of intraoral vertical ramus osteotomies for mandibular setback

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Background: Intraoral vertical ramus osteotomy is a common procedure for correction of mandibular prognathism. Knowledge of the postoperative longitudinal skeletal changes may help surgeons and orthodontists to better predict the final clinical outcome and occlusion in the postsurgical orthodontic phase.
Objectives: To investigate the postoperative longitudinal skeletal changes and stability following IVRO for mandibular setback, and the possible risk factors that might affect the stability.
Methods: A retrospective study was done to evaluate patients with mandibular prognathism who had IVRO as part or whole of the orthognathic procedures. Lateral cephalograms were traced at six time points. B-point, menton and pogonion were traced and the distances from the reference lines were measured. Factors including the magnitude of mandibular setback and adjunctive mandibular orthognathic procedures were analysed to assess their effect on postoperative stability.
Findings: It was found that after IVRO the mandible measured at B-point moved posteriorly for 0.50 mm one week after removal of IMF, followed by progressive small anterior relapse at postoperative six months, one year and two years, respectively. The mean relapse of mandible after IVRO measured at B-point at postoperative two years was 0.05 mm which was equal to 0.7% of the mean surgical movement. Large setback had significantly higher relapse compared to small setback two years after surgery. Patients with adjunctive mandibular surgeries other than IVRO had no significant differences of relapse.
Conclusions: IVRO is a stable procedure in long-term for mandibular setback with minimal relapse. Larger setback resulted in more relapse when compared to small setback of mandible.

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Surgical specifics in performing orthognathic operation in male and female patients

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Background: Nowadays the number of orthognathic patients seeking mostly for facial aesthetics has increased. According to the 10-year literature review (2005–2015) most of the patients were women with high aesthetic expectations while men sought only for functional treatment. Today with the increased role of social networks and advertisement we observe an increased number of male patients who want to their aesthetic to be improved in the first place.
Methods: 115 patients underwent orthognathic treatment during the period of 2012–2016. Three-dimensional and conventional planning was performed in all patients with special attention to aesthetic needs. Main female demands included an increased or decreased chin/mandible/molar projection and nose size. Most of the male patients wanted their face after the operation to be more brutal — it included overprojected chin area, relatively big nose, big mandibular angles. In all female patients (70 women) orthognathic surgery was combined with one or several adjunctive procedures — chin osteotomy (100%), zygoma osteotomy (57%), submental area liposuction (85%), rhinoseptoplasty (14%), mandibular angle resection (63%), fat grafting of different facial areas (7%). In the male group orthognathic surgery was combined with chin osteotomy (78%), submental liposuction (67%), rhinoseptoplasty (15%), mandibular angle resection (13%). All the patients expressed satisfaction with their postoperative results.
Results and Conclusion: There are differences in surgical planning for men and women that should be applied during the surgery to achieve good aesthetic results.

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Application of reference antenna attached to the silicone pad and registration splint for surgical navigation system

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Background: The key to the success of surgical navigation is the registration process and fixation of reference antenna. However, the application of conventional laser registration and reference headband is limited for accurate navigation. These are not adapted to intraoperative movements and could lose their accuracy. Here, we show a new technique for surgical navigation using reference

antenna attached to the silicone pad combination with a custom-made dental registration splint.
Methods: The splint was made of an acrylic resin and had an anterior extension using contrast resin; it incorporated a total of five holes for marker-based pair-point registration. The splint allowed rigid stability of the patient who required Le Fort I osteotomy while cone-beam computed tomography (CBCT) was taken. CBCT data was used for preoperative planning and intraoperative navigation. The reference antenna attached to the silicon pad was adapted to nasion of the patient. The registration process was conducted by means of the fiducial markers incorporated in the splint.
Results: There was improvement of navigation accuracy by using present surgical navigation management. Furthermore, no significant error and surgical complications were detected.
Conclusion: Our method for surgical navigation system is a promising tool aiming to improve the safety and precision of orthognathic surgery.

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Calvarial bone graft in reconstructive rhinoplasties

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In most cases of rhinoplasty a resection of the nasal osseocartilaginous framework is sufficient to achieve aesthetic or functional objectives. Saddle nose is seen in patients who lose loss structural integrity with subsequent collapse. Various causes could be the result of this deformity that include traumatic, congenital, iatrogenic (secondary to reduction of nasal dorsum, drug abuse, infection and granulomatous diseases).

When a nasal defect involves all or part of the bony pyramid, the missing portion of the nasal bone is usually replaced with autologous bone grafts which are sculpted to the defect and are secured to the remaining bony and cartilage framework.

Different types of graft materials are used to the reconstruction of the nasal framework like iliac bone, cranial vault, rib bone and cartilage, bone bank, synthetic material. Many grafting techniques have been described for use in primary or revision rhinoplasties.

We reviewed a series of 100 patients using cranial vault as the preferential bone graft for nasal reconstruction over the past 10 years. A 'L-shaped' framework is mostly used and bone grafts are assembled and fixed using titanium screws.

Cranial bone grafts is an efficient technique for nasal reconstruction achieving good functional and aesthetics results. Evaluations were made by radiographic findings and postoperative photographs.

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Accuracy of three-dimensional natural head position recording modalities

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Background: Three-dimensional (3D) images are acquired with stabilisation device(s) to minimise image artefacts. These device(s) positioned the patient's head into a random orientation. Reorientation of the 3D images into natural head position (NHP) is a prerequisite for proper assessment of dentofacial deformities.
Objective: The objectives were to evaluate the emerging technologies to record NHP in 3D and to compare their accuracy.
Methods: A systematic review of the Cochrane Library, PubMed and Embase database was performed in four rounds. The advantages, limitations and accuracies of the modalities to record NHP in 3D were compared.
Findings: Eight articles were included. Six 3D NHP recording modalities were identified. Digital orientation sensing had good accuracy, with mean angular differences from the reference of less than one degree. Laser scanning was shown to have comparable accuracy. The modality involving clinical photo and pose from orthography and scaling with iterations (POSIT) algorithm was also accurate, with less than 1° mean angular differences in pitch, roll and yaw. Stereophotogrammetry had the highest reliability with the mean angular deviations in pitch, roll, and yaw within 0.1°.
Conclusion: Digital orientation sensor and laser scanner were shown to accurately record NHP in 3D. Routine use of laser scanner was difficult due to its high cost and bulkiness. Stereophotogrammetry and the modality utilising clinical photograph and POSIT algorithm were possible alternatives.

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Distraction osteogenesis of the mandible: does postoperative infection affect stability?

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Background: Up to the present time, no study has attempted to explore a possible association between skeletal stability and postoperative infection in mandibular advancement by distraction osteogenesis.
Objectives: To determine any possible association between postoperative infection and skeletal stability of mandibular advancement by distraction osteogenesis for the treatment of Skeletal Class II patients.
Methods: Retrospective study of 20 Class II patients previously treated by distraction osteogenesis for mandibular advancement. Clinical records of these patients were reviewed and lateral cephalograms were used. Prevalence and duration of postoperative infection were recorded. Skeletal relapse was calculated based on serial hand tracings of lateral cephalograms. Statistical analysis of the data was performed to determine any association between prevalence and duration of postoperative infection and skeletal relapse.

Findings: 10 out of 20 patients presented with mild postoperative infection. None presented with more severe postoperative infections. All were treated with oral antibiotics and mouth rinse without surgical intervention. The percentage of horizontal relapse in patients with and without postoperative infections was 3.20% and 8.23% respectively ($P > 0.05$). When the duration of infection was plotted against the percentage of horizontal and vertical relapse, the relationship was weakly positive for both ($R^2 = 0.028$ and 0.22, respectively).
Conclusions: It appears that mild postoperative infection does not affect postoperative skeletal stability in Class II patients treated with distraction osteogenesis of the mandible. Future studies with larger sample size and wider range of postoperative infections are needed to further elucidate if more severe postoperative infection would affect stability of the advancement.

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Intraoperative nerve block facilitate general anaesthetic in orthognathic surgery: an randomised controlled trial

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This randomised controlled trial is designed to evaluate the effect of intraoperative nerve block for blood pressure (BP) control and general anaesthesia reagents usage in orthognathic surgery.

Orthognathic patients with at least sagittal split osteotomy or Le Fort I osteotomy (or even higher level) were enrolled. Patients were allocated into intervention group and control group via random numbers sealed in envelopes. Intervention group received intraoperative nerve blocks before the start of surgery with 3 mL 2% for any related nerves respectively including inferior alveolar never for mandibular orthognathic surgery, blocks of maxillary alveolar nerve (posterior, middle and anterior), greater palatine nerve and incisor nerve for maxillary orthognathic surgery. Participants in the control group did not receive nerve blocks.

Heart rate (HR) and BP at baseline, post-intubation, and 10 min after start of the surgery were recorded. Dosage of general anaesthetic reagents were recorded. 60 participants were averagely allocated to two groups. Baseline demographic data, HR and BP did not differ ($P > 0.05$). Nerve blocks significantly attenuated BP at 10 min after start of the surgery (systolic: intervention group 87 ± 13, control group 113 ± 25, $P < 0.0001$; diastolic: 55 ± 8 versus 67 ± 18, $P = 0.002$). Nerve blocks also attenuated the concentration of sevoflurane with 1.32% lowering in the intervention group ($P = 0.01$). For intraoperative remifentanil application rate, the control group was 65% compared to 0% in intervention group ($P < 0.0001$) and for intraoperative sufentanil usage rate, the intervention group were lowered by 80% (intervention: 20%, control: 100%, $P < 0.0001$).

Intraoperative nerve block could provide a better intraoperative BP control and facilitate general anaesthesia, the application of general anaesthetic reagents were also attenuated.

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Impact of patients' reported outcomes from surgical correction of mandibular asymmetry

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Background: Mandibular asymmetry secondary to unilateral condylar hyperplasia or asymmetric mandibular hyperplasia is common in Hong Kong. The aim of this study is to investigate the association between asymmetry and patients' quality of life (QoL) and psychosocial well-being, and the changes one year after surgery.
Methods: 32 patients attending our clinic for surgical correction of mandibular asymmetry were recruited. The evaluation was performed before surgery; week 1 and 6, and month 3, 6 and 12 after surgery using a set of self-administered questionnaires including subjective evaluation of asymmetry, SF-36, OHIP-14, orthognathic QoL (OQoL), Hospital Anxiety and Depression Scale (HADS), Satisfaction with life scale and Hope scale. Among the 32 patients, 20 patients who presented with valid cone-beam computed tomography, were selected for the correlation analysis with the QoL and psychosocial well-being.
Results: Patients with mandibular asymmetry were found to have poor QoL as revealed by OHIP-14, psychological assessment showed asymmetry patients were anxious and depressed. Surgical correction could bring an improvement of QoL but not the psychosocial well-being. Correlation analysis revealed dental midline deviation had significant association with OHIP, OQoL and HADS.

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Simultaneous face fat-grafting to enhance the aesthetic outcome of orthognathic surgery

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Background: Orthognathic surgery has evolved into an extremely demanding procedure. Good results of orthognathic surgery require not only functional correction of dentofacial deformity but also the aesthetic facial outcome. Additional ancillary procedures can be safely performed simultaneously to enhance the aesthetic results.
Methods: Over a 1-year period 12 female patients (mean age, 26 years) with dentofacial deformities underwent simultaneous orthognathic surgery combined with facial fat-grafting. The fat-grafting was performed after the orthognathic surgery was completed. We used closed sterile single-use system to wash and prepare lipoaspirate and mixed it with platelet-rich plasma to improve the vitality and longevity of transplanted fat tissue. The autologous fat was used for volumising and contouring the face. We controlled the resorption of the fat graft using ultrasound diagnostic in the 3, 6 and 12 month postoperatively.
Results: After simultaneous surgery the dentofacial deformities were corrected in all the patients (100%). The postoperative bone stability was controlled using cone-beam computed tomography 12 months after surgery. The aesthetic outcome was evaluated by the patient's visual perception and by analysing the relative position of soft tissues on the preoperative and postoperative photos.

All the patients were satisfied with the results of the surgery and evaluated the aesthetic outcome as extremely good (83%) and very good (17%).
Conclusions: Simultaneous orthognathic operation combined with fat-grafting and other additional cosmetic surgery can solve dentoskeletal and aesthetic problems of the patients in one surgical procedure.

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UVA Clinic Face Architects virtual surgical planning protocol in orthognathic surgery: a practical method for outpatient surgery

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We describe an alternative workup protocol for surgical planning of orthognathic surgery in an office-based concept using a detailed data collection and presurgical work-up that includes a systematic calibration, specific facial markers, precise clinical photography, and the digital transfer of the occlusal data. We also share our office-based orthognathic surgery experience of 60 cases using this protocol.

The clinical protocol consists of a cone-beam computed tomography (CBCT) scan of the patient, scan of stone models and physically transferred to service centre with a subsequent fusion of the two datasets. This technique eliminates the need for an additional dental model scan. This information is merged with skeletal components of the CBCT providing appropriate elements for surgical planning and fabrication of an intermediate splint by computer-aided design/computer-aided manufacturing technology. This technique forces us to perform a mandible-first sequence. The alignment of the fiducial markers and an appropriate calibration of the images endorse a better surgical planning and surgical prediction.

This protocol has allowed us to perform more complex cases with more aggressive movements and ambitious osteotomies. We can correct the yaw orientation of the proximal and distal segments anticipating the segments interferences. This protocol provides great operative insight allowing us to improve our planning and our intraoperative efficiency. In 60 consecutive triple jaw cases our surgical mean time has been of 210 min, a mean blood loss of 250 mL. UVA Clinic Face Architects Orthognathic protocol supports us to accomplished a very safe, efficient, and cost-effective outpatient orthognathic surgery.

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Accuracy of maxillary advancement in orthognathic surgery using a computer-aided design/computer-aided manufacturing generated wafer

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Background: Computer-assisted three-dimensional (3D) planning combined with computer-aided design/computer-aided manufacturing (CAD/CAM)-wafers is more and more common in orthognathic surgery. Nevertheless, the adjustment of the vertical position of the maxilla still stays difficult with this method. Fixation of the mandible to the zygoma using osteosynthesis as a reference is a possible solution.
Objectives: Aim of the study was to evaluate the precision of maxillary movement using CAD/CAM-wafers combined with temporary fixation of the mandible.
Methods: 10 bimaxillary operations were virtually planned on base of a computed tomography (CT) scan followed by performing a virtual Le Fort I osteotomy with digital maxillary advancement. For transferring the planned position of the maxilla into the operation site CAD/CAM-wafers were generated. Fixation of the mandible to the zygoma was performed using a conventional wafer representing the habitual occlusion. To evaluate the accuracy of this method pre- and postoperative CT scans were compared by measuring the 3D deviation of five occlusal landmarks defined on a scanned digital dental impression which was superimposed to the CT-datasets.
Findings: The median deviation over all landmarks was 0.76 mm. There was a median deviation of 0.97 mm in transversal, 0.62 mm in sagittal and 1.05 mm in vertical plane. The maximal deviation between planning and postoperative results was 2.03 mm in the transversal, 2.23 mm in the sagittal and 2.58 mm in the vertical plane. There was no significant difference between all three planes with a generally high precision itself.
Conclusion: The method shows to be very precise with a good clinical applicability. However, using mandible fixation for vertical reference prolongs the surgical procedure for approximately 30–45 min.

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Precision analysis of wafer-less positioning of the maxilla using patient-specific guides and implants in orthognathic surgery

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Background: Three-dimensional (3D) planning in orthognathic surgery is moving more and more into clinical routine. However, precise transfer of the plan in the operation site is still challenging.
Objectives: The aim of this study was to evaluate the precision of wafer-less maxillary positioning in orthognathic surgery.
Methods: Up to now 12 patients are evaluated in an ongoing study. After 3D planning, patient-specific guides and plates for wafer-less maxillary positioning were designed. Le Fort I osteotomy was performed in accordance to the patient-specific osteotomy-guide. Subsequently to the down-fracture maxillary positioning was achieved by fixing a patient-specific plate, in which the new position of the maxilla is encoded in all 3 dimensions. No wafer or intraoperative measurements were necessary. For mandibular positioning a wafer in final occlusion was used after performing a bilateral sagittal split osteotomy.

For accuracy evaluation of the postoperative position of the maxilla in accordance to the preoperative 3D plan, image fusion of plan and postoperative computed tomography was performed and deviations of 5 occlusal maxillary landmarks in the axes X–Y–Z were measured.

Findings: The deviation between plan and result averaged over all three axes, all patients ($n = 12$) and all landmarks ($n = 180$) was median 0.46 mm. The biggest deviations with median 0.72 mm could be seen in the *X*-axis, while median deviations in the *Y*- and *Z*-axes were 0.40 mm respectively 0.42 mm only. In addition, a significant reduction of surgery time of up to one hour could be achieved.
Conclusion: Wafer-less maxillary positioning is a precise and time saving method which shows a good intraoperative applicability.

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Facial feminisation surgery: 18 years of experience in Amsterdam

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Background: Facial feminisation surgery (FFS) comprises a series of surgical procedures performed in order to feminise the face in patients affected with male-to-female gender dysphoria (or gender identity disorder).
Objectives: This study was designed to review all feminisation operations performed at the VU University Medical Center in Amsterdam, aiming to share our experience and improve treatment in the future.
Methods: Medical records of all transgender patients undergoing FFS during the period of 1987 to 2015 were reviewed. The following data was collected: age, surgeon, type and duration of operation, complications during surgery, postoperative complications, length of hospital stay, and patient satisfaction.
Findings: 196 surgical procedures were performed in 101 transgender patients by three different surgeons. Average age was 36 years. The most frequently performed operations were: mandibular angle reduction (74/196), genioplasty (53/196) forehead cranioplasty (24/196), and zygoma sandwich osteotomy (20/196). The average duration of operation was 113 min. Patients were hospitalised on average 2.65 days. Complications during surgery occurred in one case, and postoperatively in four cases. Patient satisfaction was noted in 37 cases. 24 patients were satisfied, six were dissatisfied, and in seven cases this remained unclear due to incomplete chart data.
Conclusion: Feminisation of the face demands a combination of surgical procedures. When performed by an experienced surgeon, FFS seems to be safe, with little serious, non-reversible complications during and postsurgery. However, due to the growing demand of FFS, further research is of imperative importance to objectively assess success of operation, long-term results, patient satisfaction and quality of life.

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Three-dimensional assessment of morphological changes of the face following bilateral sagittal split osteotomy

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Background: Until now there is no good method to accurately predict morphological changes in the face following osteotomy, which is very important in planning orthognathic surgery.
Objectives: In our study we searched for a new method to register the morphological facial changes after orthognathic surgery in order to plan more accurately the result of orthognathic surgery.
Methods: In this pilot study, two cadaver heads were used as study models. These cadaver heads were fixated with a new embalming method, "Fix for Life", in which the tissues keep their live like properties. Both cadaver heads were submitted to a bilateral sagittal split osteotomy (BSSO) followed by a distraction of 5, 10 and 15 mm. Before the BSSO and after every distraction computed tomography (CT), cone-beam CT and magnetic resonance imaging were performed. All scans were converted to three-dimensional models and the soft and bony landmarks were analysed.
Findings: In these study models different morphological facial changes could be recognised after distraction such as the change of a short face to a long face with the change of distribution of stress and tension of the skin, soft tissues and muscles. Further more this study showed that the position of the hyoid in relation to the mandible stayed unchanged.
Conclusions: In orthognathic surgery the final result is defined by the stress properties of the skin, soft tissue and muscles. For a better result of orthognathic surgery and also craniomaxillofacial surgery overall, the development of new intelligent digital methods, in which the soft tissue properties are calculated, is of great importance.

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A clinical manoeuvre to avoid anterior open bite after sagittal split mandibular ramus osteotomy

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Anterior open bite is frequently seen as an immediate complication after sagittal split mandibular osteotomy. Once it happens, long-term stability of the occlusion will be questionable. The authors found an effective way to avoid this embarrassing outcome.

The importance of the position of the condyle on fixing the bone segments has been emphasised.[1,2] But still the intermaxillary elastics are routinely used after surgery which might be concealing the true result. The authors utilised stabilisation splint to secure the condyle position before surgery, which makes the joint bearing segment as a reference for positioning the teeth-bearing segment. By controlling the proximal and distal segments not only horizontally but also vertically, it became highly probable to avoid anterior open bites, thus eliminating the use of up and down elastics throughout the treatment course including postoperative orthodontics. With this technique, the final result turned out

to be more predictable and possible to obtain long-term occlusal stability.

As dental-based oral surgeons, the authors hope to be more considerate about occlusion. We would like to introduce the detail of the manoeuver with figures and videos in many cases.

Reference

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Effects of orthognathic changes to the maxillary-mandibular plane angle on pharyngeal airway measurements

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Background: Orthognathic surgery has been shown to have effects on both airway dimensions and respiratory parameters during sleep. Numerous studies have shown the effect of bimaxillary horizontal movements on the airway. Sparse research exists that looks into whether the rotational relationship of the mandible to the maxilla has an effect on the pharyngeal airway.
Objectives: The purpose of this study was to determine whether changes to the maxillary-mandibular plane angle (MMPA) during orthognathic surgery correlate to airway changes.
Methods: This was a retrospective study that looked at the last 100 orthognathic cases in our department. Details about the surgical procedure were found using electronic health records. The MMPA was measured using specialised digital software. Pharyngeal airways were assessed on 2-dimensional lateral cephalograms. The airway was measured in four areas that correlated to the nasopharynx, orophaynx, base of tongue and the epiglottis.
Findings and Conclusions: A total of 44 patients were suitable for inclusion in the study, with a median age of 22.5 years. The median preoperative MMPA was 28.4°. Paired sample *t*-test showed a significant difference between the preoperative and postoperative MMPA ($t[16] = 3.03$; $P < 0.05$). Orthognathic surgery resulted in a significant change in airway diameter at the nasopharynx ($t[39]$; $P < 0.001$) and oropharynx ($t[39]$; $P < 0.001$), but not at the base of tongue ($t[39] = -1.98$; $P = 0.055$) or epiglottis ($t[39] = -0.59$; $P = 0.56$).

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The lower third face rejuvenation: our experience

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The lower third of the face is supported by the basal border of the mandible and centred by the oral and perioral region (smile). The aging of this region is mostly due to change in its environment (skin, muscle and bone).

Chronodermie: the programmed aging, interested melting of the various components of this environment with age (bone loss related to the evolution of the dental condition, muscle atrophy, sagging skin, etc).

Heliodermatitis: aggravated aging, especially interesting the superficial dermis with variable intensity elastolysis giving vertical wrinkles above the upper lip.

We report our experience about therapeutic methods of rejuvenation lower third of the face which must fight against the forces of gravity in 50 aged patients consulting the maxillofacial and dental department for aging of the lower face during past five years. The cervicofacial lift remains the "gold standard" in some cases (three cases).

Genioplasty was indicated in five patients to improve facial contour. Preimplantary surgery was needed in eight patients when edentation is ancient. Alternatives to these surgical procedures are sometimes necessary (time ± long recovery, morbidity, the financial implications, etc.) and are done in most cases even after surgery.

As volume restoration methods we used: the lipofilling (5 cases), hyaluronic acid fillers (42 patients). Regeneration procedures are up-to-date methods such as platelet-rich plasma injections (four cases), mesotherapy, etc.

Botulinum toxin that are normally less indicated in the lower third of the face especially with the technique of mesobotox in jaws wrinkles were used in (25 cases).

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The effects and functional outcomes of intranasal procedures in excessive maxillary impaction cases

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In the case of extensive superior repositioning of the maxilla by Le Fort I osteotomy is sometimes technically challenging for high impactions because of the anatomical restrictions around the descending palatine artery, anterior maxilla and nasal structures. Epker[1] and Bell et al. suggested turbinectomy-dissecting the inferior nasal concha when planned impaction is more than 6 or 8 mm.

This retrospective study assessed the outcome of eight patients undergoing partial inferior turbinectomies in association with Le Fort I osteotomy. Partial inferior turbinectomy, when indicated, was performed after downfracture of the maxilla, providing access to the turbinates where approximately two thirds of the total turbinate volume was removed and septoplasty was completed if indicated. A review of case series of Le Fort I osteotomies with excessive superior repositioning associated with turbinectomy are presented, and the nasal functions are discussed. The results of this study showed that partial inferior turbinectomy performed simultaneously with Le Fort I osteotomy is a safe method of managing nasal airway obstruction related to hypertrophied turbinates with minimal complications.

Reference

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The use of allogeneic cartilage for grafting in functional rhinoplasty: a novel study

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Objectives: Assess utilisation of allogeneic Cartiform cartilage (osteochondral allograft composed of chondrocytes, growth factors, ECM proteins) grafts in functional rhinoplasty.
Methods: A retrospective study was conducted from 2013–2016 of 91 patients who had open functional rhinoplasties. 11 of the 91 patients received Cartiform spreader, batten, and/or columellar strut grafts. These were reviewed for operative time, graft handling, mechanical integrity, infections, healing, breathing improvement, internal nasal valve (INV) patency, external nasal valve (ENV) patency, columellar support, and tip projection.
Findings: The patients' average age is 57.6 years; all were male. Eight patients reported difficult nasal breathing. Two patients with obstructive sleep apnoea syndrome did not tolerate continuous positive airway pressure. Ten had spreader and columellar strut grafts for primary rhinoplasties to correct INV collapse, one had a batten graft for a secondary rhinoplasty for ENV collapse. Postoperatively all had a patent INV/ENV and reported improved nasal breathing. Mechanical properties and graft characteristics were equivalent, with no complications, infections, or delayed healing. Columellar support and tip projection were excellent. Operative time was decreased when Cartiform was used instead of septal/auricular cartilage harvest.
Conclusion: Allogeneic cartilage is an autologous graft alternative in functional rhinoplasties that improves nasal breathing, and maintains aesthetic characteristics. Cartiform does not increase complications, and reduces operative time by obviating cartilage harvest, and is therefore an acceptable alternative to autologous cartilage.

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Accuracy of three-dimensional soft tissue prediction for Le Fort I osteotomy: a pilot study

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Background: Three-dimensional (3D) soft tissue prediction is replacing two-dimensional analysis in planning for orthognathic surgery. The accuracy of projected soft tissue changes in 3D, however, is unclear.
Objective: To assess the error in soft tissue prediction for Le Fort I osteotomies using Dolphin 3D software.
Methods: This is a retrospective study of patients who had single-segment Le Fort I osteotomy (LFI) and had preoperative (T0) and 6-month postoperative (T1) CBCTs and 3D photographs. Patients with craniofacial anomalies or who had concomitant operations (e.g. mandibular osteotomies) were excluded. Actual skeletal change was determined by subtracting the T0 from the T1 CBCT. 3D photographs were overlaid on the T0 CBCT and virtual skeletal movements equivalent to the achieved repositioning were applied to the T0 CBCT/photograph using Dolphin 3D planner. A 3D soft-tissue prediction (TP) was generated using Dolphin's standard algorithm. Differences between the TP and T1 images (error) were measured at 14 points (6 midline, 8 lateral) and at the nasolabial angle. Linear errors 2 mm were considered clinically perceptible.
Findings: Seven subjects were included. The mean error across all linear measurements was 2.91 ± 2.16 mm; 1.66 ± 1.82 mm for midline points and 3.84 ± 1.92 mm for lateral points. No midline and six lateral (75%) points consistently exceeded the 2 mm threshold ($P < 0.05$). Mean error at the nasolabial angle was 8.1 ± 5.6 degrees ($P = 0.499$).
Conclusion: Dolphin 3D accurately predicts linear soft tissue changes that occur after Le Fort I osteotomy for midline structures, but does not perform well at lateral points on the face or the nasolabial angle.

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Can combined maxillomandibular distraction osteogenesis avoid bilateral sagittal split osteotomies?

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Background: Maxillary expansion and transversal maxillary distraction osteogenesis are becoming increasingly popular approaches in orthognathic surgery. Intraoral transversal mandibular distraction (TMD) osteogenesis procedures are utilised in many cases of transverse mandibular deficiency with dental crowding of the mandibular anterior teeth in class I, II and III malocclusions. Dental and skeletal positional changes after TMD were studied prior to osteotomies on patients with diverse malocclusions. Le Fort I advancement, trans palatal distraction (TPD) and TMD were performed both together or in later cases separately starting with the TMD followed by TPD, Le Fort I about 4 weeks later.
Methods: We sought to determine the facial aesthetic amelioration and the subsequent degree of mandibular advancement resulting in an adequate realignment of the dental arch. We also note that these changes result in a change in the facial mask both anteroposteriorly and transversally.
Findings: The facial aesthetic modifications after TMD were evaluated with cephalometric analysis, computed tomography scan, three-dimensional analysis and photographic data in 50 patients.
Conclusions: The combination of TMD with or without repositioning of the maxilla (Le Fort I) and TMD allows a relatively good restoration of the facial structure and harmony. In most cases we were able to avoid a bilateral sagittal split osteotomy due to significant mandibular lengthening.

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Day case surgery for single jaw orthognathic procedures: a survey of united kingdom-based practice

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Background: Bilateral sagittal split osteotomy and Le Fort I osteotomy are commonly performed procedures on a relatively young and healthy cohort of patients, with a low incidence of post-

operative morbidity. Overall operating time has reduced allowing for the possibility of same day discharge. Despite the increasing financial pressures within the National Health Service and patient-related outcome measures favouring early discharge, many units continue to admit patients following surgery and in some cases, to high-dependency beds.
Objectives: We aim to assess the appetite for same day discharge following single jaw orthognathic surgery in the United Kingdom and to determine the rational for current practice.
Methods: A questionnaire was distributed to all Orthognathic surgeons within the United Kingdom from details provided by the British Association of Oral and Maxillofacial Surgeons.
Results and Conclusion: In progress.

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Safe modification of anterior segmental maxillary osteotomy

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Anterior segmental osteotomy is usually performed through vestibular horizontal mucosal incision or palatal horizontal mucosal incision. These mucosal incisions have a possibility of the blood supply disturbance resulting into segmental bone necrosis. Through a pair of small perpendicular mucosal incisions at premolar buccal alveolar area, anterior segmental osteotomies are able to accomplish safely without a fear of segmental bone necrosis co-use of piezoelectric bone cutting device. This paper describes the technique and case results.

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Are patients happy with the noses we give them post orthognathic surgery?

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A complex relationship exists between jaw deformity, corrective jaw surgery and nasal aesthetics and function. Both jaw deformities and nasal deformities are common in the community and may coexist. Furthermore, nasal obstruction in children has been implicated in the development of specific patterns of jaw deformity. The nose and maxilla are intimately related and consequently changes to the position of the maxilla may affect the nose. The potential for untoward effects on both nasal aesthetics and nasal function are well known.

Various strategies are used to prevent the development of poor nasal outcomes. Where possible surgical movements of the jaws are planned to minimise changes to the nose. A range of adjunctive measures may be performed at the time of surgery designed to prevent such changes.[1] Some surgeons suggest the use of modified osteotomy designs.

Most literature regarding orthognathic surgery of the maxilla and associated nasal outcomes objectively measure changes in nasal aesthetics or detail adjunctive intraoperative techniques to limit these changes. Limited literature exists regarding patient reported outcomes for aesthetic and functional nasal outcomes following orthognathic surgery. This retrospective review of focuses on patient-centred outcomes in those previously treated with maxillary orthognathic surgery for the correction of dentofacial deformity.

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Changes in psychosocial characteristics of patients with dentofacial deformities after corrective surgery: one-year prospective study

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Background: This is a prospective study of psychosocial characteristic changes of Hong Kong Chinese patients with dentofacial deformities after jaw corrective surgery.
Objectives: To investigate the longitudinal changes of psychosocial characteristics and outcome trajectory of orthognathic patients during the postoperative 12 months.
Methods: From 1 June 2011 to 30 June 2015, a prospective cohort study was carried out on Hong Kong Chinese. Self-completed questionnaires including Brief Symptom Inventory (BSI), Eysenck Personality Scale, Adult Trait Hope Scale, Hospital Anxiety and Depression Scale, Life Orientation Test, Social Avoidance and Distress Scale and Satisfaction with Life Scale, were administered to each patient at surgical consent signing day (T1), first preoperative day (T2), first to second postoperative week (T3), third postoperative month (T4), sixth postoperative month (T5) and 12th postoperative month (T6). Outcome trajectories were established using the BSI Global Severity Index T score. Five patterns of outcome trajectories were created including chronic dysfunction, recovery, delayed reaction, resilience and others.
Findings: 133 Participants were recruited. Highest psychological symptom level and anxiety level were noted preoperatively. No statistically significant difference was noted on other psychosocial parameters. The proportion of five outcome trajectories was resilience (50.6%), recovery (10.4%), chronic dysfunction (11.7%), delayed reaction (6.5%) and others (20.8%).

Hong Kong Chinese patients with dentofacial deformity had lower psychological symptom level and anxiety level postoperatively. The depression level, life satisfaction level, optimism level, social distress and avoidance level of these patients were generally stable throughout the postoperative 12 months.

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An intraoral approach to facial skin lumps — a move towards scarless surgery

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Background: The aim of surgical management of benign facial skin lumps is to remove the lesion in its entirety, with minimal damage to adjacent tissue, while maintaining facial aesthetics. A

novel method to achieve these goals is to remove perioral lesions in the labial and buccal zones via an intraoral approach. This is of particular benefit in patients prone to hypertrophic or keloid scarring. We report an extended cases series of facial skin lumps that were excised using an intraoral approach.
Methods: A retrospective case note analysis was performed on all patients who underwent excisions of benign cutaneous lesions on the face via an intraoral approach. Patient demographics, indication for surgery and complications were noted.
Results: A total of 47 lesions were excised, by a single surgeon, in 45 patients. Indications for surgery included risks of keloid/hypertrophic scars and cosmesis. Lesions were predominantly epidermoid cysts and lipomas. Mean follow-up was 2.9 years with a 6.4% recurrence rate and 2.1% rate of haematoma and transient facial nerve weakness.
Discussion: There are many well-established techniques and approaches to remove facial skin lumps. We believe that in selected cases, an intraoral approach to such lesions, particularly in cases with high risk of keloid or hypertrophic scars or where there is strong patient preference, may be an important tool in the oral and maxillofacial surgeons armamentarium.

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Effects of one- or two-jaw osteotomies on pharyngeal airways: overview of systematic reviews

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Background: Mandibular surgeries affect pharyngeal airway dimensions, potentially being of impact on obstructive sleep apnoea (OSA).
Objectives: Collecting evidence from systematic reviews that evaluated pharyngeal airway changes related to mandibular setback/advancement with or without maxillary procedures.
Methods: Without language or timeline restriction, electronic databases were searched for systematic reviews that investigated pharyngeal airway dimensions and respiratory parameters after mandibular setback/advancement with or without concomitant upper jaw surgery.
Findings: Eleven systematic reviews were found and included. While isolated mandibular setback results in a narrower oropharynx, a concomitant upper jaw surgery leads to less narrowing. Though reduced respiratory parameters were reported postsurgically, to date no evidence exists that mandibular setback, with or without concomitant upper jaw surgery leads to postsurgical OSA development. Only two systematic reviews contained primary studies of single-jaw mandibular advancement, but none discussed its effect onto pharyngeal airways. While maxillomandibular advancement (MMA) increases the linear, cross-sectional and volumetric measurements of pharyngeal airways significantly ($P < 0.0001$), it significantly ($P < 0.0001$) reduces the apnoea-hypopnoea index (AHI) and the respiratory disturbance index (RDI).
Conclusion: Mandibular setback leads to postsurgical pharyngeal airway narrowing. Though to date no clear evidence exists that OSA syndrome (OSAS) may develop after mandibular setback without concomitant upper jaw surgery, OSAS has to be taken into consideration as a potential postsurgical adverse event. In contrast, MMA results in increased pharyngeal airways being an effective treatment for OSA.

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Surgery first approach in orthognathic surgery: an overview and outcomes in various clinical situations

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Orthognathic surgery (OGS) has evolved a great deal over the last five decades and particularly in the past 10 years, this concept and technique of surgery-first-orthognathic-approach (SFOA) or surgery-first approach (SFA) toward the correction of dentofacial anomalies is taking precedence over the conventional approach. Weighing the pros and cons of the SFA over the conventional approach, given a choice, patients now seek a quick transformation with the least possible treatment time. The prolonged treatment phase of 7–47 months before and after OGS and a temporary worsening of facial appearance is a huge disadvantage of the conventional approach over SFA. SFOA offers minimal or no presurgical orthodontics and the shortest possible postsurgical orthodontic phase taking advantage of the regional acceleratory phenomenon with completion of treatment in approximately 6–12 months.

Currently, the concept of surgery-first, followed by a short orthodontic phase can be applied in the correction of various dentofacial deformities in select situations. This paper is intended to provide an overview and outcome of SFA, utilised in 15 diverse cases, discussing the indications, general and specific guidelines, different protocol variations and potential problems. All patients benefited from immediate improvement of the facial profile after surgery, a much shorter total treatment phase and highly appreciable results. I believe SFA is a good and effective treatment alternative in select cases of any dentofacial deformity.

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The proximal lingual plate in sagittal split osteotomies — a blessing or a curse? Euristic findings of a novel technique in local bone harvesting and control of ramus

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Background: The inadvertent fracture of the proximal lingual plate constitutes a complication in sagittal split osteotomies (SSO) dependent on bicortical fixation. Its importance as a complication of SSO in monocortical plate fixation is reduced and often times its presence becomes an impediment in proper condylar seating resulting from unwanted deflections of the ramus if not critically evaluated prior and during surgery.
Objectives: This presentation proposes a novel technique in the harvesting of the proximal lingual plate as a local bone source provider in cases utilising monocortical fixation in sagittal split osteotomies stemming from lessons learnt from the lingual plate fracture.

This heuristic finding explores the indications and potential of the technique due to piezosurgery and in depth review of the three-dimensional (3D) dynamics of segment positioning (courtesy 3D planning techniques) which allows for contact point elimination and stabilisation of ramus segment as well as the simultaneous harvesting of bone.

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Long-term clinical performance of a biodegradable versus a titanium fixation system in maxillofacial surgery: a multicentre randomised clinical trial

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Background: Biodegradable fixation systems could reduce/eliminate problems associated with titanium removal in a second operation.
Objectives: The aim of this study was to compare the long-term (i.e. five years postoperatively) clinical performance of a titanium and a biodegradable fixation system in maxillofacial surgery.
Methods: The present multicentre randomised controlled trial was performed in four hospitals in the Netherlands. Patients treated with a bilateral sagittal split osteotomy and/or a Le Fort I osteotomy, and those treated for fractures of the mandible, maxilla, or zygoma from December 2006 to July 2009 were recruited. Inclusion of the 230 patients was based on power analysis using the outcome measure: bone healing after 8 weeks.[1] The patients were randomly assigned to a titanium group (KLS Martin) or a biodegradable group (Inion CPS).
Findings: After 5 years postoperatively, plate removal was performed in 22 of the 134 (16.4%) patients treated with titanium and in 23 of the 87 (26.4%) patients treated with the biodegradable system, respectively ($P = 0.036$, hazard ratio (HR) biodegradable (95% CI) = 2.0 (1.05–3.8), HR titanium = 1). occlusion, visual analogue scale pain scores, and MFIQ showed good and (almost) pain free mandibular function in both groups.
Conclusion: The KLS Martin titanium system is preferable to the Inion CPS biodegradable system in the abovementioned surgical procedures.

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MIG — a new minimally invasive genioplasty procedure

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Background: The chin has an important role in completing facial harmony. In order to enhance the appearance of a small chin several techniques have been described in literature. Nevertheless, according to Sykes et al., the gold standard is still genioplasty.
Objectives: The aim of this study was to define a new minimally invasive technique to perform a chin osteotomy and to assess the postoperative dysfunction, discomfort and recovery time compared to the standard technique described by Trainer and Obwegeser (1957).
Methods: From January 2016 till September 2016 we performed 13 genioplasties, according to our new technique. When performing a minimally invasive genioplasty (MIG) procedure, the standard horizontal mucosal incision through the Mm Mentales is replaced by a vertical incision through the labial frenulum onto the bony midline. The Mm Mentales are kept intact by elevating, instead of transecting the bellies. In patient follow-up we noticed a remarkable improvement in postoperative dysfunction and recovery of the Mentalis muscles and nerves. Seeing these results we started a prospective study with two groups of patients in whom the lower lip sensibility and functionality will be assessed. In group one the patients are treated according to the new MIG technique and in group two they are treated according to the standard technique. All included patients need a chin advancement of 4–8 mm.
Results: Preliminary results showed better postoperative recuperation and overall better functional outcome using the MIG technique. Not all patients were evaluated so definitive results will be presented at the International Conference on Oral and Maxillofacial Surgery.

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Risk factors for osseous mandibular inferior border defects after bilateral sagittal split osteotomy

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Background: Bone defects of the inferior border of the mandible (osseous inferior border defects) after bilateral sagittal split osteotomy (BSSO) can cause an unaesthetic postoperative outcome and sometimes necessitates secondary surgical intervention.
Objectives: The purpose of this study was to estimate the frequency of osseous inferior border defects after BSSO and to identify factors associated with an increased risk for osseous defects of the inferior border.
Methods: This retrospective cohort study included consecutive patients who underwent BSSO advancement, according to the Hunsuck modification using splitter and separators. Risk factors included extent of mandibular movement, rotation of the occlusal plane, postoperative position of the proximal segment, the pattern of the lingual fracture, the occurrence of bad split, and presence of third molars. The primary outcome variable was the presence/absence of osseous inferior border defects.
Findings: The study sample consisted of 200 patients with a mean follow-up of 13 months (range 6–38 months). The mean mandibular advancement and rotation was respectively 5.8 mm and 5.4 degrees clockwise. Osseous inferior border defects were present in 7.0% of sagittal splits and 12.5% of patients. Significant risk factors for inferior border defects included increased advancement, increased clockwise rotation, cranial rotation of the proximal mandibular segment, and a type II split originating in the lingual cortex.
Conclusion: Osseous inferior border defects occur significantly more often in cases with large mandibular advancement, increased

clockwise rotation of the occlusal plane, malpositioning of the proximal segment, and a type II lingual fracture.

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Application of digital techniques in correction of hemimandibular and condylar hyperplasia

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Objective: To assess the application of computer-assisted surgical navigation in condylectomy via intraoral approach through coronoid process osteotomy and its clinical results.
Methods: Between May 2011 and July 2016, 46 patients were treated by condylectomy via intraoral approach through coronoid process osteotomy under computer-assisted surgical navigation. The age of the patients ranged from 16 years to 57 years. 21 patients had condyle osteoma and 25 patients had hemimandibular hyperplasia and condylar hyperplasia. Most patients had concomitant Le Fort I osteotomy, bilateral sagittal split ramus osteotomy, genioplasty and mandible contouring to recover the facial symmetry.
Results: All patients had got good occlusion, oral function and facial symmetry after the operation. The temporomandibular joint (TMJ) dysfunction syndrome alleviated or disappeared. No relapse of osteoma or facial asymmetry was found during the 3 months to 5 years follow-up period. The postoperative mandible ramus height was increased in most cases because of the regrowth of the condyle process.
Conclusions: Computer-assisted surgical navigation can precisely accomplish the condylectomy via intraoral approach through coronoid process osteotomy. It has no skin scars, no risk of facial nerve. Furthermore it has less trauma to the patient than traditional condylectomy, and can better preserve the TMJ structure and function.

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Aesthetic aspects in orthognathic surgery: the smile

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Plato called beauty a privilege of nature and behavioural research shows that beautiful people are always being favoured in daily life. The society is confronted with unrealistic beauty ideals in advertisement, print- and electronic media. It is hardly surprising that for orthognathic patients, an aesthetical improvement is the main objective and that functional aspects fade into the background. In order for a face to be perceived as beautiful, the smile is of utmost importance.

A harmonious smile is a complex composition of many factors like the lip line, the smile arch, the upper lip curvature, the lateral negative space, the smile symmetry, the occlusal frontal plane, dental and gingival components.[1] Lip volume and length as well as its symmetrical innervation also contribute to an aesthetical perception. Additionally sagittal components like the relation between maxilla and mandible can have a big impact on a balanced smile and should be considered in planning. Many of the mentioned parameters can be influenced by orthodontic treatment and/or minor oral surgeries like gingivoplasty. A gummy smile due to short crowns can be corrected by gingivectomy, whereas in some indications like gummy smiles of skeletal origin and maxillary excess, orthognathic surgery in combination with orthodontic treatment is mandatory for a good result.

In summary, a critical analysis of the mentioned factors and clinical exploration of the patient in motion is imperative for achieving an ideal aesthetic outcome, presented in multiple cases.

Reference

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Virtual occlusal definition for segmental orthognathic surgery

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Background: Computer-assisted surgical simulation is being used increasingly in orthognathic surgery, but occlusal definition is still done by model surgery manually. We researched virtual occlusal definition for normal occlusion and proved it to be accurate and reliable. Many other authors have also proved that virtual occlusal definition for one piece maxilla was accurate with the accuracy of 1 mm.
Objective: To investigate the accuracy of virtual occlusion on decompensation dentition and the accuracy for segmental virtual occlusion definition.
Methods: 17 pairs of pre-surgery models were included in this study. For each pair, final occlusions were defined by a single investigator manually and digitised as gold standard. Maxillae in one piece as well as segmented pieces were moved to match mandibles in virtual environment to get virtual final occlusion of test groups. Marker points on fossae and cusps of test groups and gold standard were signed and compared.
Findings: The average errors between the virtually set positions and the digitised manually positions were 0.69 mm, 0.71 mm, 0.79 mm and 0.79 mm, respectively and were all within 1 mm. Errors did not differ from different teeth nor from different groups ($P > 0.05$).
Conclusion: Virtual occlusal definition for decompensation dentition, whether segmental or one-piece is accurate, and that accuracy does not decrease as the segments increase.

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Biomechanical evaluation of sagittal split ramus osteotomy fixation methods in mandibular setback

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Background: The bilateral sagittal split ramus osteotomy (BSSRO) is the most popular orthognathic surgical procedure for the correction of mandibular skeletal deformities. Rigid internal

fixation in BSSRO can improve postoperative stability and permit early mandibular function. Many modifications of the fixation methods in BSSRO have been published, but no consensus has been reached regarding the best clinical fixation method.
Objectives: The purpose of this study was to evaluate and compare the biomechanical behaviour of different internal fixation techniques in BSSRO for mandibular setback.
Methods: Synthetic polyurethane whole-mandible replicas (Synbone, Malans, Switzerland) were used in this study. The distal segment of mandible was repositioned in a 8 mm setback position. The mandible replicas were divided into three groups: Group 1: straight miniplate with 4-hole monocortical fixation; Group 2: curved miniplate with 4-hole monocortical fixation; and Group 3: three bicortical screws in an inverted-L pattern fixation. The vertical loads were applied on the incisal edge by the servohydraulic mechanical testing unit. The compression loads (*N*) at 1, 3, 5, 10 mm displacement were analysed ($P < 0.0167$).
Findings and Conclusion: Straight miniplate group (Group 1) was significantly weaker than the other groups (Group 2 and 3). There was no significant difference between curved miniplate group (Group 2) and bicortical screws group (Group 3) at 1, 3, 5 mm displacement. At 10 mm displacement, there was significant difference between Group 2 and Group 3.

For mandibular setback surgery, this study concluded that the fixation technique based on the curved miniplate group was significantly the same rigid as the fixation observed in the inverted-L bicortical screws group at the displacement ≤5 mm.

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Postoperative changes of dental show and chin projection following surgical-assisted rapid maxillary expansion

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Background: Beside maxillary expansion, surgical-assisted rapid maxillary expansion (SARME) also results in postoperative changes of facial bony and soft tissues. Clinically, postoperative changes of the dental show and chin position are observed frequently. So far, little is known regarding the effect of SARME on these potentially aesthetic relevant changes of the soft tissue facial profile.
Objectives: To quantify the postoperative changes of dental show and chin projection following SARME using three-dimensional (3D) cone-beam computed tomography (CBCT) imaging and to identify the contributing factors to these changes.
Methods: 78 consecutive patients with transversal maxillary hypoplasia and mandibular hypoplasia who underwent SARME between 2006 and 2012 surgery were retrospectively enrolled into the study. A CBCT was acquired preoperatively and at least one year postoperatively. Both CBCTs were superimposed by voxel based registration on the anterior cranial base. 3D cephalometric landmarks were identified to quantify the maxillary skeletal expansion, postoperative changes of dental show and displacement of mandible and chin.
Findings: Following SARME, the dental show increased by a mean of 2.2 mm. The chin demonstrated a mean posterior displacement of 1.6 mm. 61 patients (78%) showed a inferiorly displaced chin (mean 2.4 mm) while in the remaining group ($n = 17$) the chin was displaced slightly superiorly (mean 1.0 mm). These changes were associated with a clockwise pitch of the maxilla and occlusal plane. Postoperative changes in dental show and chin position were not correlated to the amount of maxillary expansion.
Conclusion: Clinicians should be aware of an increase in dental show and a posteriorly displaced chin following SARME.

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Three-dimensional evaluation of bimaxillary surgery: maxilla first or mandible first?

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Background: The sequence of osteotomies in bimaxillary surgery is still a controversial topic. Little clinical data and consensus exist on whether the maxilla first or mandible first surgical protocol provides the most predictable postoperative result.
Objectives: To investigate the influences of maxilla first and mandible first surgical protocol on the surgical achievability of three-dimensional (3D) virtual planning in bimaxillary surgery.
Methods: 116 consecutive patients with class II skeletal relationship who underwent bimaxillary osteotomy were enrolled into this study, 58 patients in the maxilla first group and 58 patients in the mandible first group. Based on the cone-beam computed tomography (CBCT)-based preoperative 3D virtual planning, interocclusal splints were fabricated to position the maxilla and mandible intraoperatively. After voxel based registration of the preoperative and postoperative CBCTs, the discrepancies between the 3D planned and the actually achieved position of the maxilla and mandible were quantified.
Findings: In the maxilla first group, the maxilla and mandible ended up 0.3 mm and 0.7 mm more posteriorly than planned. This surgical inaccuracy was significantly higher in the mandible first group, 2.0 mm ($P = 0.01$). The achievability of a counterclockwise pitch of the bimaxillary complex was significantly higher in the maxilla first group. No significant differences in the surgical achievability of roll, yaw and vertical displacements of the bimaxillary complex were found between the groups.
Conclusion: The maxilla first protocol was superior in obtaining the 3D planned sagittal translation and pitching of the bimaxillary complex compared to the mandible first protocol.

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Intraoral vertical ramus osteotomy with the stripping of medial pterygoid muscle will yield the postoperative condylar morbidity and temporomandibular dysfunction?

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Objectives: On the correction of mandibular deformity by intraoral vertical ramus osteotomy (IVRO), when necessary for larger retrusions, this permits stripping of all but the most posteroinferior pterygoid muscle fibres near the angle. This stripping pterygoid muscle will yield the possibility of condylar resorption and aseptic necrosis by decreasing blood supply of proximal segment. The

aims of this study were to evaluate if the correction of mandibular deformity by bilateral IVRO with the stripping of medial pterygoid muscle was acceptable results on the long-term stability and temporomandibular joint (TMJ) symptoms.
Methods: A prospective study was undertaken of 394 consecutively treated orthognathic surgical patients with mandibular deformity. Postoperative condylar change immediately after surgery, at 3, 6, 12 and 24 months after surgery were assessed by pantomogram and computed tomography. A clinical examination of sign and symptoms of TMJ dysfunction were accomplished and compared before and after surgery.
Results: The severity of pain and signs of TMJ dysfunction was significantly reduced or totally eliminated during the follow-up period. There was no abnormal bone hearing of proximal segment and condylar resorption.
Conclusion: Our studies indicated that surgical correction of mandibular deformity by IVRO with the stripping pterygoid muscle provides good stability and relief of TMJ dysfunction.

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Postoperative stability and some tips of horseshoe Le Fort I osteotomy

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Background: Horseshoe Le Fort I osteotomy has the distinct advantage of allowing superior elevated repositioning of the maxilla, especially in the posterior portion, without trimming of the bone around the descending palatine artery. We have modified the osteotomy line depending on the pattern of the maxillary movement for horseshoe osteotomy. Here we show the modified technique of horseshoe osteotomy and postoperative stability.
Methods: 26 patients who underwent horseshoe Le Fort I osteotomy from 2009 to 2015 were evaluated retrospectively. The subjects were 7 gummy smile, 1 asymmetry, 10 open bite, 4 gummy smile with asymmetry, 2 gummy smile with open bite, 2 open bite with asymmetry.
Findings and Conclusions: In case of severe open bite, we perform a transverse palatal osteotomy in between the first molar and the second molar region, and then bilateral sagittal osteotomies through the maxillary sinus. With this technique, the sagittal osteotomy can be shorter compared with the original osteotomy line and enable to decrease the risk of dental root damage. Besides, there is an advantage that the larger dentoalveolar segment is superiorly repositioned without narrowing nasal airway. For the severe occlusal cant correction, we perform unilateral HLFO to the maxillary sinus at the higher superior repositioning side and sagittal osteotomy into the nasal floor at the opposite side.

There was no complication such as intraoperative haemorrhage, avascular necrosis of the maxilla, devitalisation of teeth, or oronasal fistula. There was very little skeletal relapse over the follow-up period, even up to more than three years.

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Virtual surgical planning in the treatment of facial asymmetry

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Objective: Facial asymmetry is a clinical common deformation. It is a challenge for surgeons to reconstruct ideal morphology and rehabilitate facial symmetry. The purpose of this study was to explore virtual surgical planning and virtual guide in the treatment of facial asymmetry.
Methods: Facial skeletal asymmetry patients, including asymmetrical prognathism or micrognathism, condylar osteochondroma, hemifacial microsomia, fibrous dysplasia, secondary jaw defect were enrolled in this study. Computed tomography (CT) scans were performed and data was saved in DICOM (digital imaging and communications in medicine) format. The osteotomy lines, amount and range of resection, and the reconstruction morphology was determined and displayed by preoperative simulation with mirroring and superimposing procedures. All operations were performed under the guidance of virtual guide. The accuracy of surgery was evaluated by comparing the postoperative CT with preoperative surgical planning.
Results: All patients underwent preoperative virtual surgical planning, determined the anatomical structure and morphology of ipsilateral facial bones using image technology. The use of 3D printing virtual guide ensured accurate implementation of preoperative design in operation. The accuracy of the operation was verified by image fusion of the preoperative design and postoperative CT.
Conclusions: With the opportunity to perform preoperative planning, surgical simulation and 3D printed surgical guide, virtual surgical planning shows great value in improving the surgical accuracy and restoring facial symmetry. It is regarded as a valuable technique in these potentially complicated procedures.

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Surgery-first approach in the treatment of dentomaxillofacial deformities

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Objective: Dentomaxillofacial deformities usually need orthodontic and orthognathic joint treatment. In recent years, surgery-first approach (SFA), without presurgical orthodontic treatment, has become favoured. From 2012, our department tried its application. The purpose of this study was to report our experience with the SFA in skeletal malocclusion.
Methods: 90 patients with skeletal malocclusions (19 bimaxillary protrusions, 54 skeletal class III malocclusions and 17 facial asymmetries) were enrolled in this study. After orthognathic-orthodontics discussion, adequacy for SFA was decided and treatment plan was made. Then patients underwent orthognathic surgery, which included Le Fort I maxillary osteotomy, bilateral

sagittal split ramus osteotomy (BSSRO), subapical osteotomy and genioplasties. Postoperative orthodontic treatment began after a healing period of 2 weeks.
Results: All patients underwent orthognathic and orthodontic treatment. The mean postoperative orthodontic treatment time was 14.6 months, which was shorter than that in traditional orthognathic-orthodontic joint treatment. In the bimaxillary protrusion group, it took about 19 months, which was longer than other groups. After orthognathic-orthodontic joint treatment, good facial profile and ideal occlusion was achieved.
Conclusions: With the advantages of earlier improving of patients facial aesthetics and dental function, reducing the difficulty and treatment time of orthodontic management, and increasing patient acceptance, SPF was regarded as an ideal and valuable alternative in this potentially complicated procedure.

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Accelerated orthodontic tooth movement following local osteotomies in a rodent model

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Background: In surgery-first approach of orthognathic surgery, the clinical phenomenon of accelerated orthodontic tooth movement after osteotomy is a benefit compared with the conventional approach. According to recent reports, it has been revealed clinically that the surgery induces a regional acceleratory phenomenon (RAP), characterised by a systemic increase in the baseline bone turnover and subsequently rapid tooth movement.
Objectives: To explore whether local osteotomies could accelerate orthodontic tooth movement in an experimental study.
Methods: 45 Sprague-Dawley rats were randomly assigned to three groups (Group A, B, C) with 15 rats in each. Group A and B were the experimental groups that underwent different osteotomies including Le Fort I osteotomies and periodontal osteotomies, respectively. After osteotomies, orthodontic appliances were placed on the first molars of left maxilla to move teeth. Group C, served as the control group, orthodontic appliances were placed and no surgery were performed. On days 1, 14, and 28, digital caliper measurements were taken to record the distance of tooth movement. Simultaneously, microcomputed tomography scans and histological processing were also performed.
Findings: In both experimental groups, the molar moved more rapidly on days 14 and 28 than control group. On day 14, the tooth movement in group B was greater than group A. Histological findings showed more active alveolar bone remodelling in experimental groups on days 28.
Conclusion: Local osteotomies including Le Fort I osteotomy and periodontal osteotomy were both intensive enough to induced RAP to accelerate orthodontic tooth movement. Periodontal osteotomy could activate RAP in an earlier stage.

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Reconstructive Surgery

Outcomes following pharyngolaryngectomy reconstruction with free tissue transfer — 13-year single unit experience

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Background: Pharyngolaryngectomy is a common procedure for circumferential hypopharyngeal and advanced laryngeal neoplasms. Reconstruction of such a defect is challenging but essential to improve function and the quality of life. Different reconstruction methods have been described which includes regional, pedicled or free flaps. Clinical outcomes following reconstruction are variable and depend on different factors e.g. previous surgical or nonsurgical treatment, method of reconstruction, patient motivation, access to rehabilitation, etc.
Objective: Outcomes following reconstruction of circumferential defects of the hypopharynx in a single unit.
Methods: The study includes all patients treated at the Head and Neck Unit who underwent a pharyngolaryngectomy and reconstruction with different types of free tissue transfers between 2002 and 2015. Outcomes assessed will be swallowing, pharyngocutaneous fistulas, strictures, donor site morbidity, overall survival and disease free survival.
Findings and Conclusions: We have collected data for 45 eligible patients and we are in the process of compiling our findings and conclusions. This study would be one of the largest series of such reconstructions in the United Kingdom-based population. Our study also reflects on the change of trend in the methods of reconstruction over the years.

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Four-dimensional computed tomography evaluation of condylar movement in patients underwent mandibular reconstruction

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Background: We previously reported good visualisation of jaw movements using four-dimensional computed tomography (4DCT) to evaluate postoperative outcomes in patients who underwent mandibular reconstruction. Through the experience of that study, we found that 4DCT could excellently visualise condylar movement.
Objectives: The purpose of the current study was to show that axial 4DCT was adequate for evaluating the condylar movements.
Methods: Seven healthy volunteers (median age, 30 years; range, 27–38 years) and seven patients (median age 65 years, range 52–80 years) who underwent mandibulectomy (segmental in five, hemi in one, marginal in one) and free flap reconstruction (using the fibula in six and the radial forearm in one) were enrolled. Study subjects were instructed to masticate a cookie during the 4DCT scan. The axial volume rendering images showing the bilateral condyle were manually selected for evaluation. The institutional ethics review board approved of this study (No. 1445).

Findings and Conclusion: 4DCT motion images could directly visualise bilateral condylar movement. The crosswise difference in the distances of condylar protrusion was significantly greater in patients than in healthy volunteers. We found that axial 4DCT images could excellently visualise a condylar protrusive path. Measurement of condylar protrusion on axial 4DCT images for patients who underwent mandibulectomy and free flap reconstruction has the potential to indicate the postoperative change in functional movement of condyles following mandibular reconstruction.

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Can Abbe flap solve the problem

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Background: Cleft lip repair sometimes may create challenges if the primary repair landed in the inexperienced surgeon, creating a more complicated issue of solving such challenge making the right decision to go around. Correcting such problem is another challenge. Abbe flap is considered to be a solution sometimes to overcome such problem. This flap was first described by Robert Abbe in 1898 although, first description done by Sabtt about sixty years earlier. Restoring aesthetic and functions of the upper lip is the goal of Abbe Flap.
Objectives: My aim is to describe the surgical techniques we have adapted at the Cleft Lip and Palate Center, King Fahd Armed Forces Hospital (KFAFH), Jeddah as well as some clinical cases performed.
Methods: Use of Abbe flap surgical procedure performed in patients at KFAFH.
Findings: The use of Abbe flap can solve the problem of poor primary repair of cleft lip and palate patients.
Conclusion: Although Abbe flap is not the most common method to repair cleft lip and palate, but it can solve the problem of aesthetic and function of poor primary repair.

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Flaps optimisation selection in reconstruction of head and neck soft tissue defects

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Background: Free tissue transfers have become a necessary means in the reconstruction of tumour defects, with many factors affecting the selection of the flap.
Objectives: In this study, the authors attempt to evaluate the functional and aesthetic outcomes on both the donor and recipient sites, and to determine the effects of technical factors including the flap thickness and vessels' diameters measured by ultrasonography, the size of the defect and postoperative volume reduction of the flaps were measured by magnetic resonance imaging (MRI).
Methods: Patients operated for elective soft tissue reconstructive surgery Between March 2013 and March 2016 using 55 anterolateral thigh flaps (ALTF), 30 radial forearm flaps (RFF) and 18 latissimus dorsi flaps (LDF), color Doppler ultrasonography was performed to measure the thickness of the flap at the site of the perforator. All preoperative colour Doppler ultrasound examinations of the diameters of donor and recipient sites' blood vessels were carried out.
Results: 97.1% of flaps had complete survival and 2.9% with complete failure (two ALTF and one LDF). ALTF, RFF and LDF difference percentage between MRI1 (3–6 weeks) and MRI2 (6–18 months) of flaps' volume was 27.6%, 17.9% and 36.1% respectively.
Conclusion: Proper selection of the flap is important for the optimisation of the aesthetic and functional outcomes. Ultrasound, MRI, the surgeon's experience and defect's extension and nature play a key role in the selection of the flap.

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Delayed maxillofacial reconstruction — thinking inside and outside of the box

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The reconstruction of mandibular and midfacial defects has been well discussed in the literature over the last decade. The classic maxillofacial surgical armamentarium has been expanded with numerous technological solutions, minimal invasive approaches and microvascular surgical tools.

In the environment of smart operating rooms, and with the use of computerised virtual surgery planning software, three-dimensional printers and surgical navigation systems, the ability to preserve patients' original morphology, function and aesthetics has raised both physician and patient expectations to an all-time high.

However, when coming to plan a delayed maxillofacial reconstruction, the original morphology, function and aesthetics are unknown to the operating physicians, and therefore must be re-architectured and designed in preparation for surgery. As such, the surgical result may frequently be found disappointing and unsatisfactory as compared to patients' hopes and expectations.

The lecture will present several approaches to delayed maxillofacial reconstruction, and show how the implementation of well-known practices from other fields of surgery, including orthognathic and preprosthetic surgery, together with the combination of technologic techniques and designing programs, can result in fine functional and aesthetic maxillofacial reconstruction.

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Reconstructive surgery in Romberg disease — is addressing the soft tissues a the key to success

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Background: Romberg disease is a disease of unknown aetiology causing unilateral hemifacial atrophy. Though it can be self-limiting it can result in causing gross facial asymmetry with varying severity. A plethora of reconstructive options involving hard and soft tissues have been described with varying results but

stable results have been reported with soft tissue reconstructive options.
Objective: The aim of the presentation is to discuss the versatility of various soft tissue reconstructive options in Romberg disease.
Methods: Patients with varying severity of Romberg disease reporting to us were treated with different options tailored to specific situations. Three cases with severe form of disease involving the one side of the face were reconstructed with deepitheliased anterolateral thigh flap. One patient with involvement of the mandibular region had a modified Washio flap and one patient with cheek involvement had fat injection. All the patients were followed-up periodically for at least three years.
Results and Conclusion: All patients had successful reconstruction with no failures. The free flap group had gross facial oedema which tended to settle in six months time. Multiple periosteal anchoring helped reduce long-term sagging of the flaps. The modified Washio flap provided an ideal cosmetic option as the patient was keen on a beard. Fat injection is stable if used in a confined area involving one region. Addressing soft tissues is the key to achieving stable reconstruction in such cases.

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Virtual surgical planning to aid secondary reconstruction including dental rehabilitation

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The surgical planning for best treatment result in reconstructive surgery is mandatory and main step in this way.

Virtual planning nowadays provides the best opportunity for surgeons to manage the problems that historically seems that not solvable.

In this presentation, I will try to show the methods and results of procedures that we performed in Iran on patients who needed complicated treatment including dental rehabilitation.

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Sensoric babysitter-procedure: a technique to prevent muslcular atrophy and improve neuronal recovery?

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Objectives: The babysitter-procedure might offer an alternative, when nerve reconstruction is delayed in order to overcome muscular atrophy due to denervation. In this study we aimed to show that a sensomotoric babysitter-procedure after nerve injury is capable to preserve irreversible muscular atrophy as a promising concept for facial nerve palsy.
Methods: In a total of 20 female Wistar rats the median nerve was denervated. The babysitter procedure was performed in 10 animals receiving sensory protection with the cutaneous brachii nerve. The median nerve then was reconstructed six weeks after by autologous nerve grafting from the contralateral median nerve in both groups. Over 15 weeks functional recovery was monitored by performance in grasping tests. At the end of the observation period the wet weight of the flexor digitorum sublimis muscle was determined. The median nerve was excised for histological examinations.
Findings: Muscle weight ($P < 0.0001$) was significantly higher in the babysitter-group compared to the control group at the end of the study. The histological evaluation revealed a significantly higher diameter of axons ($P = 0.0194$) and nerve fiber ($P = 0.0409$) as well as nerve surface ($P = 0.0184$) in favouring the babysitter group.
Conclusions: Sensory protection of a motor nerve is capable to preserve muscle weight and therefore prevent atrophy after denervation. Our results suggest that metabolism of the sensory nerve was sufficient to keep the target muscle's weight and vitality in this model. Future studies will have to evaluate this technique in facial nerve reconstruction.

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Complex scalp defects

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Background: Defects of the scalp may result from trauma, tumour resection, infections, congenital lesions and radiation treatment. Large and complex defects extending to bone can represent a significant challenge to the reconstructive head and neck surgeon.
Objectives: We present our experience in the treatment of complex scalp defects.
Methods: We conducted a retrospective study of patients treated for complex defects of the scalp. Data studied were: Epidemiological (age, sex), aetiologies, characteristics of the defect, surgical procedures and outcomes.
Findings: A total of six male patients underwent reconstruction for defects in the anterior scalp subunits (forehead = 1, frontotemporal = 3, parietal = 1, parietotemporal. The average age of patients was 53 years (range, 25–81 years). Scalp defects resulted either from tumour resection (two patients), posttraumatic loss of the scalp (three patients) and electric burn (one patient). As a surgical reconstruction, galea-aponeurotic flaps and split-thickness skin grafting was performed in two cases, a temporal muscular flap was performed in one case and a latissimus dorsi free flap was performed in two cases.
Conclusion: Scalp reconstruction represents a challenge, as the reconstructive surgeon should strive for a cosmetically appealing result as well as for durable coverage to the exposed cranium. Although local flaps have been described for the reconstruction of these defects, free flaps are the preferred choice when a significant area of soft tissue coverage is required or when the defect concerns also the bone.

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Reconstructive surgery of corrosive burn sequela of the oral cavity

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Corrosive lesions of the upper digestive tract are well documented in the literature. Ingestion of acids and sodas may be intentional or accidental. The spectrum of lesions is variable depending on

the affected organs, together or separately: oesophagus, stomach and duodenum. The oral cavity is rarely affected. Microstomia, ankyloglossia, teeth loss, vestibular synechia, alteration of facial expression and speech disorder represent the main sequela of caustic lesions reported in the oral cavity.

We report the clinical case of 27-year-old woman who was a victim of burns of the oral cavity due to the accidental ingestion of a very corrosive descaling agent in October 2008. She underwent two prior surgeries at another department without any improvement. When she presented at our department, she was very weak suffering of a severe anaemia and weighing 35 kg. Situation that was incompatible with survival. After a period of reanimation and blood transfusions, we performed under general anaesthesia and intubation with nasofibroscopy a reconstructive surgery after tissue debridement using a pedicled latissimus dorsi flap to obtain a satisfactory mouth opening. The therapeutic strategy and postoperative care are discussed in this work.

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Wide excision of giant basal cell carcinoma on the right cheek using radial forearm free flap reconstruction: a case report

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Background: The basal cell carcinoma (BCC), a malignant neoplasm derived from non-keratinising cells that originate in the basal layer of the epidermis. BCC are slow growing, locally destructive, metastasis is extremely rare, occurring in 0.0028–0.55% of cases, but fatal outcomes are possible due to locally destructive growth into vital structures and recurrent problem after surgery.
Objectives: To evaluate recurrence of BCC after surgery; evaluate functional and cosmetic outcome using radial forearm free flap (RFFF) reconstruction.
Methods: A 75-year-old male patient with blackened skin at right cheek for the past three months; initially like black spot; gradually became larger, itching, no discharge. Based on clinical and histopathological examinations, it was diagnosed as giant nodular BCC with telangiectasia and pigmented areas. The treatment was wide excision using RFFF reconstruction.
Findings: Wide surgical excision is considered a good treatment option for all BCCs arising on the face. Reconstruction using RFFF offer coverage defects or provide density for recreation of defect and provide well-vascularised tissue.
Conclusion: The treatment goal of BCC was to completely remove the tumour and continuous follow-up to detect local recurrence, and provide contour at surgical defect by using RFFF reconstruction.

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Ulnar fasciocutaneous free flap for reconstruction of oral cavity defects: a retrospective review

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Objective: Evaluate patient outcomes and donor site morbidities with the use of the ulnar fasciocutaneous free flap (UFFF) in oral cavity reconstruction.
Methods: Retrospective chart review was performed of all patients who underwent UFFF reconstruction for an oral cavity defect at a tertiary care cancer centre. Data evaluated included patient demographics, comorbidities and perioperative details. Both subjective and objective donor site outcomes including Mayo wrist score were reviewed.
Findings: Seven males and 4 females were included ($n = 11$). Average age was 53 years (range, 30–80 years). Preoperative Charlson Comorbidity score ranged from 2–5. The most common pathology and defect reconstructed were squamous cell carcinoma ($n = 10$) and tongue ($n = 7$) respectively. Average flap harvest time was 80 min and mean UFFF size was 31.9 cm^2. The mean area of tissue defect that was reconstructed was 60.44 cm^3 (range, 20–110 cm^3). Mean follow-up time was 19.2 months. All flaps survived with good functional outcome. Postoperative Mayo wrist score ranged from 75–100 (average, 93). All donor sites required a split thickness skin graft that healed without complication.
Conclusions: The UFFF is a good alternative reconstructive option as compared to the radial forearm flap. Similar qualities include ease of harvest, thin pliable tissue, reliable pedicle and minimal donor site morbidity. Advantages include a less hair-baring tissue that can be utilised in those situations where the dominant hand perfusion is based upon the radial artery.

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Evaluation of the gait characteristics of the patients subjected to iliac crest bone grafting

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Background and Objective: The main goal of this study is to evaluate the preoperative and postoperative gait characteristics of the patients subjected to iliac crest augmentation performed to treat maxillary alveolar atrophy.
Methods: Gait analysis was performed to the patients who underwent iliac crest augmentation on the Istanbul University Department of Orthopaedics and Traumatology, gait laboratory preoperatively and postoperatively at two, three and four weeks.
Result and conclusions: It was statistically significant that the gait characteristics are the same as with the preoperative period after 3 weeks. Healing of gait disturbances after iliac crest augmentation procedure can be maintained after three weeks.

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Craniofacial resection and reconstruction in patients with recurrent cancer involving the craniomaxillofacial region

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Objectives: The outcomes of craniofacial resection and craniofacial reconstruction in patients with recurrent malignant tumours involving the craniomaxillofacial region were evaluated.
Methods: This retrospective observational study was conducted from January 2008 to August 2015. Data collected for each patient included age, gender, tumour site, initial treatment, craniofacial resection, reconstruction flaps and complications following craniofacial resection, adjuvant treatment and reported the outcomes of craniofacial resection and craniofacial reconstruction.
Results: A total of 24 patients with recurrent malignant tumours involving the craniomaxillofacial region were identified who had undergone craniofacial resection. The resultant craniomaxillofacial defects were reconstructed using extended vertical lower trapezius island myocutaneous flaps (TIMFs), temporalis myofascial flaps, or submental flaps. All patients with recurrent malignant tumour involving the craniomaxillofacial region underwent gross total resection of the tumour; 22 patients underwent craniofacial reconstruction. Minor flap failure and wound dehiscence in the donor site occurred in four patients. The follow-up period ranged from 8 to 36 months. Seven patients in the squamous cell carcinoma (SCC) group and seven in the sarcoma (SA) group were alive with no evidence of disease, three in the SCC group and two in the SA group were alive with disease, and four in the SCC and 1 in the SA group died of local recurrence or distant metastases.
Conclusions: Craniofacial resection remains an effective salvage treatment for patients with recurrent SCC and SA involving the craniomaxillofacial region. The extended vertical lower TIMF is a large, simple, and reliable flap for reconstructing the major defects following a craniofacial resection.

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Free flap reconstruction for the oldest old patients with head and neck cancer: clinical considerations for comprehensive care

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Background and Objectives: To evaluate and identify the clinical challenges involved in microvascular flap reconstructions for head and neck cancer defects among oldest old patients.
Methods: A retrospective study for oldest old patients treated in a head and neck department of a tertiary hospital from 2005 to 2015 was designed. All the patients reconstructed with microvascular flap for head and neck cancer were filtered for the study and the patients with age ≥85 years were segregated and analysed statistically for complications.
Findings: There were a total of 24 oldest old patients treated in the given time period, of whom 15 were males and 9 female patients. The median period of hospital stay was 23 days. 18 patients had ASA II and 6 patients had ASA III on preoperative evaluation. The median operation time was 420 min, while the median intraoperative blood loss was 550 mL. A total of 16 patients underwent prophylactic tracheostomy, 9 patients suffered from postoperative surgical complications while 16 patients experienced medical complications. The surgical complication was associated with ASA III and the medical complication was associated with tracheostomy.
Conclusion: Head and neck cancer resections and microvascular reconstructions in oldest old patients are associated with a high risk of postoperative complications, the medical complications are associated with tracheostomy while surgical complications are associated with ASA score. Although the complication rate is high; complex resections and microvascular reconstructions are successful with optimum recovery and age did not influence the surgery. Consideration is needed to avoid prophylactic tracheostomy in these patients.

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Delayed free flap failure: a case presentation and discussion

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Vascularised free tissue flaps have become an integral technique utilised in Maxillofacial Surgery in order to repair large tissue defects within the orofacial region. Since their introduction, they have quickly become the gold standard for re-establishing form and function in head and neck cancer/pathology and selective severe trauma cases. Further, their contemporary survival rate of greater than 95% make them an exceedingly reliable procedure.[1]

When free tissue flaps do fail, it is overwhelmingly associated with complications secondary to the anastomoses/thrombosis of the pedicle usually in the first 72–96 h.[1] Late postoperative failure of flaps after discharge is a rare phenomenon, especially in time periods greater than three months as the tissue becomes less reliant on the vascular pedicle, developing more prominent collateral blood supply from the recipient bed. Failure of a free tissue flap greater than eight months postoperatively with no recurrent disease or trauma is virtually unheard of in available literature.

This presentation reports on a case of an exceedingly rare free flap failure at 10 months post-microvascular reconstruction with no antecedent recurrence, trauma or infection at the site and resultant complete loss of the free flap. We report a case of a 45-year-old male with a T2N0M0 SCC of the anterior floor of mouth, who underwent a wide local excision, bilateral selective neck dissections and a radial free forearm flap reconstruction with adjuvant radiotherapy.

Reference

Wax, M. K., & Rosenthal, E. (2007). Etiology of late free flap failures occurring after hospital discharge. *Laryngoscope*, *117*, 1961–1963.

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Viability of computer-aided design/computer-aided manufacturing surgery in mandibular reconstruction

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Background: Computer-aided design/computer-aided manufacturing (CAD-CAM) has created many new opportunities for the planning and implementation of mandibular reconstruction. Although this surgical method seems to be accurate, the question of the additional cost should be discussed.
Objectives: To evaluate the cost generated by CAD-CAM surgery, we performed a comparative study assessing a total of 45 patients treated for mandibular neoplasms. The sample size was divided into two groups: (1) test group: 25 patients undergoing CAD-CAM mandibular reconstruction; and (2) control group: 20 patients undergoing a 'traditional' freehand mandibular reconstruction.
Methods: Data concerning operation time, complications, and days of hospitalisation were used to evaluate costs related to the management of both groups of patients.
Findings and Conclusion: The mean operating time for the CAD-CAM group was 440 min, whereas that for the freehand group was 550.5 min. The total difference in terms of average time gain was 110.5 min. No microvascular complication occurred in the CAD-CAM group; two complications, related to the reconstructive plates (8%) were observed in patients undergoing freehand reconstructions. The mean overall lengths of hospital stay were 14 days for the CAD-CAM group and 17 days for the freehand group. Finally, considering that the institutional cost per minute of theatre time is €30, the money saved as a result of the time gained for the CAD-CAM group, was €3400. This cost corresponds approximately to the total price of the CAD-CAM surgery.

We believe that costs for CAD-CAM surgery will be covered by gains in terms of surgical time, quality of reconstruction, and reduced complications.

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An Australian regional perspective: an epidemiological analysis of maxillofacial fractures over five years

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Background: Australians living in regional and remote areas generally experience poorer health outcomes than major cities. Trauma remains a leading cause of morbidity and mortality in Australia with higher rates of injuries in regional areas. Injuries were responsible for 7.0% of the total burden of disease and injury in Australia in 2003.
Objectives: The purpose of this study was to analyse the epidemiology of patients with maxillofacial fractures managed by the faciomaxillary unit at Port Macquarie Base Hospital. The secondary objective of the study was to compare the trends in a regional town compared to a trauma centre.
Methods: A retrospective five-year records review was performed for patients who were treated for maxillofacial fractures from May 2011 to May 2016 in the Mid North Coast Local Health District.
Results: Of all the patients over the study period, young males were the most frequently affected. The most common aetiology was assault, followed by sporting injuries. The ratio of male to female was 3:1 for maxillofacial fractures. The most commonly presented fracture was the nasal bone followed by orbital fractures.
Conclusions: Regional areas have higher rates of maxillofractures in young males often as result of assault. The rates of assaults are higher compared to urban centres with implications on injury prevention strategies.

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Is the microsurgical end-to-side continuous suture technique a safe and favourable procedure for free flap reconstruction of the head and neck? The experience of over 750 microsurgical free flaps

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Background: Free flap reconstruction provides versatile options managing oncologic defects of the head and neck and has developed to safe strategy. A variety of methods have been described for microvascular anastomosis. The end-to-end interrupted suture technique is a standard method in most of the reconstructive centres in Germany. However end-to-side continuous suture technique has been consequently used for free flap reconstruction at our department.
Objectives: Evaluating the feasibility and reliability of the end-to-side continuous suture technique in free flap reconstruction.
Methods: A clinical study was conducted of all oncologic cases from 2006 to 2016 referred to our department. We investigated the clinical outcome of free flap reconstruction in which end-to-side continuous suture technique was used for microsurgical anastomoses favouring the internal jugular vein and external carotid artery as recipient vessel. The most common cases were intraoral squamous cell carcinoma of the mouth floor, mandible and tongue using a wide variety of different flaps.
Findings and Conclusion: The overall flap survival demonstrated excellent results using this technique showing that, the continuous suture technique for end-to-side anastomosis is a highly reliable and time saving method. It keeps the donor vessel intact, and does not interrupt distal blood flow. The technique overcomes the problems of vessel size discrepancy and is the preferred procedure in microvascular free-tissue transfers in head and neck reconstruction at our department.

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Platysma myocutaneous flap for intraoral reconstruction

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Reconstruction of oral soft-tissue defects following resection of oral carcinomas can be achieved using various techniques including microsurgical tissue transfer. However, there seems to be a role for regional or local flaps. Small to medium-size defects can be functionally reconstructed with the platysma myocutaneous

flap as an excellent choice particularly in medically compromised patients not being eligible for free tissue transfer. The present paper reviews the indication, surgical technique, and complications following reconstruction of defects of the oral cavity with the platysma myocutaneous flap.

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Oculomotor nerve palsy treated by superior orbitotomy approach

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Background: Oculomotor nerve palsy caused by an extraaxial tumour is rare in the literature. There are marked features of the palsy presenting with complete opthalmoplegia, mydriasis and severe unilateral ptosis of the eye. An innovative surgical approach was used; that is superior orbitotomy with osteotomy (extracranial approach) which is underreported.
Methods: We present a 14-year-old girl with complete ophthalmoplegia, mydriasis and profound ptosis of the right eye, of five months duration. Magnetic resonance imaging revealed extraaxial tumourous mass in the retrorbita.

A superior orbital approach was chosen as this offered direct access to enucleate the lesion that was unsheathing the nerve. The approach avoids major neurovascular structures, although the supratrochlear and supraorbital neurovascular bundles were visualised and preserved. The approach provides an intermediate location between extra and transcranial approaches, however does increase the chances of an unaesthetic scar.

Pupil sparing oculomotor palsy is often due to infarction of the nerve and is associated with diabetes. Smaller pupils may be associated with Horner's syndrome or diabetic neuropathy.
Results: Postoperatively, the patient's opthalmoplegia was markedly resolved and ptosis improved dramatically.
Conclusions: We discuss a case of optic nerve sheath meningioma with associated oculomotor palsy subsequently treated by superior orbitotomy with osteotomy. We highlight oculomotor palsy as a rare presenting feature and the innovative treatment of superior orbitotomy that is both conservative, rarely used and highly beneficial.

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Lateral orbitotomy with osteotomy: team approach to extraocular space occupying lesions

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Background: Access to the orbital contents without osteotomy can proceed from the anterior orbit using either transcutaneous or transconjunctival approaches. As part of craniomaxillofacial surgery, surgical approaches to the ocular cavity have undergone significant changes. Perhaps the most important development is the formation of multidisciplinary teams involving maxillofacial surgeons, neurosurgeons, and eye surgeons.
Objectives: The aim of this review is to comprehensively explore the role of oral and maxillofacial surgeon and the multidisciplinary approaches for the management of extraocular orbital lesions using lateral orbitotomy technique.
Methods: 107 cases of orbital tumours/lesions were retrieved from the files of the oral and maxillofacial department at National Ribat University Hospital (August 1996 to May 2016). All patients' files were reviewed to determine the association among pathological variables, age, details of procedure, outcomes and complications. The comparison of lateral orbitotomy with/without osteotomy in the removal of extraocular tumours and the advancement of team approach within this field in reducing postoperative complications is discussed.
Results: In aggressive or extensive lesions surgery with osteotomy is the treatment of choice in order to completely excise the mass and to avoid or minimise chance of recurrence and morbidity.
Conclusions: A multispecialty team facilitates diagnosis, staging, and extirpation of the tumour, thereby improving outcomes and providing acceptable cosmesis and functional reconstruction. Approaches and modifications of existing techniques have evolved to minimise injury of important neurovascular structures within and adjacent to the orbit.

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Smoking and radiation history are significantly associated with osteosynthesis-associated delayed complications in free fibula reconstruction of mandible — a retrospective study

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Background: The osseous reconstruction after resection is the ideal choice for functional rehabilitation of mandible. Although the success rate of vascular fee fibula is high, late complications such as plate exposures and infections related to osteosynthesis are not uncommon. The choice of the type of dental rehabilitation is greatly influenced by such complications and defining risk factors are needed.
Objectives: To find the significant risk factors associated with delayed complications in free fibula reconstruction of mandible.
Methods: A retrospective cohort of patients who received vascular fibula reconstruction for mandible from January 2011 to December 2013 were charted. Clinical, pathological and therapeutic factors were analysed for delayed complications in univariate and multivariate analysis to find the significance.
Findings: A total of 142 patients were analysed; the median follow-up period was 47 months. There were total of 19 patients with the late complications. The median time of complications was 8 months after surgery. Preoperative or postoperative radiotherapy were significant factors (0.02) and preoperative with postoperative irradiation was highly associated with the complication (75%, $P = 0.002$). The type of Ti plate used for fixation was a significant factor ($P = 0.019$), the disease characteristics ($P = 0.02$) was a significant factor. The multivariable Cox regression showed postoperative radiation (odds 6.9, $P = 0.009$) and history of smoking (odds 4.3, 0.037) as significant factors for late complications
Conclusion: Postoperative radiation and smoking history are associated with late complications in fibula reconstruction of

mandible and a caution is needed in selecting such patients for endosseous implants.

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Nasolabial island flap for reconstruction of anterior maxilla defects class I and II

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Background: Maxillary reconstruction is essential to provide nasal-oral separation, preventing speech and appearance problems on facial structures. The nasolabial flap is a simple and reliable way for anterior maxilla defects class I and II reconstruction.
Objectives: The aim of this study was to present the use of nasolabial flap in the reconstruction of anterior maxilla defects class I and II.
Methods: Five patients, two females and three males, aged between 38 and 67 years (mean, 52.6 years), from August 2014 to January 2016 with anterior part of maxilla with or without oronasal communication were included in this study. Three patients diagnosed with squamous cell carcinoma of gingiva (T1N0M0, T2N0M0, T4N0M0, respectively), one with epithelial-myoepithelial carcinoma of maxilla (T2N1M0) and one with ameloblastoma of maxilla. The nasolabial flaps were used in five patients. Follow-up data was collected for a period ranging from 9 to 26 months.
Findings: All patients healed without infection, flap loss, flap failure. Patients satisfied with good aesthetic appearance, bilateral symmetry and inconspicuous scars.
Conclusion: The nasolabial flap is a good choice for reconstruction of anterior maxilla defects class I and II.

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Postoperative symptoms burden in free flap reconstruction of head and neck: a qualitative study

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Background: Patients with free flap reconstruction in head and neck may experience various symptoms after surgical intervention, been pain the most prevalent unpleasant symptom. The multifactorial nature of pain is particularly evident in oncological patients, as it can be accompanied by psychological, emotional and social problems. These patients are difficult to express their feelings.
Objectives: This qualitative study was aimed to establish all the postoperative symptoms that these patients may experience.
Methods: A qualitative study was performed. A total of 31 patients who undergone free flap reconstruction were included in this study. The patients listed all the symptoms or discomfort experienced from day one to day six after surgery. Two groups of evaluators analysed independently the data that the patients have been documented.
Results: 31 patients were surveyed. Totally, 25 symptoms were documented. Pain was the most relevant symptom.
Conclusions: This qualitative research confirmed that patients with free flap reconstruction might experience various symptoms during their early postoperative stage. Our efforts should be concentrated to enhance the control of these unpleasant symptoms, therefore increasing the quality of life.

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Preliminary results of the effectiveness between the use of computer-aided design/computer-aided manufacturing, virtual surgery and stereolithographic model techniques and the classic techniques in reconstruction of mandibular defects using free osteocutaneous fibula flap

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Background: Reconstruction of mandibular defects remains a challenge for the oral and maxillofacial surgeon. The purpose of this study is to compare our experience in the mandibular reconstruction using the computer-aided design/computer-aided manufacturing (CAD/CAM) technology, virtual surgery, stereolithographic models and cutting guides with the classic reconstructive technique used to date.
Methods: We compared 22 cases of mandibular reconstruction between 2014 and 2016 using free osteocutaneous fibula flap. We analysed total surgical time, harvest flap time, positioning time of the flap, modelling time of the reconstructive plate in those cases in which is not preformed, ischemia time, ease of connection to the area of resection and intraoperative events. We also evaluated the aesthetic results and functional outcome.
Results: We performed the classic reconstructive technique in seven patients and the three-dimensional (3D) technique with CAD/CAM in 15 patients. After using virtual surgery the ischemia time, the modelling time of the fibula and the positioning of the flap in the mandibular remnant were shorter than with the classic techniques. With the use of preformed plates for the fixation instead of the hand made modelling plates we save more surgical time. Functional outcome and aesthetics results are better with the 3D techniques.
Conclusions: The use of CAD/CAM technology, virtual surgery and stereolithographic models with cutting guides are a widely accepted method that allows us shorter surgical time, less time of ischemia of the flap and better oncological, functional and aesthetic results in patients with large bone resection in the mandibular region in comparison with the classic technique.

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Surgical outcome of fibular free flap on mandibular reconstruction

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Background: Fibular free flap (FFF) has been well accepted for jaw reconstruction over decades and has now become a popular

option for lower jaw reconstruction. FFF provides several advantages over other donor sites with low unsuccessful rates.
Objective: The aim of this study was to analyse the surgical outcomes of FFF for mandibular reconstruction.
Methods: This retrospective study analysed 22 patients over a five-year period. We categorised the outcome as successful or unsuccessful.
Results: Of the 22 patients, 21 were successful with 13 patients (59.09%) without any complication, eight patients (36.34%) with complication including orocutaneous fistula, wound dehiscence, soft tissue contracture, facial asymmetry and donor-site morbidity, and one patient (4.54%) was unsuccessful.
Conclusion: These preliminary data suggest a high success rates. FFF remains a good option for mandibular reconstruction and the good postoperative management of the flap should be maintained to prevent complications.

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Evaluation of bone height in osseous mandibular reconstruction using free fibular grafts

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Background: Free fibular grafts have become the preferred method of mandibular reconstruction. However, there were few studies that investigated detailed bone resorption with respect to the number of osteotomies.
Objectives: The aim of this study is to evaluate factors that potentially influence bone atrophy of fibular grafts.
Methods: There were 25 patients (13 males and 12 females, mean age, 62 years; range, 50–77 years) included in this study. According to HCL classification, the following mandibular defect types were found: 17 L, 5 LC, 2 LCL, and 1 H. There were between zero and three segmental osteotomies per patient. Postoperative Panorex radiographs were used to evaluate bone height at standardised locations on each segment of fibular graft.
Findings: Main bone loss of the fibula graft was found in the body segment rather than the ramus segment. Multiple segmental osteotomies did not affect bone atrophy of the fibula graft. Bone atrophy of female patients was significantly higher than that of male patients in the body segment at late follow-up. Bone hypertrophy in the ramus segment was found in 25% of patients.
Conclusions: The load-bearing status of the mandible (i.e. opposing dentition or use of denture) and multiple segmental osteotomies of the fibula graft did not seem to affect bone atrophy of the fibula graft.

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Non-odontogenic oral to chest haemolytic streptococcal gangrene reconstruction with submental island flap

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Background: Necrotising fasciitis is a life-threatening emergency requires, most of the time, surgical intervention. Beta-haemolytic streptococcal necrotising fasciitis (haemolytic streptococcal gangrene) are associated with soft tissue necrosis and vascular thrombosis. When occurred in head and neck, the condition is rare but depends upon prompt alertness of oral and maxillofacial surgeons and otolaryngologists to prevent mortality or permanent complications.
Objectives: To review our experience of our submental island flap reconstruction in tongue base to neck.
Methods: Review of treatment record a referred case to a tertiary medical centre.
Findings and Conclusion: The 72-year-old female had history of diabetes mellitus presented as sore throat with dysphagia for three days. At presentation, generalised swelling over neck and local heat was noted and computed tomography found swelling of hypopharynx and subglottis with wide distribution of multifocal gas accumulation in bilateral pre-epiglottic space, retropharyngeal space, lateral hypopharyngeal wall, left submandibular space, carotid space and anterior cervical space. Deep neck infection with necrotising fasciitis was diagnosed and emergent cricopharyngeal myotomy was performed. Blood culture yielded *Streptococcus constellatus* and viridans while no odontogenic lesion of sinusitis was found. Follow up neck sonography revealed sufficient blood flow over right facial artery, thus, submental island flap for local reconstruction was performed nine days after denuding the necrotising fasciitis over the 3 × 3 cm defect of vallecula. The flap was inverted downward and the skin of the flap was sutured to the pharyngeal defect. The patient's condition gradually improved as antibiotics with Augmentin continued and was discharged 16 days after admission with satisfying recovery.

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Experience with radial forearm flap as beginners

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Background: Radial forearm free flap (RFFF) is a suitable flap to begin with as a novice to microvascular surgery due to its long pedicle and the ease of harvest. Outcomes and complications of RFFF by experienced surgeons are well described in literature. However, the outcome of RFFF surgery in the hands of a learner is not well known.
Objectives: To describe the experience, outcomes, complications and lessons learnt during RFFF surgery in the hand of trainees.
Methods: Demographic, clinical and surgical data of all RFFF surgeries harvested by two oral and maxillofacial surgeons newly trained in microvascular surgery was prospectively collected over nine months. Both surgeons had three months lab based training prior to starting surgery.

Findings: A total of nineteen RFFF surgeries were performed over nine months in patients diagnosed with oral cancer. Cheek, lateral tongue and lip were the common sites reconstructed. Vein crisis was the most frequent complication which occurred in four cases (21.1%) followed by hematoma formation (2; 10.5%). Re-exploration was done in five (26.3%) cases during the first 48 h. Flap failure occurred in two patients (10.5%) due to venous congestion which occurred on fifth postoperative day. Of these two patients, one was malnourished and had previous radiotherapy and the other was diagnosed with chronic alcoholic liver disease.
Conclusion: RFFF had a good prognosis even in the hands of trainee surgeons. Proper patient selection, close flap monitoring and early intervention for complications are key factors for success.

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Application of phleboplasty combined with microvascular anastomotic device in venous anastomosis with diameter discrepancy in head and neck defects reconstruction

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Objectives: To assess the clinical application value of phleboplasty combined with microvascular anastomotic device in venous anastomosis with diameter discrepancy in head-neck defects reconstruction.
Methods: 66 pairs of veins with significant diameter discrepancy were anastomosed in head-neck reconstructive surgeries with free flaps. 40 of them were anastomosed with microvascular anastomotic device (the coupler group) after phleboplasty including lateral incision, Y-T enlargement and wedge excision while the other 26 pairs of veins were conventionally sutured (the sutured group). Diameter of each vein, anastomosis time, postoperative vascular crisis, flap survival and complications related to the microvascular anastomotic device was recorded.
Findings: The average anastomosis time of the coupler group was 4.78 ± 1.14 min for lateral incision, 5.16 ± 2.07 min for Y-T enlargement and 11.09 ± 3.21 min for wedge excision, and all of them were significantly shorter than that of the sutured group. All veins in the coupler group were successfully anastomosed in a single coupling procedure without anastomotic impatency, blood leak, vessel tearing and ring shedding. One patient underwent cervical haematoma 5 h after operation, and the flap blood supply was unaffected after the haematoma was removed. All flaps in the coupler group survived completely. Six to 18 months followed up showed all flaps healed perfectly and no obvious surgical complications or microvascular anastomotic device rejection happened.
Conclusion: Pleboplasty including lateral incision, Y-T enlargement and wedge excision can reduce the size discrepancy and the anastomosis time, ease the difficulty level and guarantee the patency of the venous anastomoses for head and neck reconstruction.

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Application of microdissected thin anterior lateral thigh flap in precise microsurgical reconstruction of oral and maxillofacial soft tissue defects

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Objectives: To investigate the application of microdissected thin anterior lateral thigh (ALT) flap in precise reconstruction of oral and maxillofacial soft tissue defects and to assess the clinical outcome.
Methods: From January 2014 to September 2015, we utilised the technique of microdissected thin ALT flaps to repair the defects resulted from radical resections of primary sites in 42 patients with oral cancer. Using Doppler probing to detect and mark the dominant perforator. Initial incision was made medial to the marker. Careful dissection under operating microscope was conducted suprafascially to isolate the dominant perforator as well as identifying its source and type. The size of flap was determined according to the area of the defect. Meanwhile the flap was thinned in accordance with the contour of the defect.
Results: 45 microdissected thin ALT perforator flaps were harvested and used to reconstruct the defects of tongue, buccal, oral floor, and gingiva in 42 patients. In total, 65 perforators were identified, in which 28 were direct cutaneous branches, 13 were fascia-cutaneous branches, and 24 were fascia branches. Four flaps underwent marginal necrosis which healed smoothly after debridement and dressing changes. Six to 24 months follow-up showed satisfactory appearance of the recipient sites with favourable speech and swallowing function. All donor sites were closed primarily, leaving no complications.
Conclusion: Microdissected thin ALT perforator flap is an optimal choice for personalised reconstruction of soft tissue defects of oral and maxillofacial region, for it can decrease donor-site morbidity and achieve better appearance and function reconstruction effect of the recipient site.

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Orbital exenteration — defect classification and reconstructive algorithm

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Background: Orbital exenteration (OE) is a mutilating surgical procedure reserved to neoplastic disorders or extensive facial trauma with unfavourable eye involvement.[1] As a multitude of reconstructive procedures exist, it is of crucial importance to offer a disease tailored treatment to gain successful patient outcome.[2]
Objectives: In order to provide a standardised approach to the surgical procedure of OE we developed a defect driven classification for ablative orbital therapy followed by a reconstructive guideline.
Methods: The records of 39 patients who underwent OE from 2007 to 2016 were reviewed. Following the retrospective evaluation we designed a classification and a reconstructive algorithm for OE surgery and reconstruction.
Findings: In 26.3% the surgical procedure included solely orbital exenteration and in 73.7% an extended orbital exenteration was

performed. The classification refers to the extent of surgical resection. Type I describes resections limited to the orbit. Type II defines additional loss of one (IIa) or more (IIb) orbital walls/rims. Type III embraces cases with skull base penetration. Type IV describes defects with oro-orbital communication. The reconstructive algorithm respects the underlying malignancy, a (neo-)adjuvant therapy and the defect classification.
Conclusion: The classification as well as the reconstruction algorithm will help to restore anatomic boundaries and conduct physiological and psychological recovery to the patient.

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The sandwich technique: an operative approach in the prevention of complications by extensive defects in the head and neck

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Background: The functional and aesthetic reconstruction of head and neck defects with microvascular or pedicled flaps is an established operative technique. However, in cases of large primary tumours, tumour recurrence or osteoradionecrosis, a single flap can be not sufficient because of extensive soft tissue and bone defects. Postoperative complications include intra- and extraoral fistula formation, tissue repair defects, dehiscence and necrosis, all of which could be very difficult to treat.
Objectives: A solution to reducing postoperative complications is to make a wider range of tissues available with regard to skin, muscle and bone. For this very reason we have established the sandwich technique. This operative concept comprises two microvascular and/or pedicled flaps, which are taken from different regions depending on which tissues and vascular structures are needed.
Methods: Between 2012 and 2016 the sandwich technique was used on 21 patients. Each operation strictly followed a detailed preoperative planning with the following flaps which were freely combined according to their desired features: fibula free flap; anterolateral thigh; radial forearm flap; tensor fascia lata; latissimus dorsi; deltopectoral flap and pectoralis major flap.
Findings: The postoperative results show a sufficient functional and aesthetic reconstruction from complicated and extensive defects within the head and neck region.
Conclusion: The sandwich technique proved suitable for complex reconstructions. The extensive variability and options for combinations of flaps is a huge advantage for complicated cases. A sufficient preoperative planning is without doubt important and necessary to achieve a successful outcome.

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Donor site morbidity — deep circumflex iliac artery

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Deep circumflex iliac artery composite free flap is an ideal bony flap for reconstruction of segmental resection of mandible and in some maxillectomy. The contour of the iliac crest makes it an ideal choice.

Donor site morbidity even in extensive bone harvesting is low. The common complications include pain, temporary limping, neuropathy, and herniation of abdominal content. We present a single surgeons experience and rare complication of fracture of the osteotomised end of the anterior superior iliac crest in two patients.

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Sectioned images and surface models of a cadaver for understanding the free vascularised anterior rib flap

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Background: The purpose of this study is to describe the vascularised anterior rib flap on sectioned images and surface models using Visible Korean for medical education and clinical training in the field of mandibular reconstructive surgery.
Methods: Serially sectioned images of the thorax were obtained from a cadaver. Significant structures in the sectioned images were outlined and stacked to create a surface model.
Findings and Conclusions: The PDF file (8.45 MB) of the assembled models can be downloaded for free from our website at http://vkh.ajou.ac.kr/Products/PDF/Vascularized_anterior_rib_flap.zip http://anatomy.co.kr.

In this file, important anatomical structures related to the vascularised anterior rib flap can be examined in the sectioned images. All surface models and stereoscopic structures of the vascularised anterior rib flap are expressed in real time. We hope that these state-of-the-art sectioned images, outlined images, and surface models will help students and trainees gain a better understanding of the anatomy of the vascularised anterior rib flap.

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Inverse planning in maxillomandibular reconstruction

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Background: Even though microvascular surgery has become standard of care for jaw reconstruction, fixation of bone flap in a three dimensionally accurate position to receive dental implants is a difficult proposition.
Objective: To assess and analyse the effectiveness of inverse planning method in an ideal positioning of bone flap for future dental rehabilitation.

Methods: 14 patients who underwent maxillary or mandibular reconstructions following resection of benign pathology between July 2014 and September 2016 were included in study (maxilla, $n = 6$; mandible $n = 8$). Choice of reconstruction in all cases was microvascular fibula osteocutaneous flap. Stereolithographic (STL) models of jaws and fibula (wherever indicated) were produced from computed tomography scans. Model surgery was performed to determine most ideal position of fibula. Cutting guides and splints were fabricated, reconstruction and plate was precontoured to ensure accurate translation of planning to the operating table. Maxillary and mandibular reconstruction was performed with guidance of preoperative inverse planning and using fibular osteotomy and reposition guide templates to replicate the inverse planning intraoperatively.
Findings: Though the technique involves meticulous lab work, it was effective in reducing operative time required for fibula osteotomy and fixation. Postoperative radiological examination showed excellent positioning of bone that facilitated easier and more accurate placement of dental implants. The prosthetic rehabilitation procedures were significantly simplified and showed better load sharing by implants.
Conclusion: Rapid prototyping technology and inverse planning technique significantly improves functional and rehabilitative outcome in maxillary and mandibular reconstruction with free fibula flaps, followed by dental implants.

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Evaluating the effectiveness of clockwise rotation of the maxillomandibular complex for skeletal class III correction

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Objective: To investigate the skeletal stability after Le Fort I osteotomy with clockwise rotation and bilateral sagittal osteotomy.
Methods: 34 young Vietnamese patients were treated with Le Fort I osteotomy with clockwise rotation and setback bilateral sagittal split osteotomy. The lateral cephalographs were obtained before surgery (T1), right after surgery (T2), and on average of 15 months after the operation (T3). The horizontal and vertical relations of landmarks to the reference line and soft tissue changes were evaluated.
Results: During the T2–T1 period, there was upward and forward movement of the posterior part (PNS, UMD) and advancement and impaction of the anterior part (ANS, A point, UIE) of the maxilla. The mandible was moved superiorly and posteriorly. During the T3–T2 period, maxillary segment showed counterclockwise rotation relapse. The posterior part was relatively stable especially in the vertical position and the anterior part moved in the posterior and superior directions.
Findings: Mandibular landmarks showed forward relapse in the horizontal aspect and upward relapse in the vertical aspect. According to the skeletal changes, the soft tissue of the lower facial profile is rotated clockwise.
Conclusions: Two-jaw surgeries involving clockwise rotation of the occlusal plane showed stable results especially in the maxillary posterior landmarks. The clockwise rotational movement can be beneficial to increase skeletal stability and facial aesthetics.

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Application of combined computer-aided design/computer-aided manufacturing and three-dimensional printing in mandibular reconstruction: a controlled clinical trial

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Background: Mandible defects reconstruction requires high precision. Computer aided techniques should be adopted.
Objectives: To evaluate the effect of three-dimensional (3D) printed mandible and computer-aided design/computer-aided manufacturing (CAD/CAM) surgical guide plate in mandible reconstruction.
Methods: Patients requires segmental mandibulectomy of benign lesions and fibular flap reconstruction was recruited and allocated. Intervention group got computed tomography scan of the mandible and fibula. They were reconstructed by specialised software and surgical guide plate were designed and produced via CAD/CAM device. The post-reconstructed mandible was also simulated and 3D-printed, followed by bending of the titanium plate on this model. Patients got mandibulectomy and fibula molding with the surgical guide aided and their mandible was reconstructed via the pre-bended titanium plate. Patients in the control group got fibula molding and intraoperative reconstructive plate bending based on the surgeons' clinical experience. Operation time, facial asymmetry, masticatory efficacy and patients' quality of life were recorded 6 months after surgery.
Findings and conclusion: 17 participants in intervention group and 23 in the control group were recruited. Surgical time was on average shorter by 63 min in the intervention group ($P < 0.001$). Significant facial asymmetry (over 5% difference) was observed in 3 participants in the intervention group and 11 in control ($P = 0.037$). Intervention group had higher quality of life with no statistical significance (12.35 ± 5.68; 10.27 ± 6.32) [$P = 0.14$]. No difference was observed in masticatory efficacy. Preliminary results indicated that CAD/CAM and 3D printing techniques could significantly reduce surgical time in mandibular reconstruction and had higher cosmetic function.

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Tripaddled anterolateral thigh chimeric flap for extensive full-thickness cheek reconstruction after radical resection of advanced buccal cancer

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Objectives: Anterolateral thigh (ALT) free flap can provide a very large soft-tissue for reconstruction of extensive full-thickness cheek defect after salvage surgery of advanced buccal cancer, however the donor site cannot be closed primarily if ALT flap is too wide. The aim of this study was to evaluate the reliability of tripaddled ALT flap with kissing pattern for reconstruction of extensive full-thickness cheek defects, which can ensure the primary closure of donor site simultaneously.
Methods: 10 patients with advanced buccal cancer who underwent reconstruction of extensive full-thickness cheek defects with tripaddled ALT chimeric flap between March 2013 and June 2015

were enrolled. Among three skin paddles, distal paddle was used to reconstruct the inner mucosa defect, and other two large skin paddles were stacked side by side as kissing pattern for outer mega cheek defect.
Results: All patients were male, with a mean age of 48.3 years (range, 29–61 years). All tumour sizes were T4 stage. The mean area of intraoral defect was 32.2 cm^2 (range, 24–40 cm^2) and the mean area of extraoral defect was 106.34 (range, 85.4–143 cm^2). The mean width of outer skin defect was 9.5 cm. All flaps survived and all donor sites were closed primarily.
Conclusion: Tripaddled ALT flap stacked as kissing pattern is a novel and reliable modification on conventional flap design, which provides customised coverage for extensive and full-thickness buccal defects whilst minimising donor-site morbidity.

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Imaging evaluation of recipient vessel of osteoradionecrosis of the mandible with vascularised flap reconstruction

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Objectives: To investigate colour duplex sonography (CDS) and computed tomography angiography (CTA) — two types of detection technology used in the evaluation of recipient vessel of osteoradionecrosis of the mandible with vascularised flap reconstruction, to provide guidance for surgeons, and reduce the risk of flap necrosis.
Methods: 10 patients with osteoradionecrosis underwent surgery and vascularised flap reconstruction, CDS and CTA technology were used to detect the affected side of the neck, arteriovenous were detected before operation, and record the related vascular examination results, statistical analysis of inspection data. The results of the operation to be confirmed as the gold standard, the diagnostic test was designed to investigate the accuracy of CDS and CTA in the diagnosis.
Results: 10 patients underwent reconstruction with fibula myocutaneous flap. CDS and CTA detected external maxillary artery occlusion in four cases (40%), external jugular vein occlusion in three cases (30%), and carotid artery stenosis, arterial wall calcification formation in one case; CDS could detect the vessel of blood dynamic before operation, and recipient area around soft tissue can be three-dimensional imaging display through CTA.
Conclusion: CDS and CTA are used for the detection of osteoradionecrosis of vascular reconstruction of patients before surgery, can provide the recipient vessels without absence for surgery, haemodynamic course and syntopy precise information, can significantly reduce the risk of vascular tissue flap reconstruction failure.

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Transfer virtual surgery plan in maxillary defect reconstruction: navigation surgery or model-guided surgery?

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Background: As virtual surgery plan (VSP) becomes an important method for preoperative design in maxillary defect reconstruction, the two methods to transfer design from computer to real-time surgery: the navigation guided surgery and model guided surgery technique had been frequently used and reported.
Objectives: To compare the repeatability of different methods in transferring VSP for maxillary defects reconstruction.
Methods: 21 Patients who received maxillary defect reconstruction using either navigation and/or model guided surgery to transfer VSP from March 2012 to December 2015 were included in this study, and divided according to the transfer methods adopted: Group A ($n = 5$, used model-guided surgery solely); Group B ($n = 16$, used navigation and model guided surgery in combination). The three-dimensional (3D) deviation in midface area of preoperative design and postoperative CT scan were compared using a 3D comparing algorithm, the result of 3D deviation less than 2 mm was recorded.
Findings: The postoperative computed tomography showed that the 3D deviation less than 2 mm on midface area was 91.76% (86.77–96.68%) in Group A, and 90.56% (83.00–96.012%) in group B, with no significant differences between two groups.
Conclusion: There was no significant difference between these two groups in repeatability, but still needs to be proven by a larger sample. Model-guided surgery can be used for facilitating the titanium plate/mesh bending, while navigation guided surgery show the real-time location of the grafts. Surgeons can choose different methods solely or in combination base on the extent of defect and reconstruction methods.

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Total mandibular titanium prosthesis in a child

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Objectives: The aim of this study was to report a case of a six-year-old child with the diagnosis of Gorham-Stout syndrome, presenting without the complete mandible. The patient was breathing because an acrylic device was projecting the muscles, but is sustained a local infection.
Methods: The mandibular reconstruction was planned using computer-aided design/computer-aided manufacturing (CAD/CAM) technology. The skull of the patient was used to design and manufacture the customised total mandibular prosthesis with two temporomandibular joint fossae. CAD of the surgical devices used NX 10.0 software (Siemens, Plano, Texas, United States of America). The authors assumed that this design would maximise aesthetics, mandibular projection, facial height and future growth. The virtual designed mandible was submitted to a topological optimisation and finite element analysis in order to remove excess material and improve stiffness of the mandible.
Findings: The final result was a mandible weighing 59 g with two fossae for articulation and with threaded holes for future

implant insertions and dental rehabilitation. Surgery and postoperative follow-up was uneventful. The patient resumed normal functions at the first postoperative day, with decrease morbidity when compared to microvascular grafts. No bone grafts were used.
Conclusion: The project of this mandible may benefit many others patients which sustain serious mandibular defects, providing less morbidity and allowing for total mandibular and dental rehabilitation.

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Application of digital and three-dimensional print surgical guiding plates in free flaps reconstruction of mandible defect

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Background: The three-dimensional (3D) print surgical guiding plates could be used to assist the mandibular reconstruction.
Objectives: To establish digital and 3D print surgical guiding plates in order to provide a comprehensive reconstruction plan for patients with mandible defect with free fibular flap.
Methods: Preoperative spirals computed tomography (CT) scan and 3D reconstruction imaging was taken in 11 patients with mandibular tumours or defect from 1 September 2015 to 1 March 2016. The stereolithographic model of mandible was made using RP technique and reverse engineering (RE) from CT data. The processes of cutting tumour and shaping fibula transplantation were simulated using Mimics 15.0 software. The surgical guiding plates were devised and incused. Segmental mandibulectomy and mandibular reconstruction with vascularised fibula were performed based on the preoperative design and guiding plate. All patients with follow-up were evaluated for postoperative functional and aesthetic results.
Findings: The method could effectively transfer the virtual surgical planning information. During operation, the surgical guiding plates were small and tightly fit with bone tissues without extending the original surgical incision. Cutting, reformation and reposition of the fibula could be accelerated by surgical guiding plates. An average precision of 2 mm was found for the mandibular angle region and condyle.
Conclusion: The surgical guiding plates can enhance the operative accuracy and improve the surgical effect with good feasibility, leading to better aesthetic and functional reconstruction outcome in mandible defect reconstruction.

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Visualisation of perforator free flap perfusion in the immediate postoperative period using spy elite fluorescent imaging system

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Background: Use of microvascular free flaps for head and neck reconstruction has reported success rates over 94%. Administration of intraoperative fluids >7 L has been shown in the literature to increase the complication rate in head and neck reconstruction, intraoperative vasopressors are given to assist in limiting the amount of fluid administration and to counteract vasodilatory effects of inhalational and intravenous anaesthetics. However, concern exists that the use of vasopressors results in peripheral vasospasm, reduced flap perfusion, thrombosis and failure. Despite this belief, vasopressors are routinely administered during head and neck reconstruction.
Objectives: Prospective study of 20 reconstructive patients aims to use SPY Elite Fluorescent Imaging System during the intraoperative and immediate postoperative period to assess the potential effects of inhalational and vasoactive medications administered intraoperatively on perfusion of perforator free flaps.
Methods: Perforator free flap were viewed under SPY Elite twice during the intraoperative period (prior to pedicle division and after inset) and once in the immediate postoperative period. Type, concentration of the anaesthetics, type and amount of vasoactive medications and vital signs were recorded. In the immediate postoperative period clinical exam and Doppler ultrasound were also assessed. These time points were compared to ascertain differences in flap perfusion.
Findings: Preliminary data shows mild decrease in flap perfusion in immediate postoperative period when compared to intraoperative period with no significant in change in flap outcomes.
Conclusions: Flap perfusion during the intraoperative and immediate postoperative periods is nominal with no overall changes in flap survival.

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Microvascular reconstruction in vessel-depleted neck: alternative vascular options

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Background: The commonly used recipient vessels in head and neck reconstruction are often significantly compromised, nonviable or absent in patients exposed to previous treatment such as radiotherapy and/or chemotherapy or surgery.
Methods: The author aims to present a review of microvascular reconstruction in this challenging group and formulate an algorithm for vessel selection, including alternative that are not considered common practice in head and neck reconstruction.
Results: Several patients presenting with recurrent malignant disease or osteoradionecrosis following extensive treatment for previous head and neck cancer were successfully treated with microvascular reconstruction.

Our strategy for achieving arterial anastomosis includes exploration and anastomosis with ipsilateral or contralateral neck vessels if present. Alternatively, the transverse cervical, suprascapular and superficial temporal arteries were used. Venous anastomosis was achieved with superficial temporal or innominate veins when external or internal jugular veins were absent. Vein grafts were used frequently to lengthen both arteries and veins.
Conclusion: Vessel-depleted neck is not a contraindication to microvascular reconstruction. The branches of external carotid artery and internal or external jugular veins can be successfully utilised if present. However, when these are absent, superficial temporal vessels, transverse cervical and suprascapular arteries and smaller innominate veins are reliable alternatives. Vein grafts should be used freely when needed. They have proved very effective despite widespread use to lengthen both arteries and veins.

Additionally, superficial temporal vessels and vein grafts can address some of the challenges of midface reconstruction, particularly with flaps known to have short pedicle such as the deep circumflex iliac artery and scapula.

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The proximal peroneal artery perforator flap: an alternative to the radial forearm flap for head and neck reconstruction

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Background: The radial artery forearm free flap (RAFFF) is a reliable and versatile flap that has remained the workhorse for head and neck reconstruction. However, objective and subjective concerns regarding the donor site morbidity needs careful consideration and should not be dismissed lightly. We have used the proximal peroneal artery perforator flap (PPAP) as an alternative. The author presents the technical aspects of harvesting this flap and a review of our experience using the PPAP flap for head and neck reconstruction.
Methods: Data were collected prospectively on 8 consecutive head and neck reconstructions using the free PPAP flap. Patient details and intraoperative flap details were recorded.
Results: Eight patients underwent reconstruction of their head and neck defects with a free PPAP flap. The flap dimensions and length (3–7 cms), diameter (0.8–1 mm) and course (myoseptocutaneous) of the single perforator supplying the flap were recorded. All donor sites were closed primarily.
Conclusions: The PPAP flap is a good choice for head and neck reconstruction and represents a viable alternative to the RAFFF. It has reliable anatomy and provides a thin and pliable skin that is ideal for many head and neck defects particularly intraoral lining. It carries significantly less donor site morbidity that is more acceptable to the patients. The primary disadvantages are the short length of the pedicle and challenging technical aspects of vessels anastomosis due to the small vessel diameter. In our practice, the PPAP flap has replaced RFFF for reconstruction of head and neck soft tissue defects.

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Facial reconstruction: patient specific implants, success and failure

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Background: Implants used in craniofacial surgery can be classified according the biomaterial used or its clinical presentation like stock prostheses. Patient specific implants (PSI), those defined like implants made with specific anatomic dimensions of patient, through design, planning and manufacturing computer guided or aided, which finally will adjust with accuracy and precision in anatomic sites with disturbance in shape and thickness.
Objectives: (1) To release different biomaterials used in reconstructive craniofacial surgery implants with their success and failure rates, exposing benefits, contraindications and frequent complications; (2) to present a clinical protocol, which will resume planning, biomaterial choice, design and surgery technique; and (3) to present 2 clinical cases worked in our institution.
Methods: Display will be with films, reviewing available literature updated with clinical cases and the setting up of a clinical protocol.
Findings: There are not enough randomised controlled trials, meta-analysis, which can determine the ideal biomaterial to develop a PSI.
Conclusions: PSI represents the ideal option to reconstruct high complexity craniofacial defects for its safety, reproducibility and high accuracy, even there's not an ideal biomaterial for fabrication, in this review the titanium and polyetheretherketone are biomaterials with less complication rates.

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Efficacy of various biologic wound dressings on facial skin wounds—a comparative clinical study

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Background: Face is a highly aesthetic zone and management of facial soft tissue defects poses a great challenge to surgeons. Exposed wounds generally need to be covered with dressing materials as they inhibit bleeding, increase protection of wound and maintain water and electrolyte balance.

Human amniotic membrane (AM), collagen membrane, platelet-rich fibrin (PRF) and chitosan have attained importance in various clinical fields including wound healing. Though these materials have their own unique properties, there is a need to compare and evaluate their efficacy as wound dressings for post-traumatic soft tissue injuries of the maxillofacial region.
Objectives: To evaluate operability, postoperative pain, wound contracture, rate of healing, scarring and antiinflammatory effects of AM, collagen, PRF and chitosan.
Methods: A study is being conducted in Department of Oral And Maxillofacial Surgery at our institution encompassing a total of 40 patients with facial soft tissue injuries. They are randomly divided into four groups, with 10 patients in each group treated with AM, collagen, PRF and chitosan.
Conclusions: In the modern era, there are numerous wound-dressing materials like AM, collagen, PRF and chitosan. The study aims to assess the effectiveness and usefulness of these materials, which are being evaluated by scoring a variety of parameters in the intraoperative and postoperative periods. These include rate of wound healing (based on the granulation tissue formation), pain relief (using the visual analogue scale) and height, pliability, vascularity and pigmentation of scar (using Vancouver scar scale).

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Stage approach of marsupialisation and total enucleation with peripheral ostectomy for treatment of large cystic ameloblastoma at posterior mandible: report of two cases

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Background: Ameloblastoma is a locally invasive odontogenic tumour. The standard treatment for a conventional ameloblastoma is generally accepted to do a resection with safety margin of at least 5–10 mm. Total enucleation might be not sufficient for the treatment of large ameloblastoma.
Objective: The study aimed to report two cases of patients who were diagnosed of ameloblastoma at posterior mandible and underwent staged approach of marsupialisation and total enucleation of large cystic ameloblastoma at posterior mandible.
Findings: Two patients aged 13 and 28 years, presented with cheek swelling and jaw expansion were reported. Incisional biopsy revealed plexiform type of ameloblastoma at posterior mandible and clinical findings showed cystic-like tumour. The treatment sequence started from wound decompression and observed for 6–12 months for tumour size reduction and definite treatment by surgical enucleation and peripheral ostectomy and soft tissue excision along the fistula. The pathological confirmed solid ameloblastoma with plexiform pattern of both cases. After two years follow-up period, computed tomography scan showed no evidence of residual tumour and good bone healing.
Conclusions: Surgical decompression following by aggressive enucleation is an option for treatment of cystic ameloblastoma especially in young patient. However long-term follow-up should be concerned and carefully examined.

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Definitive surgical management of an enormous assumed thyroglossal duct cyst: a case report

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Thyroglossal duct cysts commonly present in childhood but can also afflict the adult population. The most frequent presenting sign is a painless midline neck mass. The patient in this case study was a 20-year-old male from Prey Veng province, who presented for treatment five years after a 'neck' swelling was first observed. The size of the lesion at presentation was 19 cm × 14 cm × 12 cm and because of its location the mandible was severely distorted.

The patient underwent two stages of treatment: initial excision of the cyst, and subsequent reconstruction to restore the mandibular morphology. Computed tomography was used to fabricate a three-dimensional surgical biomodel and plan the mandibular repair. A 2 cm mandibular midline ostectomy and bilateral sagittal split setback osteotomy were utilised to reduce the length and breadth of the mandible and to restore form and function. A number of unsalvageable teeth were also removed, and the patient was able to wear a conventional removable prosthesis. At the three-year follow-up appointment, no recurrence of the lesion was noted, and the patient had good function and appearance.

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Fibula jaw in a day: preserving vascularity to the implanted segments

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Over the years, there have been a lot of technological advances in virtual surgical planning (VSP) in maxillofacial reconstructive surgery. One of the advances has been the introduction of the 'Fibula Jaw in a Day' procedure, which we previously described.[1] This allows for jaw reconstruction and dental rehabilitation to be performed within the same surgery. Concerns regarding this technique have revolved around the potential for devascularisation of the implanted segment. We present a series of six patients and describe our technique for preserving vascularity to implanted segments.
Technique: Anatomic vascular studies show that septocutaneous perforators from the peroneal artery pass along the posterior surface of the fibula and through the posterior crural septum to the skin. Our technique involves (perforator planning), which we previously described, to capture the perforator within the bony segment that we plan to implant. This is performed during the VSP session using the patient computed tomography angiogram of the lower extremities. Capturing the perforator within the planned segment allows for providing periosteal blood supply to the implanted segment. In our technique we leave a small cuff of muscle to protect the periosteum. We also restrict placement of the implants to the anterior surface of the fibula, so as not to disturb the perforators on the posterior aspect.
Results and Conclusion: Six cases were treated successfully using this technique. A series of photos/videos are used to illustrate this technique.

Reference

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Virtual surgical planning of double-barrelled fibular osteoseptocutaneous free flap for mandibular reconstruction

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Background: There were many articles about double-barrelled fibular flap for mandibular reconstruction. But the accurate relationship between the two layers bone was rarely reported.
Objectives: The purpose of this study was to evaluate the feasibility of the novel design of the double-barrelled fibular flap from virtual surgery to actual result.

Methods: From 2012 to 2016, 52 patients underwent segmental mandibular reconstruction with double-barrelled fibular osteoseptocutaneous flaps with computer-aided design/computer-aided manufacturing technic. Preoperative computer tomographic (CT) scans were imported into Mimics 10.01 software (Materialise, Leuven, Belgium) for surgical planning. The double-barrelled bone was strung with 16 mm fixation screws instead of miniplate. 63 dental implants placement were simultaneous in 30 patients and 32 dental implants placement were in second stage in 18 patients. Postoperative CT and digital imaging were evaluated to assess surgical accuracy using software. The pre- and postoperative morphometric measurements were compared using the Student *t* test.
Results: Two flaps occurred vascular crisis postoperatively. There was no flap necrosis. One hundred four CT scans from 52 patients who underwent partial mandibular resection were analysed. The dimensions of the double-barrelled fibula segments after osteotomy showed no difference from the preoperative virtual surgical planning (VSP). But the condylar locations showed a disposition out of the fossa ($P < 0.05$), between VSP and postoperative CT scans. There was no difference in implants between VSP and postoperative CT scans.
Conclusions: The VSP of relationship of double-barrelled fibular is important for segmental mandible reconstruction. The benefit of VSP was to enhance surgical accuracy and safety.

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Computer-aided design/computer-aided manufacturing versus conventional fixation methods for mandible reconstruction: a biomechanical *in vitro* study

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Background: There are several methods for osseous fixation in mandible reconstruction with a trend towards computer-aided design/computer-aided manufacturing (CAD/CAM) plates. There a no studies comparing biomechanical aspects of conventional plates with CAD-CAM fixation systems to date.
Objective: The aim of this study was to determine the plate with the highest fatigue strength.
Methods: We designed a polyurethane mandible reconstruction model (Synbone, CH) with cortical and cancellous equivalents. Three different fixation systems with each six specimen were tested. Mandible reconstruction of a right-sided two-segment defect was performed with either miniplates (Group A), a conventional 2.0 mm reconstruction plate (Group B) or an individual CAD-CAM plate (Group C) [Depuy Synthes, Germany]. Mastication was simulated via cyclic dynamic testing using a universal testing machine (MTS, Bionix, Eden Prairie, MN). Specimens were tested at a rate of 1 Hz with increasing load application (+0.15 N/cycle) on the left side.
Findings: Material failure in the miniplate group occurred at 51.920 simulated bite cycles on average (corresponding to a load of 0.56 ± 0.4 kN). CAD CAM and reconstruction plates failed at 0.66 and 0.65 kN on average. Material stiffness was higher (+70 N/mm) in the CAD CAM group. Plate breakage appeared in groups A and B, while screw breakage was recorded as failure mechanism in Group C.
Conclusion: All three tested fixation methods seem sufficiently stable for mandible reconstruction. For two-segmental defects, rigid fixation seems to be better in reconstruction plates compared to titanium miniplates.

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Long-term biomechanical donor site morbidity after radial forearm free flap

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Background: Although the radial forearm free flap (RFFF) is a commonly used microvascular graft for head and neck reconstruction, long-term biomechanical results regarding donor site morbidity are rare.
Objective: To evaluate long-term functional outcome after RFFF.
Methods: In a prospective study 32 patients underwent biomechanical assessment preoperatively, three month postoperatively and two years postoperatively. Both the donor and the contralateral arm were examined. The primary endpoint of the study was grip strength. Further, Mayo-Wrist-score, DASH-score, fine motor skill strengths (tip pinch, key pinch, palmar pinch) and the range of motion were analysed. Primary defects were closed with local full-thickness skin grafts (FTSG) from the donor site forearm avoiding a secondary defect site.
Results: In the long-term analysis, grip strength was reduced in both arms. A significant improvement over time was found only for the donor arm. A persistent deficit of tip pinch strength and dorsal extension was recorded. Persistent sensory limitations occurred in 4 cases. Patient satisfaction after two years of follow up was high and daily life routine was not restricted.
Conclusion: Gross and fine motor skill limitations are reversible short-term effects after RFFF harvesting and do not restrict daily routine in the long-term. These findings substantiate the value of the RFFF as a workhorse reconstructive surgery.

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Prefabrication of customised polymethylmethacrylate implants in cranioplasty and the mechanical properties of polymethylmethacrylate versus polyetheretherketone

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Background: The two most widely used implant materials in cranioplasty are polyetheretherketone (PEEK) and polymethylmethacrylate (PMMA). PEEK has been used for the last two decades in cranial surgery, due to its excellent biocompatibility, good mechanical strength and radiographic translucency. PMMA has a relatively low cost and has an extensive track record dating back to the 1940s. Sterilisation is a mandatory process for materials used in medical applications like skull implants. While sufficient strength and stiffness are important criteria that implant

materials have to fulfil for successful applications in bone surgery, the sterilisation method used can compromise their mechanical properties.
Objectives: The aim of our present study was three-fold. First: to investigate the mechanical properties of PMMA and PEEK before and after different sterilisation modalities. Second: to support the development using these data of a new implant fabrication with PMMA using three-dimensional (3D) design and rapid prototyping. Third: to assess the costs and results of 50 patients treated with PMMA skull-implants using the newly developed fabrication.
Methods: Mechanical tests on PMMA and PEEK, 3D design and rapid prototyping.
Findings: The mechanical properties of PEEK and PMMA did not differ significantly. The customised implants fitted perfectly. Two patients needed an implant removal as result of an infection. No complications appeared in the other 48 patients. The mean cost of the implants was approximately 450 euros.
Conclusion: PMMA is a reliable material for the prefabrication of customised skull implants. The PMMA customised skull implants offer good clinical results.

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Microvascular reconstruction for the treatment of persistent frontal sinus infection

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Background: Frontal sinus fractures are uncommon, most of frontal sinus fractures are seen with midfacial injuries. The indications for frontal sinus surgery include injury to or obstruction of the nasofrontal ducts, dura/cerebral involvement, and aesthetic deformity.

Open treatment of the injured frontal sinus and nasofrontal outflow tract (NFOT) is currently the recommended standard, with careful attention to meticulous extirpation of the frontal sinus mucosa and obliteration or cranialisation; however, some patients may develop persistent frontal sinus infection, we present two cases that were successfully treated with microvascular surgery.
Methods: Two patients with persistent frontal sinus infection after a frontal sinus fracture were treated in our department at Son Espases University Hospital

- 46-year-old male patient obliteration of the NFOT is done with a vascularised fibula free flap.
- 66-year-old male patient with a frontal cranial base defect was treated with a radial free flap.

The two flaps survived and resulted in complete sinonasal separation and the patients are free of frontal sinus symptoms.
Conclusion: Microvascular reconstruction is a good treatment option to seal the NFOT and to obliterate the dead space for the treatment of persistent infection associated with frontal sinus fractures.

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Comparison of vascular and avascular reconstruction of cranial defects

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Background and Objectives: Scalp defects often arise in multimorbid patients. This study aimed at establishing an algorithm of defect repair with particular focus on new regenerative options.
Methods: All patients between April 2005 and April 2016 were reviewed in a retrospective fashion. Different reconstructive options were compared with regard to duration of hospital stay as well as rate of reoperations needed to achieve full closure.
Findings: 125 patients were identified. Local flaps were more effective than skin grafts ($P = 0.038$) and microvascular free flaps ($P = 0.037$) in case of skin-galea-periosteal-defects. However, no differences were found between skin grafting in combination with wound bed preconditioning using a dermal regeneration template and microvascular free flap transfer.
Conclusion: Scalp defects should be repaired based on careful evaluation of defect anatomy as well as patient's general health. Application of dermal regeneration templates allows for an increase of the indication spectrum of free skin grafts.

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Free flap reconstruction following ablative tumour surgery — donor-site morbidity and quality of life

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Background: The use of microvascular free flaps tailored specifically to the ablative surgical defects in the head and neck region has allowed precise anatomic reconstructions to be performed.
Objectives: The present prospective study investigated donor site morbidity and quality of life following cancer ablation and primary reconstruction.
Methods: All patients undergoing microvascular reconstruction between April 2005 and April 2016 were recorded. Donor-site morbidity was assessed for the patients undergoing flap harvest from the shoulder and arm region using the DASH Score preoperatively as well as one and three months postsurgery. Quality of life was evaluated using the standardised QLQ-C30 and H&N35 questionnaires developed by the European Organization for Research and Treatment of Cancer (EORTC).
Findings: A total of 525 microvascular free flaps were transferred for head and neck reconstruction purpose. Among them were 231 scapula, 56 fibula, 180 radial forearm, 46 latissimus dorsi and 12 upper arm flaps. One month postsurgery the DASH score reached 52% and decreased to 20% until week 3 postsurgery.
Conclusion: The general quality of life (QLQ-C30) was negatively affected by age >70 years ($P = 0.05$) and the head and neck-specific quality of life (H&N35) was negatively affected by radiation therapy, smoking habit and alcohol abuse.

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Comparison of conventional and two methods of computer-assisted mandibular reconstruction planning techniques

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Resection of mandible is key treatment modality of squamous cell carcinoma infiltrating mandibular bone. Reconstruction of consequent defect with composite vascularised flaps is very demanding task in order to restore preoperative facial contour, normal function of temporomandibular joint and facilitate future prosthetic reconstruction.

In our department we use different methods for planning reconstruction: free handed reconstruction (FH), based on pre-bending of plate on mandibular surface preoperatively and shaping bone on head surgical site after disconnection of pedicle, and two methods of computer-guided reconstruction—first with pre-bent plate (PP) on three-dimensional (3D) printed model of reconstruction designed in freeware and hand made cutting guides, second is DePuy Synthes TruMatch® patient-specific plates for mandible (PSPM) with 3D printed cutting guides from Materialise company. These methods of reconstruction planning will be compared from perspective of operation time, precision of reconstruction on preoperative and postoperative computed tomography (CT), early and late sequelae occurrence and aesthetic and functional outcome.

Defects were reconstructed using fibular free flap or with deep circumflex iliac artery flaps. Preoperative and postoperative CT scans were performed. They were compared and differences measured using Dolphin 3D software. Aesthetic and functional outcomes were compared using questionnaires and photography.

Cohort of 18 patients, 6 patients was reconstructed with use of FH method, 6 with PP and 6 with PSPM. PSPM was most successful in restoring of shape of mandible, in aesthetic and functional aspect. FH and PP was less accurate in restoring the precise shape. However use of PP method reduced operation time significantly too.

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Assessment of the accuracy of a three-dimensional modelling technique in maxillofacial reconstruction: a prospective study

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The use of rapid prototyping three-dimensional (3D) models has revolutionised the way reconstruction of complex defects of the maxillofacial skeleton are planned. They help save time, and improve accuracy.

Five patients who had 3D planning to plan their reconstruction were involved in this study. The defects ranged from mandible segmental defects, to mandible defects involving one condyle, to a complex midface defect.

The patients had a postoperative computed tomography scan to evaluate the accuracy of the reconstruction result. The findings of the study are discussed.

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Mandibular defects reconstruction with fibula flap and free fibula bone graft

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Background and Objective: The vascularised free fibula flap has become the most popular reconstruction method for segmental mandibular defect because of adequate bone graft length and acceptance of dental implants. Because of the height discrepancy between the native mandible and transplanted fibula, it is difficult to wear conventional dentures or receive osseointegrated implants. The purpose of this study was to research if mandibular defect could be reconstructed with fibula flap and nonvascularised free fibula bone graft to get a better contour and high neo-alveolar bone.
Methods: 17 patients received mandible reconstruction with fibula flap and free fibula bone graft. In the operation, fibula flap was used to reconstruct the mandible as the inferior portion or superior alveolar portion. The nonvascularised fibula bone was fixed to the fibula flap with titanium plate or screws to augment the height of fibula bone. The periosteum between vascularised and nonvascularised fibula was removed to get a better attachment between vascularised and nonvascularised fibula.
Findings: The operation proceeded very smoothly in all 17 cases. The follow up time was 6 months to 24 months. All patients got a good appearance, and the bone height improved 5–15 mm compared with conventional one-strut type technique.
Conclusions: It is a good choice to reconstruct mandibular defect with fibula flap and nonvascularised free fibula bone graft to get a better contour and high neo-alveolar bone.

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Reconstruction of complex mandibular defects using titanium custom-made implants

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Background: Reconstructing mandibular deficiencies is challenging due to the unique anatomy and diversity of defects. In mandibular reconstruction, restoration of function, occlusion and aesthetics is the primary goal. Autografts are the gold standard for mandibular skeletal reconstruction. However autografts have few disadvantages, which led to the research of alloplastic materials. Development of computer-aided design/computer-aided manufacturing systems allows for precise preoperative planning and designing of patient specific implants preoperatively.
Objective: Describe the use of patient specific implants for mandibular reconstruction.
Methods: Three cases of mandibular bone reconstruction are presented. One patient following ablative surgery, one following traumatic avulsion injury and the third due to an extremely atrophic

mandible. All three mandibular defects were reconstructed using titanium implants shaped as a crib, thus allowing addition of artificial and autogenous bone grafts for future dental implant placement.
Findings: Mandibular defects were reconstructed using titanium for strength and function and exhibited proper mouth opening, function and aesthetics. In one of the patients dental implants were designed as part of the patient specific implant thus allowing for future implant supported dental rehabilitation not requiring support of the bone graft.
Conclusions: Individual computer-aided design/computer-aided manufacturing systems for pre-existing facial defects are becoming a popular alternative to autografts. Results are promising and exhibit excellent aesthetic and functional outcomes, while reducing operating time and avoiding donor site morbidity. This procedure provides a simple way to reconstruct complex three-dimensional structures with precision that is difficult achieving with standard methods.

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Virtual surgical planning in head and neck tumour and reconstructive surgery

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Background: Over the past 10 years, we began to utilise computer-aided design/computer aided modelling (CAD/CAM) software, combined with intraoperative navigation, to plan and carry out head and neck tumour ablation and reconstruction.
Objectives: To critically examine the evolution of virtual surgical planning (VSP) and explore our reconstructive outcomes with specific focus on the accuracy of recently introduced custom plates compared to the stock reconstruction plates.
Methods: Review of evolution of VSP in our institution over the past decade with a retrospective analysis of mandibular reconstruction using custom reconstruction plates compared to standard reconstruction plates between December 2012 and December 2016. Comparison of accuracy was done by analysis of pre- and postoperative scans.
Results: 74 patients with a variety of benign and malignant tumours were managed utilising a combination of CAD/CAM software for presurgical planning, stereolithographic models, and/or intraoperative navigation. All subjects included in the study underwent reconstructive surgery for a variety of benign and malignant head and neck tumours as well as traumatic avulsive injury using microvascular free tissue transfer.
Conclusion: VSP in head and neck tumour surgery has resulted in an efficient and accurate method of optimising functional and aesthetic reconstructive outcomes. The recent addition of custom plates has facilitated added predictability to the reconstructive procedures but with comparable accuracy compared to stock reconstruction plates.

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Oncologic maxillary reconstruction: when, what, and how

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Background: Maxillary defects caused by oncologic treatment can lead to significant facial deformity and functional impairment. Although different techniques have been used in the maxillary reconstruction, there is no consensus on when, what and how to repair the maxillary defects.
Objective: The objective of the present study was to compare different reconstructive techniques currently used for the oncologic maxillary defects.
Methods: We retrospectively reviewed our experiences of maxillary reconstruction after tumour ablation. The indications and clinical outcomes of different reconstructive techniques were compared.
Findings: In our case series, the pathology of maxillary tumours included squamous cell carcinoma, adenoid cystic carcinoma, ameloblastic carcinoma, malignant fibrous histiocytoma, myoepithelial carcinoma, ameloblastoma, cementifying fibroma, and odontogenic fibroma. The most commonly used methods for the reconstruction of maxillary defects were obturator prostheses, soft-tissue flaps, and bony flaps. Obturator prostheses were used for small or medium defects, especially in medically compromised patients. Soft tissue flaps were indicated in posterior infrastructure maxillectomy with palatal or buccal soft tissue defects. Bony flap could be used for the majority of the maxillary defects to restore the form and function of maxilla. For bony flap reconstruction, computer aided surgery planning and three-dimensional printed surgical templates can facilitate the operation process, reduce the surgical time, and increase the reconstruction accuracy.
Conclusion: Maxillary reconstruction after tumour resection is still a challenging issue. There is no unique and omnipotent method. Personalised reconstructive planning is the key to achieve satisfactory aesthetic and functional outcome.

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Alveolar inferior neurovascular bundle preservation with autogenous iliac bone graft in segmental mandibulectomy: an attempt to improve quality of life

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Background: Fibrous dysplasia is a benign bone lesion that regarded as a developmental skeletal disorder and characterised by replacement of the normal bone with benign cellular fibrous connective tissue. The phenomenon of bony metaplasia often happens in fibrous dysplasia which cause inappropriate cell differentiation and increased cell proliferation. In maxillofacial region, the proximity to neurovascular structure and aesthetic supporting structure may overwhelm the patient due to functional and aesthetic consequences. Resection of tumours, protection of vital structures and reconstruction the loss anatomical structure become the treatment of choice for fibrous dysplasia in patients without systemic compromise.

Case report: This paper reports the mandible segmental resection with bone graft and inferior alveolar neurovascular bundle preservation as a treatment for mandible fibrous dysplasia in adult without systemic compromise.
Result: Patient showed no neurosensory dysfunction found, deviation and limited range during mouth opening, good bone graft growth without any sign of osteomyelitis, then patient was planned to have dental restoration using dental implant after a year evaluation.

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Current role of computed tomography angiography in fibula flap: a rare case study of peroneal arteria magna

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Background: Although Doppler imaging could be used to predict exact location of perforator, computed tomography angiography (CTA) is necessary in patients needed for reconstruction with free flap from lower extremities. A reported rare case of peronea arteria magna.
Objectives: This study is to evaluate necessity of CTA as a planning tool in free flap surgery from lower extremities.
Methods: 30 patients (aged 25–45 years) with mandibular benign pathology (ameloblastoma) undergoing free fibula flap for reconstruction over a period of three years were included in study. After preoperative colour Doppler showed appropriate result to harvest free fibula flap. Out of these, one case was diagnosed with peronea arteria magna in which free fibula flap could not be used and reconstruction was done with Recon plate.
Results: While, Doppler imaging could be used to predict the exact location of perforator, however this gives no reliable information about size and course of vessels. But, rare diagnosis as peroneal magna could not be evaluated.
Conclusion: CTA is a valuable imaging tool for the preoperative assessment of the donor-site vascular supply for lower extremity flaps. It can also reduce intraoperative dissection time and minimises surgical error in the identification of vascular anatomy.

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Cost analysis of free flap surgery in head and neck reconstruction

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Background: Free flap surgery is overall considered the gold standard for head and neck reconstruction. Despite of this, microsurgery is not performed in any centre because of surgical skills and training needed, and the elevated equipment costs and surgical devices.
Objectives: Aim of the study is to evaluate costs of free flap procedures in head and neck reconstruction at Casa Sollievo della Sofferenza (San Giovanni Rotondo, Italy).
Methods: Collecting data from the clinical notes and using the "Hospital Patient Costing" method highlighted on health activity-based costing (HABC) study, we derived the single hospitalisation cost for each activity (ward costs, operation theatres costs, intensive care costs) divided to productivity factors (surgeons, nurses, other health operators, drugs, devices).
Findings: We obtained the real cost of a single hospitalisation event that can be compared to standard benchmark cost evaluated from a statistical analysis from an Italian Hospital Network and also compared with the NHS refound tariffs.
Conclusion: HABC method allows determining costing for single hospitalisation event for each productive factor (human and not) and for single clinical activity. Sharing the HABC system with a group of hospitals allows defining standard cost (benchmark). Monitoring costs improves efficiency and allows reinvesting the money saved and reduces healthcare costs without losing standard qualities.

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Giant cemento-ossifying fibroma of the mandible: a rare case

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Background: Giant cemento-ossifying fibromas (COFs), also known as ossifying fibromas are classified as a fibro-osseous neoplasms and benign lesions affecting the jaws and other craniofacial bones. These tumours occur in the third and fourth decades of life, with predilection for women, predominantly occurring in the premolar/molar region of the mandible. Most of the lesions typically show slow and often expansile growth, centrally within the jaw and characteristically behave in a benign form, but occasionally they may present as an aggressive gigantiform lesion. Case reports of massive expansile COFs (measuring more than 10 cm) are rarely reported in the literature.
Objectives: This article aims to provide overview about giant COF of mandible and its management.
Methods: A 36-year-old female presented with giant COF of mandible causing extensive disfiguration of the face and feeding problem. The tumour was treated by surgical resection followed by immediate reconstruction of a fibular free flap.
Results: Follow-up of the patient showed recovery was uneventful and the patient had an acceptable aesthetic facial profile.
Conclusion: Giant COF occurs rarely in the jaws. Surgical resection and immediate reconstruction with fibular free flap is the treatment of choice. The prognosis is known to be fair and recurrence after surgical removal seems to be unusual.

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Double rib serrates anterior osteomyocutaneous free flap in mandibular reconstruction—a novel approach

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Background: Composite mandibular reconstruction remains a challenge, particularly in cases of major soft and hard tissue defects. The correction of complications of prior reconstructions

can necessitate the use of emerging operative techniques for adequate management.
Objective: This case report describes the use of a composite osteomyocutaneous serratus anterior and double rib free flap for the reconstruction of a complicated mandibular deformity on a background of extensive failed reconstructions where more standard techniques, such as fibula flaps, were not available.
Methods: The two rows of ribs were used to create a neomandible and the skin paddle was used to cover the neck defect once the appropriate chin projection was restored. The muscle was used for the lining of the floor-of-mouth.
Findings: The primary problems for the patient, prior to this surgery, arose as a result of the severe Andy Gump deformity and the subsequent functional impediments: oral incompetence and saliva leak, severely impeded speech, and inability to swallow appropriately. The grounds of using a double rib approach were to recreate the neomandible in such a way as to create a rigid dam effect with sufficient depth to hold saliva. The benefits of the flap included adequate bone transfer for functional and aesthetic repair, with appropriate soft tissue coverage of the floor-of-mouth and base of tongue.
Conclusion: The author notes that this is not the flap of choice for mandibular reconstruction, but identifies this as a novel alternative to a free fibula flap in similar situation.

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Cook-Swartz Doppler Probe for evaluation of perfusion of microvascular flaps

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Background: Microvascular reconstructions are clinical routine in maxillofacial surgery. In the literature, transplants are revised in 4–16% cases, and loss rates are between 0 and 6%. While transplant survival is primarily dependent on perfusion of the flaps' vessels, different methods have been described to control flap-perfusion. The implantable Cook-Swartz Doppler Probe consists of a piezo-crystal that is attached to a silicone strap. This strap can be easily placed on the transplant-vessel, the probe is connected to a Doppler device via a simple wire.
Methods: In a single centre observational study, the Cook-Swartz Doppler Probe was implanted in 63 consecutive patients that needed a microvascular reconstruction in the maxillofacial region.
Findings: In 47 patients, a flap was placed after tumour resection, 13 patients had an osteoradionecrosis and 3 had other diseases. 17 radial forearm flaps, 11 latissimus dorsi flaps, 3 scapula flaps, 12 combined latissimus dorsi-scapula flaps, 9 fibula flaps, 10 deep circumflex iliac artery (DCIA) and 1 anterolateral thigh (ALT) flap were used. 59 probes were put on the artery, 6 on the vein. In 12 patients the position of the vessels were corrected during wound closure. Seven salvage operations were conducted successfully; one DCIA transplant was lost after the salvage operation. In a patient with radial forearm flap the probe was damaged during the operation and could not be used. Following, the transplant was lost. A combined latissimus dorsi-scapula transplant necrotised even though the Doppler signal was positive.
Conclusion: The Doppler control of the vessel perfusion during wound closure enables direct corrections. In the postoperative setting, the probe facilitates early salvage surgeries. Wrong positive Doppler signals are possible. Further investigations in larger collectives are suggested.

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Preventing early-staged graft bone resorption by simultaneous innervation in iliac bone flap for mandibular reconstruction

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Background: The postoperative spontaneous resorption of vascularised bone grafts jeopardises dental-implant-based functional rehabilitation of jaw bones. Our recent studies and studies by others demonstrate the crucial role of innervation in bone regeneration and turnover.
Objectives: To propose a novel strategy of simultaneous innervation in iliac flaps, and to evaluate its capabilities to prevent bone resorption of grafts in mandible reconstruction.
Methods: Based on animal experiments on goats, we developed a new technique for simultaneous innervation of vascularised iliac flap in mandibular reconstruction, through neurorrhaphy between ilioinguinal nerves, which innervates iliac bone, and residual nerves. Patients with postoncologic continuity defects of the mandible underwent segmental mandibular reconstruction (10 innervated flaps and 12 control flaps). Graft bone resorption was analysed by computed tomography scans at 6 and 12 months postoperatively and bone quality was evaluated for suitability of dental implantation, with histological and histomorphometric analyses for graft bone samples.
Findings: At 12-month follow-up, graft bone density loss and osteoclast activity in control group were dramatically higher than innervated group. Bone quality evaluation indicated suitable condition for dental implantation in all the innervated group but 41.7% in control group. Histological analyses showed successful innervation and active osteoblastic differentiation from bone marrow mesenchymal stem cells in innervated group but not control group.
Conclusion: Innervated iliac flaps may effectively prevent bone resorption of grafts in mandible reconstruction which otherwise jeopardising the success of dental implants. This new strategy appears clinically valuable and provides insights into the homeostasis of vascularised grafts for functional reconstruction.

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Nasal reconstruction: a brief history, current techniques and advances

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Background: The current practice of nasal reconstruction represents centuries of pioneering global developments, from the first recorded cheek flap in ancient India (700 BC) to novel tissue engineering studies and the exploration of computer-aided design/computer-aided manufacturing (CAD/CAM) technology today.

Objectives: Outline the history of nasal reconstruction and the current techniques utilised within the field. Discuss the principles of nasal reconstruction with reference to functional and aesthetic outcomes and intraoperative and postoperative considerations. Describe the key areas of research and development that demonstrate promise in paving the way for future trends.
Methods: We critically review the evidence for current techniques in nasal reconstruction, focusing on functional and aesthetic outcome data to provide an up to date approach to the management of patients with nasal defects. We evaluate the management of recent trauma and oncology cases in terms of the current principles of nasal reconstruction.
Findings: Free tissue transfer techniques, the emergence of Mohs surgery and the aesthetic subunit principle have revolutionised both the approach and outcome of nasal reconstruction. The paramedian forehead flap continues to represent a fundamental option in the reconstruction of major defects. Advancements in biotechnology including tissue engineering and CAD/CAM demonstrate great potential for improving clinical outcome and patient satisfaction.
Conclusion: The increasing prevalence of malignant melanoma in the United Kingdom indicates a growing demand within the notoriously complex field of nasal reconstruction, heralding further advances in practice. Careful consideration of the clinical, functional and aesthetic implications, thorough preoperative planning and a patient-centred approach will protect optimal outcomes as novel techniques are explored.

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Patient-specific computer-aided design/computer-aided manufacturing orbital wall implants for the therapy of empty socket deformities

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Background: Aesthetic satisfactory results in the treatment of empty socket deformities are a challenge.
Objectives: In a multidisciplinary approach, integrating maxillofacial surgery, oculoplastic surgery and ocularistic art, it is possible to improve results considerably.
Methods: The treatment algorithm consists of:
(1) implantation of patient-specific orbital mesh implants (PSOMI);
(2) fat-dermis-grafting in the remaining soft tissue of the orbit;
(3) manufacturing of a synthetic eye prosthesis.

In the centre of the algorithm stands the reduction of the orbital volume. This is achieved by implantation of a PSOMI which leads to the effect that the soft tissue in the orbit is pushed cranial and anterior. Using this technique, the volume of a fat-dermis-graft which is additionally implanted in the orbital soft tissue can be reduced significantly. Finally, a functional shaped synthetic eye prosthesis is getting inserted after a short period of wearing a conformer.
Findings: In all our cases ($n = 9$) aesthetic outcome could be improved significantly. No implant extrusion or infection was seen. In one patient a re-operation with a larger PSOMI had to be performed. In one other patient additional standard titanium-mesh had to be implanted on the top of the PSOMI to reduce orbital volume more than planned preoperatively.
Conclusion: The presented technique leads to stable and satisfactory long-term results. However, the prediction of the correct volume reduction during computer-assisted PSOMI planning is an open question which has to be investigated. In addition, soft tissue condition of the surrounding tissue can limitate the amount of volume reduction by the use of the PSOMI.

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Computer-assisted navigation in mandibular reconstruction with fibula free flap

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Background: The mandible is an important component of the face, as it contributes to motor functions and facial appearance. In mandibular reconstruction, accurate location of the reconstructed mandibular angle and condyle becomes important and challenging, because the mandibular angle is important for facial symmetry, and the condyle is closely related to temporomandibular joint function.
Objectives: To present our experiences of computer-assisted navigation in mandibular reconstruction and evaluate its effectiveness.
Methods: 10 patients who underwent navigation-guided mandibular reconstruction with a fibula free flap were reviewed. During preoperative planning and simulation, the ideal position for the reconstructed mandibles was determined based on mirror imaging of the unaffected side. Under intraoperative navigation, the ideal positions of the mandibular angles and condyles were confirmed by the navigation probe. The surgical results were evaluated through postoperative panoramic radiographs, coronal computed tomography (CT) scans, image fusion and clinical examinations.
Findings: Navigation-guided mandibular reconstructions were successfully completed based on preoperative planning and simulation. The navigation system could continuously track the position of the probe, which guided the positioning of the fibula flaps. The surgical discrepancy in the mandibular angle between the actual surgical results and the preoperative designs was 2.29 ± 1.14 mm. Panoramic radiographs and coronal CT scans illustrated that all the condyles fitted into their glenoid fossae. All patients were satisfied with their functional and aesthetic outcomes.
Conclusion: Computer-assisted navigation is a viable technology for improving surgical outcomes in mandibular reconstruction, which can assist the surgeons by providing real-time three-dimensional surgical references during the operation.

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A new method for designing and fabricating customised mandibular reconstruction plates using three-dimensional printing technology

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Background: Mandibular reconstruction following malignancy ablation is the mainstream therapy in restoring patients' aesthetic and functional outcomes. Currently the titanium reconstruction plates used are commercialised products with unified specifications. The plate should be bended to match the individual anatomical contour of mandible, while the process is time- and energy-consuming. Over-bending would induce stress fatigue and potential plate fracture.
Objective: To design and fabricate the customised titanium mandibular reconstruction plate based on three-dimensional (3D) printing technology.
Methods: The computed tomography imaging of patients with mandible tumour were acquired. The Proplan CMF 2.0 software (Materialise, Leuven, Belgium) was used to facilitate virtual 3D model reconstruction and surgical simulation. We used the combination of different computer-aided design tools based on our established algorithm. The digital file of the customised plate was then subjected to 3D printing by fusing fine pure titanium powders together.
Findings: Virtual mandibular surgery was operated and double-barrel fibular reconstruction was simulated to restore the mandibular continuity and body height. The customised titanium plate was successfully designed and fabricated. The plate included three parts: the lower 2.0 mm-thick reconstruction plate which curved like the outer shape of the restored mandible, the upper 1.0 mm-thick miniplate and the two bars connecting the upper and lower plates.
Conclusion: This work presents a new and versatile method for designing and fabricating customised mandibular reconstruction plates using 3D printing technology. The superiority of applying the 3D-printed customised titanium plate in surgery will be further explored.

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A new procedure assisted by digital techniques for secondary mandibular reconstruction with free fibula flap

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Background and Objectives: To describe a new procedure assisted by digital techniques for secondary mandibular reconstruction with free fibula flap.
Methods: The three-dimensional (3D) reconstruction images for vessels was used to demonstrate the vascular diameter and location, which help select the most suitable vein and artery for anastomosis. Maxillary and mandibular stone models of the patient were fabricated and a stable occlusal relationship was determined on an articulator. 3D tooth model data were scanned using a 3D optical measuring system, and the obtained stereolithographic (STL) data was imported to Geomagic software. Preoperative maxillofacial and fibular noncontrast-enhanced computed tomography scans were acquired, and the data were imported to ProPlan CMF software. The maxilla and mandible were segmented, and STL data were imported to Geomagic software. The registration function was used to determine the ideal mandibular position. First, with the maxillary position fixed, the maxillary and mandibular models were registered with the maxilla. Then, with the tooth model positions fixed, the mandible was registered with the models. Virtual plan and surgical navigation was used to design and correct the mandibular and fibular position.
Findings and Conclusion: Our technique enabled precise recovery of the original mandibular configuration in this patient.

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Applicability of buccal fat pad for oral reconstruction

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Background: Pedicled buccal fat pad (BFP) fills an anatomical gap consisted of the buccinator muscle, the masseter muscle, and the ramus of the mandible. It has a sufficient blood supply from the surrounding arteries. We have been using BFP grafting for oral defects induced by ablative surgery for a tumour, an ankylosis of the temporomandibular joint and so on. This study sought to evaluate the applicability of pedicled BFP grafting with a higher number of cases than our previous report in 2015.
Objectives: We retrospectively evaluated 64 grafting's of 63 cases (32 males, 31 females; mean age, 71.7 years). They received pedicled BFP grafting in our department over a 9-year 2-month period from June 2007 to August 2016.
Methods: We evaluated them based on the following criteria: the epithelialisation, the graft infection, the fistula recurrence, the facial contour deficiency, the limitation of the mouth opening, and the facial nerve palsy. Besides, by means of gene expression microarray analysis, we have investigated genes which are potential targets for epithelialisation of BFP.
Findings and Conclusion: Complete epithelialisation of the BFP occurred within 4 weeks in most of the grafting's. Four weeks post-surgery, no complications occurred in most of the grafting's. BFP grafting appears to be feasible for the reconstruction of surgical defects in the oral region.

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Application of three-dimensional printing technology in oral and maxillofacial reconstruction

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Objective: To explore the clinical application of three-dimensional (3D) printing technique in oral and maxillofacial reconstruction.
Methods: From January 2010 to December 2015, all of the clinical cases, which were reconstructed by microvascular free flap due to oral and maxillofacial defects in our department were followed up. Suitable cases were selected to using 3D printing technology for

preoperative preparation, surgical implement and postoperative evaluation. All the clinical data were collected.
Results: In the past five years, 3D printing technique was used in 27 clinical cases which microvascular free flap was used to reconstruct oral and maxillofacial defect. In our study, rapid prototyping 3D printing models were used to simulate the tumour ablation and evaluate the defect extension in 14 cases. In another 10 cases, 3D printed surgical templates were printed according to the preoperative digital design. For the third part, patient-specific maxillofacial implant were printed using 3D printing technique in three cases. All of the free flaps were survived and the final reconstructed results were satisfied in all patients.
Conclusion: 3D printing technique had promising implication in oral and maxillofacial reconstruction. Preoperative rapid prototyping 3D printing model could be used to predict the extension of defects, simulate the reconstruction operation and prefabricated titanium mesh or plate. 3D printed surgical template was helpful for the accurate implementation of surgical plan.3D printing patient-specific implants were very useful to reconstruct complex 3 dimensional defects and obtain the best reconstructive result.

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Long-term results of microvascular submandibular gland transplantation in severe keratoconjunctivitis sicca

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Background: Dry eye syndrome is a common disease that results in possible damages of the ocular surface, or even in visual disturbance. Microvascular autologous submandibular gland (SMG) transfer provides a continuous and seromucinous tear substitution by salivary secretion. It is an effective treatment for severe keratoconjunctivitis sicca. This study was designed to investigate the long-term results of SMG transplantation and the ocular surface improvement.
Methods: From February 2001 to December 2015, 55 patients (58 eyes) with severe dry eye syndrome were treated by SMG transfer. The transplantations were successful in 53 cases (56 eyes). Postoperative scintigraphy, Schirmer's test, breakup time, corneal staining and management of complications were performed to compare with 27 eyes without SMG transplantation. The mean follow-up time was 48 months.
Results: Long-term follow-up reveals that SMG transplantation is an effective solution for patients with severe dry eye syndrome. The discomfort symptoms were relieved, and the frequency of use of pharmaceutical tear substitutes was reduced (90.91%). 34% of the patients (17/50) suffer from epiphora, which were modified by reduction surgery. Objective examination showed significant improvement in tear film and some features of ocular surface ($P < 0.05$). Visual acuity improved in 13/50 patients.
Conclusion: Submandibular gland transfer in most patients achieved long-term relief from discomfort and stabilisation of the ocular surface. The function proven clinically and biochemically was stable for many years after surgery. Nearly 26% of the patients were improved in vision acuity with mile damage of the ocular surface.

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Computer-aided surgery technique in jaw reconstruction with vascularised fibula flap

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Background: Computer-aided technique has being increasingly applied to maxillofacial surgery. In this paper, we present our experience in jaw reconstruction with fibula flap.
Objective: To review the clinical cases and experience of computer-aided surgery technique in jaw reconstruction with vascularised fibula flap from 2005 to 2015.
Methods: There were 42 patients who underwent jaw reconstruction using vascularised fibula flap at the Department of Oral and Maxillofacial Surgery, Peking Union Medical College Hospital from 2005 to 2015. Disease classification included 24 malignant lesions, 13 benign lesions and 5 secondary-stage reconstruction after trauma or tumour resection. Before surgery, the patients received computed tomography angiography (CTA) of bilateral lower extremities and thin-layer CT scanning of upper and lower jaw. Using software we simulated the excision and the design of reconstruction. The surgical model was made by rapid prototyping technology and pre-bent the Ti-Plate. Whilst, we designed and manufactured the cutting plates to guide the tumour resection and fibular osteotomy intraoperatively.
Results: All of the operative processes went smoothly. 41 cases of fibular flap survived. The overall success rate was 97.6%. One flap failed because of thrombosis, substituted with free fibular slice graft. The patients were satisfied with the cosmetic and function outcomes.
Conclusion: Preoperative CTA is useful for donor site evaluation and selection. Using computer-aided technique can improve the efficiency and precision of surgical operation, which will help surgeon to achieve better result, especially for the patients with complicated jaw defects and secondary-stage reconstruction cases.

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Improving the accuracy of mandibular reconstruction with vascularised iliac crest flap: role of computer-assisted techniques

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Background: Vascularised iliac crest flap is widely used for mandibular reconstruction, it is often challenging to predict the clinical outcome in a conventional operation based solely on the surgeon's experience.
Objectives: Herein, we aimed to improve this procedure by using computer-assisted techniques.
Methods: We retrospectively reviewed records of 45 patients with mandibular tumour who underwent mandibulectomy and reconstruction with vascularised iliac crest flap from January 2008 to June 2015. Computer-assisted techniques including virtual plan, stereomodel, pre-bending individual reconstruction plate, and surgical navigation were used in 15 patients. The other 30 patients

underwent conventional surgery based on the surgeon's experience. Condyle position and reconstructed mandible contour were evaluated based on postoperative computed tomography. Complications were also evaluated during the follow-up.
Findings: Flap success rate of the patients was 95.6% (43/45). Those in the computer-assisted group presented with better outcomes of the mandibular contour ($P = 0.001$) and condyle position ($P = 0.026$). Further, they also experienced beneficial dental restoration ($P = 0.011$) and postoperative appearance ($P = 0.028$). The difference between postoperative effect and virtual plan was within the acceptable error margin. There is no significant difference in the incidence of postoperative complications.
Conclusion: Computer-assisted techniques can improve the clinical outcomes of mandibular reconstruction with vascularized iliac crest flap.

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The effect and safety of lower limb blocks in postoperative analgesia for the free flap donor sites

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Background: The use of free fibular flaps and anterolateral thigh (ALT) flaps for repairing the oromandibular defects is well established, whereas few attentions were focused on postoperative analgesia for the donor area.
Objective: To evaluate the effect and safety of lower limb blocks in postoperative analgesia for the free flap donor site.
Methods: 40 patients with oromandibular defects who were scheduled for elective reconstructive surgery using free fibular or ALT flaps, were divided into two groups in a randomised, single-blind fashion. In Group PCA, only intravenous patient controlled analgesia (PCA) was used postoperatively. In Group PCA + B, both intravenous PCA and lower limb blocks were used. For patients with fibular flaps harvested, femoral nerve block and common peroneal nerve with ropivacaine were administered. For patients with ALT flaps harvested, femoral nerve block with ropivacaine was administered. Pain scores at donor site, monitoring of vital signs, onset and duration of sensory and motor block, the dose of postoperative rescue analgesics and patient satisfaction with pain relief were performed.
Results: Pain scores were lower in Group PCA + B. In Group PCA + B, sensory blocks lasted 13.5 ± 4.1 h. Expectations of patients were improved in Group PCA + B. None experienced motor blockade. Lower limb blocks reduced postoperative analgesic requirements.
Conclusions: Lower limb blocks may be safe and effective in postoperative analgesia for the donor site of free fibular and ALT flaps. Lower limb blocks also improve patient satisfaction.

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Deep circumflex iliac artery perforator flap with iliac crest for reconstruction of composite oromandibular defect

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Background: Mandibular reconstruction is one of the cornerstones of oral and maxillofacial surgery. Bone grafting is a favourable option for such reconstruction. Deep circumflex iliac artery terminal musculocutaneous perforator flap with iliac crest is a good choice for oromandibular defect because of its adequate bone and satisfactory soft tissue.
Objectives: This study examined oromandibular defects reconstructed using deep circumflex iliac artery perforator flap with iliac crest (DCIAPF).
Methods: From November 2015 to August 2016, 23 patients with mandibular defects after oncological resection received DCIAPFs for oromandibular reconstruction.
Findings: All perforators, identified preoperatively by Doppler examination, were terminal end perforators of DCIA. The DCIAPFs were successfully harvested in all patients. The flap survival rate was 95.6% (22/23); one flap failed due to artery spasm. Three patients had slight skin-edge necrosis in skin island. Anatomical reconstruction contour of the mandible and sufficient bone length and height were achieved, with no serious donor-site complications during the follow-up period.
Conclusion: The results demonstrated that the DCIAPF is a favourable single flap option for oromandibular reconstruction after oncological resections with less donor-site complications because of its adequate bone and satisfactory soft tissue, with constant location of the perforator.

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Are antithrombotic agents necessary for head and neck microvascular surgery?

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Background: Despite numerous reported protocols to prevent thrombosis after free tissue transfer surgery in head and neck region, the efficacy of antithrombotic agent is still debated.
Objectives: The aim of this study was to determine the effect of aspirin and dextran-40 in preventing thrombosis after free flap transfer surgery in head and neck region.
Methods: One hundred patients were randomly assigned to no agent group ($n = 50$) and antithrombotic group ($n = 50$). Patient demographics; donor site; and outcome variables including microvascular thrombosis, bleeding, and flap loss were recorded. Coagulation values including platelet count, prothrombin time (PT), and activated partial thromboplastin time (APTT) during perioperative period were measured.
Findings: The overall free flap survival rate was 99%. There were no statistically significant intergroup differences in the free flap success rate ($P = 0.315$), postoperative bleeding ($P = 0.315$), or microvascular thrombosis ($P = 0.307$). Significant difference was observed in platelet count, PT, and APTT when all time points of outcome measurement were evaluated together in both groups (repeated analysis of variance, $P < 0.001$). However, these differ-

ences ceased to exist between the two groups when comparing the change tendency during the perioperative period ($P > 0.05$).
Conclusion: Postoperative administration of aspirin and dextran-40 neither provide a significant improvement in free flap success rate nor increase the risk of local complications. Aspirin and dextran-40 are not necessary for patients with free flap transfer surgery of head and neck.

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Research and New Technologies

ZS maxillofacial trauma app: a two-year review of an iPhone app intended to aid assessment of maxillofacial trauma

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Background: The ZS maxillofacial trauma scoring system app was introduced in 2014 and was intended to aid assessment and interpretation of maxillofacial trauma based on computed tomography imaging of facial bones. It has been used worldwide for the last two years and has received positive feedback amongst oral and maxillofacial trainees.
Objective: The aim of this study was to review the creation process of a novel oral and maxillofacial trauma scoring system mobile app, review the current trends of use worldwide and look at potential ways in which oral and maxillofacial apps can be improved.
Methods: The iOS development team for the ZS app provided the programming storyboard for the ZS app. Several screenshots were obtained of the prototype and creation process. Further analysis of the current trends of use were obtained using iTunes Connect App Analytics.
Findings: Over the past 24 months, the ZS app was downloaded by 1,436 iOS users. 78% of these users had downloaded the app on iPhone devices, and the remaining 22% on an iPad. Approximately 53% of the users were based in the United States, 26% in the United Kingdom, and the remaining users were predominantly based in Brazil, Saudi Arabia and India.
Conclusion: The ZS maxillofacial trauma app continues to perform well globally. There appears to be less users in Western Europe, Central Asia and Australia and this may reflect in differences of smartphone use within a hospital setting. Further avenues for app improvement include clinical assessment of the trauma patient and encrypted photo capturing.

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Evaluating the effect of low intensity pulsed ultrasound on the quality of regenerated bone in vertical alveolar osteodistraction

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Vertical alveolar distraction osteogenesis (VAD) is gaining popularity as an alternative method for reconstructing alveolar atrophy. There is limited information about the application of ultrasound for callus maturation during human distraction osteogenesis; aim of the study: to analyse the effect of low intensity pulsed ultrasound (LIPUS) on the height and maturation of the bone regenerated by vertical alveolar distraction in anterior mandible.
Methods: Twelve adult patients (nine males and three females) suffering from vertical alveolar ridge defect in the anterior mandibular region due to periodontal disease were selected. The patients were divided randomly into two equal groups of six patients each according to the proposed line of treatment. Group I: ridge augmentation was carried out by vertical alveolar distraction osteogenesis, Group II: ridge augmentation was carried out by vertical alveolar distraction osteogenesis coupled by low intensity pulsed ultrasound (LIPUS). Bone height was assessed preoperatively, immediately after activation and finally before implant placement using cone-beam computed tomography. Histologic analysis of the regenerated bone was done on implant placement.
Results: The activation height was significantly higher in Group II; ($P = 0.001$), similarly, consolidation height was greater in Group II; ($P = 0.0017$). The greatest mean area percent occupied by bone trabeculae and that of newly formed bone were recorded in Group II, unpaired *t* test revealed that the difference between both groups was statistically significant ($P = 0.0002$ and $P = 0.0009$, respectively).
Conclusions: LIPUS combined with alveolar distraction osteogenesis led to more vertical bone gain and stability of the formed callus.

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The use of muscle as a bone bioreactor: an *ex vivo* experiment

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Background: Muscle is vascular tissue and has a propensity to form bone when exposed to an osteogenic stimulus such as bone cement, bone morphogenetic protein (BMP) and mesenchymal stromal cells (MSCs).
Objective: The present study evaluated the ability of the autologous muscle free graft to regenerate at cranial bone defects.
Methods: A critical size defect ($8 \times 2\,mm^2$) was created in the calvarium of 40 rats. Treated autologous muscle grafts were then implanted into the cranial defect. The cases were randomly divided into the following groups: (1) muscle injected with CS/HAC, (2) muscle injected with CS/HAC/BMP-7, (3) muscle injected with CS/HAC/BMP-7/MSCs (4) empty defect. At 8 weeks the bone regeneration was assessed using microcomputed tomography (micro-CT) and histology.
Results: Clinically, monocortical bone regeneration were observed bridge the defects area only in groups (2) and (3). The volumetric assessment of micro-CT analysis reported $83.4\% \pm 20\,mm^3$, $73.6\% \pm 12\,mm^3$, and $42 \pm 24\,mm^3$ for group (3), group (2) and group (1), respectively. Qualitative data revealed thinner and more condensed trabecular pattern than the surrounding native bone. Quantitative histomorphometry assessment showed that the average bone surface area was $85.2 \pm 6.0\,mm^2$, $71 \pm 18\,mm^2$, and $32 \pm 13\,mm^2$ for group (3), group (2) and group (1), respectively.

Conclusion: This study confirms the *in vivo* osteogenic properties of modified muscle graft and suggests novel strategies for bone regeneration.

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Use of membrane composite (polyvinyl alcohol-colagen-hydroxyapatite) in mandibular bone regeneration of animal testing Sprague-Dawley rats

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Background: The need of alternative bone substance in oral and maxillofacial surgery has increased. Guided bone regeneration method is one of bone adding volume method by making the bone tissue regeneration to occur selectively in a room where the growth of bone cells are protected by a particular substance (membrane). In this study, a composite membrane consist of combination of polyvinyl alcohol (PVA) material + collagen + hydroxyapatite (HA) was made.
Objective: To evaluate the use of composite membrane (PVA-collagen-HA) for regeneration of mandibular defect in Sprague-Dawley (SD) rats comparing with control group by observing the osteoblasts.
Methods: 40 male SD rats aged 8–10 months with weight of approximately 225 ± 25 g were divided into two groups. First 20 rats were treated as control group and another 20 rats for testing group. Defecation on left angulus mandibula was done for all groups and composite membrane (PVA-collagen-HA) applied only in rats of testing group. The appearance of osteoblasts were evaluated histopathologically on interval at days 3, 7, 10, 14 and 21 after application of composite membrane. This study was done under certification from the research ethical committee.
Result: There is a significant difference ($P < 0.01$) in the number of osteoblast cells between the control group and the group applied with composite membrane (PVA-collagen-HA) on interval of determined days (days 3, 7, 10, 14 and 21).
Conclusion: Use of composite membrane (PVA-collagen-HA) accelerates the mandibular bone regeneration of SD rats.

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Reduction of overall radiation exposure and closer positioning of the sphenopalatine ganglion microstimulator in cluster headache patients using intraoperative navigation

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Background: The sphenopalatine ganglion (SPG)-microstimulator is implanted into the pterygopalatine fossa to electrically stimulate the SPG as a treatment for cluster headache. Preoperative surgical planning to ensure the placement of the microstimulator in close proximity to the SPG is critical for treatment efficacy. The aim was to reduce radiation dose intra- and postoperatively and to improve the surgical procedure using a passive optical navigation system during placement of the microstimulator.
Methods: Preoperatively computed tomography (CT) scans were matched with the navigation system to be used intraoperatively. Intraoperatively, the SPG-microstimulator was implanted using CT navigation, while the final position of the SPG-microstimulator was verified by three-dimensional cone-beam CT. Those images where matched immediately with the preoperative CT scans containing the digitally inserted SPG-microstimulator. This allowed visual comparison due to overlay of both CT scans and verifies ideal or incorrect positioning.
Results: 24 surgeries were performed using navigation compared to 21 procedures without. Using navigation, an average distance reduction of 2.38 mm between expected target point and electrode tip was achieved. In 3 cases (3 of 24; 12.5%) positioning of the SPG-microstimulator was more than 5 mm distant to the desired target location, compared to four cases (4 of 21; 19%) performed without navigation. Total radiation exposure was reduced to two-thirds by using navigation.
Conclusions: Using intraoperative navigation, a significant distance reduction between SPG-microstimulator and expected target point was achieved. Additionally, radiation exposure was reduced by one-third. Overall, a distinct improvement was achieved in positioning the SPG-microstimulator, and postoperative CT scans were excluded, due to intraoperative image fusion and immediate verification.

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Assessment of functional outcome and quality of life after treatment of squamous cell carcinoma

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Objective: To assess the functional outcome and impact on the quality of life after treatment for squamous cell carcinoma.
Methods: This study included 120 patients presenting for regular postoperative follow-up at least 4 months after treatment of squamous cell carcinoma.
Result: Depression, isolation and low social interaction was highly prevalent among patients, but improvements in behaviour and functional outcome were seen subsequently few months after treatment. Young patients found to be more depressed than older patients due to their functional loss and aesthetics. Patient who can eat and speak properly showed greater well-being and social interaction. Regardless of the different treatment modalities used to treat patients, compromise quality of life and difficulties in social return was significant in this study.
Conclusion: Oral squamous cell carcinoma imparts serious negative psychosocial impact among patients due to impairment of speech, limited mouth opening, inability to maintain adequate nutritional status and facial disfigurement. All these factors lead to low social interaction, poor functional outcome and an adverse effect on quality of life. Clinicians must aim to supplement psychological assessment and counseling with the disease treatment to improve well-being of the patient.

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Study of anatomical variance of the zygomaticofacial foramen and determination of reliable reference points for surgery

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Background: Dissection onto the facial aspect of the zygoma is necessary in several maxillofacial procedures. This carries inherent risk of damage to the vessels exiting the zygomaticofacial foramen (ZFF) on the facial aspect of the zygoma.
Objectives: The aim was to compare ZFF anatomy between ethnic groups and sexes, and to determine reliable reference points for surgery.
Methods: 858 zygomatic bones on dry adult skulls were used in the study. Skulls were selected from nine different geographic regions for a comparison between ethnic groups, and a comparison of anatomy between sexes was completed. Each zygoma was examined for the number of ZFF, after which a cross-line laser was used to create two consistent lines from which the ZFF was measured and mapped.
Findings: There were significant differences in number and location of ZFF between ethnic groups, but not between sexes. Of all 858 sides, 1 ZFF was most commonly identified (49.8%). However, foramina number ranged from 0 to 4 per zygoma. Despite this variability over 80% of ZFF bilaterally were found within a 15 mm diameter circle centred at 5 mm anterior to the intersection of lines discussed above. Moreover, over 90% of ZFF fell beyond an arc of 5 mm from the orbital margin.
Conclusion: We present a novel method of identifying a 'ZFF zone' within which the majority of foramina lie. This simple technique can be of use in directing osteotomy sites, local nerve blocks, and in preventing iatrogenic damage to the ZFF neurovascular bundle.

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Osteoinductivity of calcium phosphate ceramics in a sheep model plus clinical application

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Background and Objectives: Ceramics consisting of calcium phosphates (CaP), seem very promising bone graft substitutes. They possess osteoinductive properties, without expensive and hard to obtain osteogenic cells and/or growth factors. The aim of this study is to investigate the osteoinductivity and biocompatibility of 6 new ceramics. Also clinical application was tested.
Methods: Six different CaP ceramics consisting of biphasic calcium phosphate (BCP) and tricalcium phosphate (TCP) were implanted ectopically in the long dorsal muscles in sheep with a follow-up of three and nine months. Vital stainings were administered to monitor bone formation. Light microscopy was used to evaluate bioactivity, degradation and tissue reaction. Fluorescence microscopy and histomorphometry were used to determine the extent and period of osteoinduction.
Findings: The BCPs and the TCP scaffold showed osteoinductive properties, although large inter-animal differences occurred. Granule size did not seem to influence the bioactivity of the ceramics. The other materials did not present osteoinductive properties. Regarding the degradation patterns and tissue reactions of the hosts, all materials were found to be biocompatible.
Conclusion: The TCP granules were not osteoinductive while the BCP granules showed high osteoinductive capacities, regardless the granule size. The osteoinductivity of the TCP scaffold deserves further research. Besides osteoinductive properties of the BCPs and TCP scaffold all of our materials proved to be biocompatible. In the meantime BCP granules have been successfully applied for reconstruction of large skull defects in children. The technique of this treatment will be demonstrated.

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A pilot study into prevention of antiresorptive drug-related osteonecrosis of the jaw in a porcine animal model

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Background: Antiresorptive drug related osteonecrosis of the jaw (ARONJ) can occur in patients taking bisphosphonates following an invasive dental procedure of the bone. At present, there is no accepted preventative intervention for the condition and its pathogenesis remains shrouded in mystery.
Objectives: The objective of this study was to elucidate if the application of a polyethylene glycol hydrogel with the addition of platelet-rich plasma (PRP) or recombinant human bone morphogenetic protein-2 (rhBMP-2) to a dentoalveolar socket could prevent the development of ARONJ in a pig animal model.
Methods: Three Australian minipigs (~50 kg) were given weekly IV infusions of zoledronic acid (0.05 mg/kg) over eighteen weeks. Six weeks after the initial infusion the first premolars and first molars were removed surgically under general anaesthesia and defects homogenised to a volume of 785 mm^3. The defects were then randomly assigned to a group and the interventions placed into the sockets. Defects were closed via a mucoperiosteal advancement flap and 4/0 Vicryl. After euthanasia the extraction sockets were harvested and processed for laboratory analysis.
Findings: Visually groups one and eight had necrosis with exposed bone present. Groups who received rhBMP-2 had the greatest mucosal closure. Laboratory analysis revealed statistically significant differences ($P < 0.05$) between the groups that received rhBMP-2 compared to groups 1 and 8 in bone volume regenerated, osteoclastic and osteoblastic gene expression, and angiogenesis.
Conclusions: The application of a hydrogel or carrier with rhBMP-2 can stimulate increased angiogenesis and bone turnover in the local extraction socket environment. Further work is required to determine the minimum therapeutic dose of rhBMP-2 for ARONJ prevention.

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Fabrication of a silk fibroin-fish collagen membrane for guided bone regeneration

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Background: A collagen membrane has been the most widely used resorbable barrier membrane in guided bone regeneration, however, a membrane is collapsible and fast degradation. Silk fibroin has been introduced for improving the properties of a membrane due to its high mechanical strength, low immunogenic responses, and economical advantage.
Objectives: This study aimed to fabricate a resorbable barrier membrane using the composite of silk fibroin and fish collagen materials.
Methods: A silk fibroin film was made of Bombyx Mori silk and immobilised with collagen from brown-banded bamboo shark skin by chemical cross-linked. The silk fibroin films were hydrated prior tensile test to select suitable formula before immobilisation with collagen. Then physical and mechanical properties were evaluated to verify characteristics of a barrier membrane compared with a commercial collagen membrane. The morphology and structure of samples were characterised by scanning electron microscopy (SEM), Fourier transform infrared spectroscopy (FTIR) and atomic force microscopy (AFM). The hydrophobic-hydrophilic surface was assessed by water contact angle.
Findings: The SEM examination demonstrated collagen fibril structure covering silk fibroin film and differed from silk fibroin film that showed smooth surface. The AFM demonstrated that immobilised collagen on silk fibroin film showed rougher surface with fibrils covering. The FTIR showed spectrum of peptide bonds. The immobilised collagen on silk fibroin film demonstrated more hydrophobic surface than silk fibroin film.
Conclusion: The in-house immobilised collagen on silk fibroin film has been developed at an economic cost and possesses physical properties of a barrier membrane used for guided bone regeneration.

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The use of TissuePatch™, a self-adhesive sealant film to prevent postoperative vascular leakage after head and neck surgery

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Background: Meticulous haemostasis is required during head and neck surgery, to minimise the potentially devastating sequelae of postoperative bleeding. While its mainstay has been sound surgical technique and the use of haemostatic agents such as Surgicel®, recently self-adhesive, absorbable surgical sealants (TissuePatch™) have been used to minimise leakage in neurosurgery and thoracic surgery. We present a case series demonstrating its use in head and neck surgery.
Methods: A retrospective case note review was conducted of all patients undergoing head and neck procedures under a single surgeon in whom TissuePatch™ was used. Patient demographics, nature of surgery and the type of patch were noted. Pre- and post-operative haemoglobin (Hb) levels, postoperative drain output and complications were recorded.
Results: 20 patients received the patch. 70% were female. Patients mainly underwent parotid gland surgery (40%) and submandibular gland surgery (30%). The mean preoperative Hb was 13.4 with a mean postoperative drop of 1.4. Length of hospital stay was 1.6 days. 85% patients had drains placed, which were left *in situ* for 1.5 days with an average drainage of 27.5 mL. No patients required blood transfusion. One patient suffered a postoperative haematoma requiring surgical exploration.
Conclusion: We have found that the use of TissuePatch™ was a safe adjunct to ensure an effective seal to the potential sources of oozing or bleeding from the head and neck operative site. It was versatile, easy to handle and apply, adapting easily to the vascular bed on which it was placed.

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Salivary lithiasis intraductal fragmentation with stonebreaker and sterile sheet

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Background: 1% of the main salivary gland are obstructed by calculus. Minimally invasive surgery has been developed to remove these calculus, preserve the glands and decrease the morbidity
Objectives: Sialendoscopy with Stonebreaker (SB) intraductal calculus fragmentation has recently been available. We report our indication, experience with this technique and added an improvement with use in a sterile sheet.
Methods: Submandibular and parotid glands lithiases have been treated with SB in a sterile sheet.
Findings and Conclusion: Sialendoscopy with SB and sterile sheet was efficient to treat our patients suffering from impacted submandibular and parotid calculus. The use of a sterile sheet helps to operate several patients in the same day with only one SB handpiece. For submandibular gland, the duration of sialendoscopy with SB fragmentation was longer than with a transoral calculus removal (62 nm versus 40 nm). For parotid gland sialendoscopy with SB use avoided to do a combined approach and to open the skin. A mean of 47 impacts was delivered to the calculus. The use of a sterile sheet does not extend the procedure duration except in complicated cases when more than 80 impacts are delivered, needing to change the cartridge. For main salivary gland impacted calculus, sialendoscopy with SB fragmentation in a sterile sheet is efficient, more conservative, than other techniques and must be recommendable.

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Genetic association of oral submucous fibrosis with oral squamous cell carcinoma

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Background: Oral submucous fibrosis (OSF) is a chronic, progressive, premalignant condition. It has high rate of morbidity due to progressive inability to open mouth due to juxtaepithelial inflammatory reaction and progressive fibrosis of lamina propria. The chewing habit of paan, chaliya, gutka, naswar, mava and manpuri are the potential risk of OSF in the developing countries like Pakistan. It has been observed that significant mortality rate of OSF can transform into oral squamous cell carcinoma (OSCC). It has been reported that TP53 mutation at DNA binding domain was found in OSCC patients of Pakistan. The aim of the study is to find out the loss of TP53 functions in OSF patients and association between OSF and OSCC patients.
Methods: Blood and tissue samples 250 OSF patients will be collected. The samples will be compared with age- and sex-matched controls. Mutations in exons of TP53 genes will be examine by polymerase chain reaction and direct DNA sequencing.
Results: Missense mutation was found at exon 4 and 7 at TP53 gene. Genetic aberration is expected in OSF patients which will be compared with the results OSCC patients.
Conclusion: Germ line mutation(s) of TP53 pathways are involved in different steps of tumourigenesis and increasing the susceptibility of OSF in Pakistan. These finding will help in accurate and early diagnosis, better prognosis, which will be helpful in saving the patients from painful and mutilating ablative surgery of the patients.

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Mesenchymal stem cells long-term bone healing effects in bisphosphonate-related osteonecrosis of the jaws

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Treatment modalities and strategies with focus on bone healing for the patients with recurrent bisphosphonate-related osteonecrosis of the jaws (BRONJ) stage II and III are still not predictable, and have been changing over last few years. Effective and stable treatment has still to be developed. Interrupting bisphosphonate therapy does not seem to be beneficial and cannot be used effectively in cancer patients. The purpose of this presentation is to evaluate the long-term therapeutic effect of mesenchymal stem cells (MSCs) on bone regeneration in five cases with BRONJ after 48 months clinical and radiological observation period. Biostimulant and bone regeneration effects of MSCs reduce the healing time and local pain immediately after surgery. They improve the final reparative process of bone, increase inorganic matrix of bone and osteoblast mitotic index and stimulate lymphatic and blood capillaries growth in the affected area. MSCs nowadays appears to be a promising modality of BRONJ treatment, being safe and well tolerated, and it permits the minimally invasive treatment of recurrent stages II and III of MRONJ.

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A measure of postoperative satisfaction after application of Mphi therapeutic laser for pain management in patients with surgical extraction of impacted third molars

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Background: The use of therapeutic lasers in wisdom oral surgery is gaining momentum.
Objectives: This study aim to assess the efficacy of a MLS Mphi therapeutic laser in management of postoperative pain, swelling, and trismus related the surgical extraction of impacted third molars (SEITM).
Methods: 42 patients, each underwent SEITM under local anaesthetic, were selected for a double-blind, randomised, controlled clinical trial. The patients were divided into control and study group, each of 21 patients, match by age and sex. Immediately after the extractions, the experimental group received one off 1.27 J/cm^2 of energy density intraorally using Mphi laser while the control group received sham radiation. The degree of postoperative pain, swelling, trismus, and dry socket was registered for both groups at day one, day 7 (one week) and day 28 (4 weeks) using questionnaire and visual analogue scale.
Findings and Conclusion: The study group revealed to have less: pain, swelling, bleeding and speech impairment and had better overall satisfaction at one day and one week than the control counterpart ($^*P < 0.05$). No significant difference in pain at one month. Compared with the control group, the study group showed less dry socket ($P > 0.05$), less use of pain killer between day one to day seven, and less moderate trismus and more mild trismus compare to the control group at one week ($P < 0.05$). The application of Mphi laser in SEITM statistically produced early stage of satisfaction as well as reduced postoperative pain, swelling, bleeding, speech impairment, analgesics use and trismus.

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A review on the application of concentrated growth factors and MPhi laser to regenerate oral defects in the oral and maxillofacial region and a two cases report

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Background: The application of concentrated growth factors (CGF) and therapeutic MPhi laser (TML) is gaining popularity.
Objectives: The purpose of this study is to conduct a systemic review of cases reporting on the use of CGF and TML for tissue regeneration in the oral maxillofacial region (OMFR).
Methods: Literature search was carried out using MEDLINE and manual search by keywords "concentrated", "growth factors", "tissue engineering", "regenerative medicine", and "blood". This review followed methods recommended by PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) while including human studies with adequate information and data published in English, but excluding any studies that did not

involve human and those papers with a lack of data. Should there be an insufficient publications, this paper will be converted into a clinical-related article of cases reporting on the application of CGF and TML in OMFR.
Findings and Conclusion: There was no published data on the searched topic. Thus this paper was featured as two cases report on the surgical regenerative management of oral lesions on two patients using CGF and MPhi laser. In both patients, when bony defects regenerated with autologous fibrin rich CGF and synthetic alloplastic materials, and treated with MPhi laser, postoperative recovery was uneventful. TML showed reduction in postoperative pain, swelling, bleeding, speech impairment, analgesic use, trismus and wound healing. There was no difference in wound healing after one and three months. The innovative applications of CGF in conjunction with TML for regeneration defects in OMFR produced early stage of satisfaction and minimise complications.

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The physiological effects of surgery. A literature review and multicentre study assessing anxiety levels in junior trainees whilst undertaking clinical procedures within oral and maxillofacial surgery

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Background: It is well recognised that surgeons can experience high degrees of anxiety whilst operating. The most obvious measurable manifestation is an increase in heart rate (HR). Effects of such physiological responses can pose significant threats to surgical performance and health. There are significant comparisons to anxiety experienced in competitive sport and the sports models used by athletes to reduce anxiety have easy translation into surgery.
Methods: Anxiety levels in year one dental core trainees were assessed using a self-completed questionnaire and direct measurement of intraoperative HR. The data was recorded in two UK maxillofacial units (Leicester Royal Infirmary and Queen's Medical Centre, Nottingham). A literature review was also undertaken with the aim of investigating the patterns of heart rate changes in operating surgeons of other specialties and grades.
Findings: A total of 44 clinic procedures were assessed. The average intraoperative increase in HR was 37%. Measurements frequently showed heart rates above 120 beats per minute (BPM). These results were comparable to other recent studies.
Conclusion: The findings show significant increases in the HR of clinicians whilst operating. This physiological response appears to be independent of experience, complexity of operation and self-reported anxiety. This frequent stress induced stimulation of the sympathetic nervous system can have detrimental effects on surgical performance and poses significant threats to health. Many psychological models used in sport to manage anxiety have easy translation into our speciality. The application of these models should be recognised, further assessed and considered for incorporation into surgical training.

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CINTHA Trial. A randomised clinical study to investigate the effectiveness of sphenopalatine ganglion stimulation in cluster headache

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Background: Chronic cluster headache (CCH) is a debilitating disorder with a significant impairment for the patient leading to low quality of life. The sphenopalatine ganglion (SPG) proved to play an important role in CCH pathophysiology.
Objectives: A randomised clinical trial (RCT) was designed (CINTHA Trial) to evaluate the effectiveness of SPG stimulation by a neurostimulator implant in medically refractory, chronic CCH patients.
Methods: The RCT consist of 5 stages including the baseline stage, implantation/recovery stage, treatment titration stage, validation stage and follow-up stage. The titration stage is used to find out the SPG stimulation intensity with the most pain reduction for each patient. A stimulation with this intensity and a control non-stimulation are applied to the patients randomly during the validation stage. In total 35 patients have to be included in the study. Pain intensity, medication usage, quality of life and costs will be assessed. The study is granted by the Dutch Health care system (Innovatiefonds zorgverzekeraars) and ATI systems.
Findings: The study started in 2015 and is still ongoing. The study protocol, the preliminary results and complications will be discussed.
Conclusion: The SPG stimulation proved to be effective, however the implantation of the neurostimulation can be time consuming and the implantation can lead serous complications.

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Change of globe position on computed tomography head and cone-beam computed tomography—implications for management

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Background: Patients with suspicion of orbital floor fracture require computed tomography (CT) scan assessment of the orbits preoperatively. In our institution, this is often done through a cone-beam CT (CBCT) of the facial bones, as CBCT is known to expose patients to less ionising radiation than conventional CT scan. We have noted that patients who are at risk of head trauma receive a CT head to assess acute intracranial pathology in accident and emergency, and this often does not include the orbital floor. Therefore some patients undergo both axial CT scan and CBCT. The position of the globe in the two types of scan differs, and this may have clinical implications for the request of custom-made implants for reconstruction and in the clinical assessment of the patient postoperatively.
Objectives: We analysed the globe position relative to the orbital bony structures in patients who received both CT head and CBCT in our Institution.

Methods: We retrospectively analysed the data of conventional CT scan versus CBCT on the same patient, to assess the change in position of the globe from supine to a natural head position and postsurgical intervention. Data was collected over a period of 24 months.
Findings: 10 patients received both CT head and CBCT of the facial bones. We report the magnitude of changes of globe position and demonstrate a novel three-dimensional movement analysis.
Conclusion: Globe position changes in moving the head from supine to a natural head position. This has implications in planning of surgery and final outcome.

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In vivo transduction of oral epithelial cells by ultrasound guided intra-amniotic injection using lentiviral vector

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Background: Oral squamous cell carcinoma is the most common malignant disease in head and neck cancer. A well-matched animal model is very important method to investigate the cancerogenesis and mechanism or target therapy for this deadly disease. Successful transduction of skin epithelial cells by intra-amniotic injection using lentiviral vector has been reported. It is supposed that oral epithelial cells have the same origin as skin. We are going to identify that transduction of oral epithelial cells is possible and find out the best time point for injection.
Objectives: To investigate the possibility of transduction of oral epithelial cells by high-frequency ultrasound guided intra-amniotic injection using lentiviral vector and the best time point to inject.
Methods: Wild type female mouse C57bl/6 was mated with Rosa-YFPfl/fl. Embryonic day E0.5 of pregnancy was estimated by the presence of a vaginal plug after overnight mating. Exact gestational day was determined using ultrasound. The intra-amniotic injection using lentiviral vector was performed from E9.5 to E14.5 guided by high-frequency ultrasound.
Findings: Successful transduction of oral epithelial cells using high titer lentiviral vector has been made during injection from embryonic day E9.5 to E11.5. Very few transduction can be seen when injected later than E12.5.
Conclusion: *In vivo* successful transduction of mouse oral epithelial cells by high-frequency ultrasound guided intra-amniotic injection can be performed at mouse embryonic day 9.5 to 11.5. E9.5 is the ideal injection time point which can harvest the high efficient transduction and broad distribution.

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Poor bisphosphonate-related osteonecrosis of the jaw bone defects repair view of bone marrow stromal cells

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Background: Treatment of bisphosphonate-related osteonecrosis of the jaw (BRONJ) has posed significant challenges to maxillofacial surgeons due to the poor repair of BRONJ bone defects, even at nearby sites of normal-appearing bone. Accumulated studies had shown that bone marrow stromal cells (BMSCs) play key roles during bone repair. However, what's the native BMSCs activities derived from BRONJ lesions and the roles these BMSCs have in BRONJ defect repair are not clear.
Objectives: To explore the mechanisms of poor BRONJ bone defects repair from the view of bone marrow stromal cells.
Methods: Three BRONJ patients were recruited in this study. The BMSCs were isolated from centre area of BRONJ lesions (Centre-BRONJ BMSCs) and peripheral area at the standard debridement boundary (Peri-BRONJ BMSCs), and the BMSCs isolated from three healthy mandibles were considered as control (Control BMSCs). After BMSCs identification by flow-cytometry assays, the proliferation ability, the multidifferentiation capacity, the osteoclasts-inducing ability were assessed.
Result: Center-BRONJ BMSCs and Peri-BRONJ BMSCs had a slower proliferative rate, a reduced colony-forming unit capacity, fewer lipid droplets formed, lower expression of peroxisome proliferator-activated receptor gamma2 and lipoprotein lipase, a decreased osteogenic differentiation capacity with lower Runx2 and osteocalcin expression levels and a reduced capacity for new bone formation *in vitro* and *in vivo* compared with control BMSCs. The osteoclast-inducing ability was also impaired in both BRONJ BMSCs.
Conclusion: Decreased BMSCs activities might contribute to the poor BRONJ bone defects reparative capacity.

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Execution of midfacial osteotomies with a cold ablation robot-guided laser osteotome

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Background: The application of Er:YAG lasers is well established to treat pathologic teeth structures. Recently, several studies have been published investigating the use of Er:YAG lasers in bone surgery. The advantages of laser-osteotomy are the freedom of cutting geometry, minimal damage to the bone and the surrounding tissues and the high accuracy. These advantages can be effective only when the system is coupled to a robotic guidance.
Objectives: In this study we present the results of cadaver trial. The aim was to show applicability, effectiveness and safety of the Cold Ablation Robot-guided Laser Osteotome (CARLO) when performing osteotomies in the maxilla and in the midface.
Methods: In six Thiel-fixated human cadavers the system was used to perform midfacial osteotomies to simulate complete and partial resections of the maxilla like in ablative tumour surgery. Also Le Fort I osteotomies were executed. The cutting pattern were either planned on basis of computed tomography data or intraoperatively marked with a pointing tool.
Findings: It could be shown that the CARLO system can be effectively used to tackle the above-mentioned indications.
Conclusion: The CARLO system is a new emerging technology that shows very promising results in the preclinical evaluation.

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The use of fluorescent lecthins to detect oral cancer and dysplasia

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Oral cancer is the sixth most common cancer in the world with approximately 275,000 people diagnosed each year. Early stage diagnosis is critical to improve survival. Our study tested a new oral screening technique based on lecithin histochemistry. The use of fluorescent lecthins as an adjunct to clinical examination was more sensitive and accurate than traditional screening methods, resulting in increased and earlier detection of oral cancer and dysplasia.

The inclusion criteria were subjects with the following characteristics: (i) absence of risk-habits (tobacco and alcohol usage, >40 years old or (ii) presence of a clinically suspicious oral lesion (potentially benign, premalignant, or malignant). The test utilised fluorescent molecular probes (Dye 1, a nuclear stain-DAPI; and Dye 2, a lectin-WGA-FITC) were subsequently applied to the oral cavity. Biopsies of clinically suspicious areas (including areas of aberrant molecular probe staining) were obtained for histopathological diagnosis by a board certified oral pathologist. Sensitivity and specificity metrics for the data were calculated by correlating fluorescence results to histopathological diagnoses.

This *in vivo* clinical study was performed on 25 patients with a variety of oral mucosal conditions. The results confirmed a sensitivity of 100% in cancer, 80% in dysplasia with a 60% specificity. This system is a noninvasive, low-cost and consistent method in enhancing the early identification of malignant lesions and holds the promise for earlier detection of oral cancer.

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Healing mechanism and osteogenic capacity of bovine bone mineral—human amniotic mesenchymal stem cell and autogenous bone graft in critical size mandibular defect

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Background: Maxillofacial bone engineering showed promising result; however, its healing mechanisms and effectiveness had not been fully understood.
Objectives: The study compared the bone healing mechanism and osteogenic capacity between bovine bone mineral (BBM) scaffold loaded with human amniotic membrane stem cell (hAMSC) and autogenous bone graft (ABG) in the reconstruction of critical size mandibular defect.
Methods: Critical size defects were made at mandible of 45 New Zealand White rabbits which were subsequently reconstructed with BBM-hAMSC, BBM alone, and ABG, respectively. At the end of first, second, and twelfth weeks, five rabbits from each group were sacrificed for histology and immunohistochemistry staining. Expressions of vascular endothelial growth factor (VEGF), bone morphogenetic protein-2 (BMP-2), Runt-related transcription factor 2 (Runx2) and angiogenesis were analysed in first and second week, while Runx2, osteocalcin, collagen-I fibres, trabecular area and bone incorporation were analysed in twelfth week.
Findings: Expressions of VEGF, BMP-2, Runx2 and angiogenesis were higher in ABG compared with BBM-hAMSC group in the first and second week group. In twelfth week expressions of Runx2 and osteocalcin as well as thickness of collagen-I fibres were significantly higher in BBM-hAMSC compared to ABG group, while there was no statistically difference in trabecular area and bone incorporation between BBMhAMSC and ABG group.
Conclusion: Early healing activities were higher in ABG than in BBM-hAMSC, while osteogenic activities in the late stage of healing were higher in BBM-hAMSC compared to ABG. In addition, the osteogenic capacity of BBM-hAMSC was comparable to ABG in the reconstruction of critical size defect in the mandible.

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Secreted ectodomain of sialic acid-binding immunoglobulin-like lectin-9 and monocyte chemoattractant protein-1 derived from dental pulp stem cells synergistically regenerate transected rat peripheral nerves by altering macrophage polarity

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Background: We previously reported that the implantation of a collagen graft soaked with serum-free conditioned medium (CM) from the stem cells of human exfoliated deciduous teeth (SHED-CM) into the nerve gap promotes neuronal regeneration, however therapeutic mechanisms are elusive. In another study, we identified a set of M2 macrophage inducers, monocyte chemoattractant protein-1 (MCP-1) and the secreted ectodomain of sialic acid-binding immunoglobulin (Ig)-like lectin-9 (sSiglec-9) in SHED-CM, and showed that they promote functional recovery after rat spinal cord injury.
Objective: We examined the therapeutic effects of MCP-1 and ED-Siglec-9 in the treatment of the peripheral facial nerve injury.
Methods: The rat facial nerve was resected 5 mm. Next an atelocollagen sponge impregnated, MCP-1 and sSiglec-9 was placed in the nerve gap. The neurological recovery of the transected FN was assessed by examination of vibrissae movements (VMs), histological analysis with electron microscope, and gene expression analysis with real-time polymerase chain reaction. Human Schwan cells (SCs) were cultured for 24 h with CM from MCP-1/sSiglec-9-induced M2 macrophage (M2-CM). Effects of M2-CM for proliferation, migration and differentiation of SCs were evaluated.
Results: SHED-CM or MCP-1/sSiglec-9-treated rats exhibited markedly improved VMs that were synchronised with that of the contralateral uninjured side five weeks after injury. The FN of both treatment groups displayed each many myelinated axons. M2 macrophages converts proinflammatory circumstances to anti-inflammatory one, and promote to proliferation, migration and differentiation of SCs.
Conclusion: SHED-CM and MCP-1/sSiglec-9 may provide a novel strategy to treat the FNI.

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Complications of sialendoscopy in Sjögren's syndrome patients

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Background: In literature it is suggested that sialendoscopy of the major salivary glands could possibly alleviate symptoms of Sjögren's syndrome (SS).[1]
Objectives: To evaluate our experiences of sialendoscopy of the salivary glands in patients with SS.
Methods: In this retrospective case series study the surgical data of patients with SS who had undergone sialendoscopy were used. Outcome measures were successful entry in the salivary gland and completion of sialendoscopy as planned. Furthermore, per- and postoperative complications were scored.
Findings: Data of sialendoscopic procedures in 26 patients with SS (24 females and 2 males; mean age, 57 years (range, 27–72 years) were analysed. Sialendoscopy was successfully performed in 78 salivary glands (75%), 50 parotid and 28 submandibular glands, of the 104 salivary glands in the 26 patients. Sialendoscopy failed in 26 (25%) of the 104 sialendoscopic procedures (2 parotid and 24 submandibular glands). In 16 salivary glands the ductal orifice could not be identified. In seven salivary glands sialendoscopy could not be performed due to partial or complete stenosis of salivary duct. In three salivary glands sialendoscopy was not performed because of a ductal perforation. Three patients developed a postoperative infection.
Conclusion: Overall rate of complications was limited and types of complications in patients with SS could be regarded as minor. Most complications were seen in sialendoscopy of the submandibular glands. Careful preoperative selection of both patients and salivary glands may contribute to a lower rate of complications and more predictable results.

Reference

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A remote controlled haptic drilling robot for oral and maxillofacial surgery

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Background: Surgeons are required advanced techniques and experiences to handle drilling devices correctly. The lack of these may bring on overcuts and damages to the surrounding tissue. This situation has risks of causing the subsequent complications or life-threatening accidents by heavy bleeding and nerve damage.
Objectives: In order to solve this problem for any surgeons, we developed a remote controlled haptic drilling robot.
Methods: The system consists of a master robot and a slave robot. The master robot is a robot that surgeons operate, and the slave robot is a robot that interacts with the cutting material. The force and position of robots are transmitted in both directions by bilateral remote control. Pine and Balsa wood were used as phantoms. They have same hardness of porous cortical bone and dense trabecular bone as mentioned in Misch's bone density classification. They were drilled continuously and the value of the force scaling function was calculated from the maximum motor torque and the cutting force.
Findings and Conclusion: We succeeded to send haptic sense from 15 km remote site. Although the force of master robot was increased, the force scaling function decreased the force of slave robot. It made slave robot stop around the position limitation and the error was in 60 μm. It was only 2.5% of 2 mm margin. The validity of the proposal was confirmed using phantoms individually. The drill could successfully stop within safe position from the position limitation. Higher accuracy was expected by fine adjustment in force scaling.

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Evaluation of bone grafting materials based on characterisations of surrounding multinucleated giant cells in human biopsies

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Background: Numerous bone grafting materials have been used for bone augmentation procedures. Multinucleated giant cells (MNGCs) have widely been detected around bone grafting materials as key contributors to bone metabolism and immunology by participating as osteoclasts (OCs) in the resorption of bone grafts or as foreign body giant cells during material rejection.
Objectives: The aim of this study was to investigate their phenotypes around bone grafting materials by utilising 23 markers to identify differences between OCs and MNGCs as well as to characterise their potential to polarise towards classical tissue-inflammatory M1-macrophages or wound-healing M2-macrophages.
Methods: Three human bone biopsies undergoing alveolar bone augmentation procedures with either deproteinised bovine bone mineral (DBBM) or biphasic calcium phosphate (BCP) were investigated. The specimens were tested for marker-specific antibodies for MNGC, OC, general macrophage, M1, or M2 phenotypes by enzyme and immunohistochemical staining.
Findings and Conclusion: It was found that giant cells around DBBM and BCP expressed not only typical OC markers (e.g. TRAP, cathepsin K, RANK) but also expressed exclusive MNGC-specific markers (e.g. CD86, CD98 and HLA-DR). Furthermore, while MNGCs around both DBBM and BCP expressed general macrophage markers (e.g. CD68, EMR1), they also showed the ability to polarise towards classical M1-(CD64, CD197) and M2-(CD163, CD206) macrophages. The findings illustrate the fact that MNGCs found around bone grafting materials show specific phenotypes of macrophage lineages not found in OCs. Furthermore these MNGCs showed the potential to polarise towards M1- or M2-phenotypes.

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The therapeutic effect of patient-specific implants in cranioplasty

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Background: Patient specific implants are being used for the reconstruction of large skull bone defects. Several therapeutic effects have been suggested in current literature but were never objectified.
Objectives: To evaluate the change in quality of life, pain, aesthetics, and the surgical and medical outcomes after reconstruction of large skull bone defects with titanium or polyetheretherketone (PEEK) implants.
Methods: We retrospectively evaluated 29 consecutive patients receiving a patient specific skull implant between November 2004 and December 2015. 21 patients received PEEK implants and eight received titanium implants. Data was acquired regarding quality of life, aesthetics, pain, demographics and complications. Quality of life was measured using the Glasgow Benefit Inventory (GBI). Additional questions were asked concerning pain, satisfaction and aesthetics.
Findings: The mean total GBI-score was +26.1 (95% CI 16.8–35.4, $P < 0.001$). Headache complaints or pain in the operation site improved in 75.0% and 77.8% of these patients, respectively. In 8.0% an increase was seen with regard to both variables.
Conclusion: Reconstruction of skull bone defects with PEEK and titanium patient specific implants gave a statistically significant improvement in quality of life. Furthermore, it decreased pain and headaches and gave aesthetically good results.

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Method comparison between bone histology and magnetic resonance imaging: is magnetic resonance imaging suitable to quantify osteogenesis?

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Currently, histological techniques are mainly used to analyse biomaterial-tissue-interactions. However, these methods are destructive and time-consuming. Furthermore, they require a large number of animals as longitudinal observations are not possible. The evaluation by non-destructive imaging techniques like magnetic resonance imaging (MRI) could be an alternative, but is has to be evaluated if the new methods enable also sufficient quantification, e.g. of bone formation. The present study examined the suitability of MRI to assess osteogenesis in an artificial maxillary bone defect in a rat model. The bone defects ($n = 84$) were augmented with 3 different bone grafts, as well as an empty control defect was analysed. After 6, 9 and 12 weeks the bony ingrowth and the remaining defect width were measured by histomorphometry and MRI. By using a graphical concordance analysis the mean difference between MRI and histological results was clearly detectable. For the parameter bone volume the histomorphometrical result was on average 2.4% higher than the MRI values. For the parameter remaining defect width there was also a statistical significant bias between both methods measurable (6.7%). Reason for the data bias is mainly the analysed section position, which could be proven in a repeated measurement experiment.

In conclusion the application of MRI enables sufficient defect visualisation, but the quantitative results differed in comparison with histology while not exactly the same slice positions were analysed. If the same slice is analysed by both methods the results are absolutely comparable and the MRI is suitable to assess osteogenesis.

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Sphingosine coated titanium reduces colonisation of *Staphylococcus aureus*

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Background: Sphingosine is a part of mammalian innate host defense against bacteria and has been shown to have antimicrobial properties against bacteria implicated in hardware failure.
Objectives: To investigate if a coating of sphingosine will reduce bacterial contamination of osteosynthesis hardware used in facial fractures and osteotomies.
Methods: Grade II titanium was dip coated into a sphingosine/ethanol solution in concentration of 30 mM, 10 mM, 1 mM and plain ethanol. Droplets (~10 μL) of *Staphylococcus aureus* were transferred to the coated titanium plates and incubated. The adherent bacteria were transferred to Lennox agar plates and colony forming units (CFU) quantified. Mean CFUs were analysed using a Student's *t* test with a P value < 0.05.
Findings: Plates coated with 10 mM and 30 mM sphingosine reduced adherent bacteria by 86.24% and 91.99%, with log reduction of 0.86 and 1.10. CFUs decreased by a power of 10 in both groups.
Conclusion: Sphingosine coated titanium plates provided a dose dependent reduction of adherent bacteria. Further testing is required to show its efficacy in an animal model.

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Isolation and characterisation of mesenchymal stem cells from the temporomandibular joint

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Background: Disorders of the temporomandibular joint (TMJ) complex affect 6–12% of the population, with the joint's disc usually involved. Tissue engineering and regenerative medicine may constitute a promising therapeutic approach, with resident stromal progenitor cells a key factor in the process.
Objectives: We hypothesised that the TMJ disc (TMJD) contains multipotent mesenchymal stem cells (MSCs) that may play an important role in regeneration of the disc.
Methods: TMJD cells were cultured and evaluated for growth kinetics and colony-forming units (CFUs). Single cell-derived clones were isolated and induced to differentiate toward the osteogenic, adipogenic, and chondrogenic lineages by culturing

in various induction media. Flow cytometry was used to identify MSCs surface markers in additional cell samples, and reverse transcriptase-polymerase chain reaction was used to determine gene expression patterns within isolated cells.
Findings and Conclusion: High numbers of CFUs were observed, indicating cell self-renewal. Biochemical assays showed significantly higher alkaline phosphatase activity, lipid droplets concentration, and glycosaminoglycans levels in cells cultured in osteogenic, adipogenic, and chondrogenic induction medium, respectively.

Approximately 1% of the total cell population demonstrated the capability to differentiate into all 3 mesenchymal lineages. Chondrogenic gene levels within TMJD-derived cells were significantly reduced in passaged culture.

Our results support the hypothesis that MSCs populate the TMJD and possess proliferation and differentiation capabilities. These cells may contribute to the regeneration potential of dysfunctional tissue and become the primary component in future attempts at tissue engineering or regeneration of this complex.

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Neuroprotective and analgesic properties of melatonin: preliminary results of a randomised, controlled clinical trial

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Background: Persisting neurosensory disturbance affects a significant number of patients following orthognathic surgery for which there is currently little to offer. Melatonin has demonstrated a neuroprotective effect following neural trauma in animal studies.
Hypothesis: Through its antioxidant properties, melatonin reduces postoperative pain and diminishes the incidence of neurosensory deficit.
Objectives:
1. To measure the effect of oral melatonin on postoperative pain perception
2. To determine the impact of oral melatonin on neurosensory deficits related to orthognathic surgery
3. To measure the impact of oral melatonin on enzymes related to oxidation pathways

Methods: A double-blind randomised clinical trial was conducted and ethics approved. Study groups consisted of a standardised melatonin dose and identical placebo, commenced the night prior to surgery, continued for 21 days. All patients underwent surgery according to standardised protocol. Data collection consisted of postoperative pain scores, neurosensory testing and biochemical assays for hydrogen peroxide and antioxidant enzyme levels.
Statistical analysis: *T*-test, correlation, and ANOVA were used. A P value < 0.05 was considered statistically significant.
Findings: Patients treated with melatonin reported significantly lower postoperative pain scores, and significantly improved neurosensory profiles up to 1 month postoperation. Biochemically, significantly lower levels of hydrogen peroxide and higher levels of superoxide dismutase, glutathione peroxidase and catalase were measured. A statistically significant correlation was found between pain scores, antioxidant levels and neurosensory testing profile.
Conclusion: Significant benefit of melatonin on postoperative recovery was found, correlating statistically with enzymatic changes induced by melatonin. These preliminary results supported our hypothesis and we await further data.

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Three-dimensional printing of patient specific boluses for radiation therapy

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Background and Objectives: Boluses are widely used in radiation therapy to correct for anatomical irregularities and deliver correct radiation doses to the tumour, especially in patients being treated for skin cancers and head and neck cancers. A bolus is made of a flexible material with properties equivalent to tissue when irradiated. However, most conventional boluses are suboptimal since they do not conform to patient anatomy. This presentation will demonstrate how novel three-dimensional (3D) printing technologies can be used to manufacture patient-specific boluses for radiation therapy.
Methods: Computed tomography images of the patient are converted into a patient-specific bolus design using an in-house developed dose calculation algorithm. This algorithm optimises the dose distribution with regard to dose coverage, conformity, and homogeneity within the tumour. The designed bolus is used to create a mould which is manufactured using an inkjet 3D printer. In a final step, liquid tissue-equivalent silicon is poured into the mould which can be removed after the silicon has set.
Findings: Since 2014, 157 patients have been treated in the VU University Medical Center using 3D printed patient-specific boluses. All 3D printed boluses demonstrated an excellent fit, which resulted in an improved overall accuracy of dose delivery. Furthermore, the introduction of 3D printing in radiation therapy has reduced the lead time hence costs of the treatment.
Conclusions: The combination of the novel dose calculation algorithm and 3D printing has improved the quality of radiation therapy. In the near future, direct silicon printing will allow even faster treatment of cancer patients.

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What is our goal in orbital reconstruction? Quantitative assessment of orbital volume in 100 individuals by manual segmentation and automatic registration

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Background and Objectives: The knowledge on the symmetry of intra-individual orbital volumes is crucial when applying radiological quantitative assessment methods for preoperative planning and postoperative outcome evaluation. To generate these values, the bony orbits in facial computed tomography (CT) scans were analysed using a manual segmentation and automatic registration.
Methods: A surface mesh of the surface of orbit of 100 patients was extracted from CT scans. The average shape of the orbit

for our population was calculated iteratively using the Coherent Point Drift method [Myronenko A. et al., 2010]. This altas was then registered to all samples (l/r orbits) to find the corresponding anatomical points among samples. After registration, all the surface reconstructions of all the patients had an identical mesh topology as well as nodes at corresponding anatomical locations. The region of interest was selected on the atlas and morphed to all samples based on correspondences found during registration.
Findings: The volume difference was calculated locally by creating a volume based on difference in nodal position between left and right orbit (based on the anatomical correspondence of the mesh). In addition, the total volume difference between left and right orbit of a patient was calculated. It showed an average difference of $600 \pm 500\,mm^3$ between the volume of the left and right orbits, which represents a difference of 2.1%.
Conclusion: With the help of modern CT technique and digital assessment methods it was possible to show that the intra-individual volume difference in the orbits is about 2%, and not 7–8% as is often cited in literature.

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Sphenopalatine ganglion stimulation for treatment of cluster headache, a postoperative observational study

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Background: Cluster headache is a rare form of primary headache characterised by intense unilateral pain and autonomous nerve symptoms. Pharmacological treatments are sometimes insufficient, which calls for surgical alternatives in treatment refractory cases. Stimulation of the sphenopalatine ganglion (SPG) is a new method shown to be effective for preventing and treating attacks.
Objectives: Evaluate the outcome of a new method to treat Cluster headache.
Methods: A new method where the SPG neurostimulator was inserted through an intraoral approach under GA guided by fluoroscopy. Four weeks after the operation the patient started the stimulation of the SPG. We conducted an observational study on the first 16 patients that received a SPG neurostimulator at Uppsala University Hospital. Patients were interviewed and received instructions, new stimulator settings as well as advice. This was followed by a one-month registration period after which a second interview was held. Evaluated parameters included patient global impression of change (PGIC), as well as changes to headache characteristics and required medication.
Results: Using PGIC as primary endpoint, 56% and 69% of the patients qualified as treatment responders in the first and second interviews, respectively. Significant improvements were observed for headache intensity ($P = 0.007$), frequency of attacks ($P = 0.041$) and pain interference to daily functions ($P = 0.047$). 56% of the patients also reported a decreased intake of medication.
Conclusion: SPG-stimulation (SPGS) resulted in significant improvement for the majority of the studied patients with cluster headache. Other findings, such as a decrease in medication, less frequent attacks and less intense attacks, further support the efficacy of SPGS.

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Matrix metalloproteinase-9 gene polymorphisms and the risk for oral squamous cell carcinoma metastasis

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Background: The survival of patients with oral squamous cell carcinoma (OSCC) has not changed significantly over several decades. The degradation of extracellular matrix (ECM), which is caused by proteinase, especially matrix metalloproteinase-9 (MMP-9), plays critical roles in the cancer development and aggression. Non-synonymous single-nucleotide polymorphisms (SNP) in the functional domain of the MMP-9 gene may influence substrate and inhibitor binding and contribute to cancer predisposition and aggression.
Objectives: We aimed to investigate the association of MMP-9 genetic polymorphisms to the risk of OSCC metastasis.
Methods: To test our hypothesis that common non-synonymous SNPs R279Q and R668Q in MMP-9 are associated with OSCC metastasis, a case control study was conducted of isolated DNA of 30 non-metastatic and metastatic OSCC using polymerase chain reaction-restriction fragment length polymorphism assay with multivariate logistic regression analysis to calculate adjusted odds ratio and 95% confidence interval.
Findings: This study suggests that genetic variants for SNP are associated with higher susceptibility to metastasis of OSCC.
Conclusion: These findings indicate that the non-synonymous SNPs R279Q and R668Q in MMP-9 may confer the biomarker in the metastasis of OSCC.

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Cognitive training in surgical training: the story so far

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Background: Technological advances had transformed modern day living. High specification mobile devices are nowadays viewed as necessities. New approaches to surgical training are emerging with these new technologies, offering effective supplementary training tools to the traditional apprenticeship structure. With increasing pressures in the healthcare sector, these new approaches to training can be vastly beneficial.
Cognitive Training within Surgery: Cognitive training has been shown to improve motor skills within sports and aviation industries. Research demonstrated the use of psychological processes could enhance the performance of skilled behaviours, suggesting its potential role in surgical education to improve surgical performance. This is further supported by studies of simulation-based education in gastrointestinal endoscopy, which demonstrated improved performance both in test setting and clinical practice along with improved patient outcomes. The author explores the current cognitive training tools available to surgical trainees and their potential benefits.
Future of Surgical Training: Cognitive training or the use of psychological processes can potentially serve as a highly effective supplementary training tool in the development of technical skills in surgery. Further research is needed to better our understanding of cognitive training interventions; nevertheless, this presents us with an exciting development in the future of surgical training.

Decision-making in surgery is important, a skilfully performed operation is 75% decision-making and 25% dexterity (Spencer F, 1978).

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Touch surgery: an inventive adjunct to surgical training

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Background: Simulation has become a well-established training tool for many different industries. The aviation industry has led the way with simulation as a way to deliver safer training at a reduced expense and better prepares the trainee pilots to handle crisis situations. Their approach is to focus on cognitive training then the acquisition of technical skills alone.
Application in Healthcare: Simulation in healthcare is gaining pace. Studies have demonstrated a transfer of skills from the training labs to the clinical settings, ranging from improved operative times to better patient outcomes. This has led to the mass adoption of simulated practice in healthcare. The primary focus had been technical skills training, but recently cognitive rehearsal and immersive crisis training are increasingly popular. Presently the greatest barrier to scaling up the adoption of simulated practice lies in the cost of training tools.
New Development: Touch Surgery™ is a novel App-based surgical simulator on Apple and Android devices. This provides trainee surgeons with cognitive-based training aimed to improve judgment and knowledge, allowing them to focus on acquiring dexterous skills in real-life procedures. The app-based solution has had widespread uptake with over a million users from countries all over the world.
Conclusion: Simulation is associated with enhanced performance in clinical practice and improved patient outcomes. The Touch Surgery™ App provides free training for surgery on mobile devices. At a time of where there are more active mobile devices than humans on earth, this solution may overcome the scalability issue faced by the simulation industry.

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The application of digital imaging and communications in medicine data with z-brush three-dimensional software — how can the design and fabrication of an epithesis be supported by it?

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Background: From extensive damage in the facial area after ablative surgery and/or radiation therapy epithetic treatment can be a formidable challenge. Often it is only a reduced and/or compromised bone structure available that does not allow normal epithetic anchors to be used. Now with the foundation provided by Digital Imaging and Communications in Medicine (DICOM) data sets the possibility is offered for a patient-specific epithetic framework to be generated in every conceivable geometrical configuration.
Objectives and Methods: Examples of patient cases are given where with the foundation provided by DICOM data and with the help of the Z Brush three-dimensional (3D) software the preoperative planning, the framework and also the epithetic form was undertaken from 3D print or 3D visualisation.
Findings and Conclusions: The computed tomography and magnetic resonance imaging data can be used to assist the epithetic provider with the corresponding software knowledge with the planning and fabrication of an individual epithetic structure. Planning dependability for the epithetic provider, clarity of communication with the surgeon through 3D visualisation and practical assistance for the epithetic manufacture are the advantages of the analysis from DICOM data.

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Palatal periosteum derived mesenchymal stem cells cultured in serum and xeno-free medium

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Background: Mesenchymal stem cells (MSC) from palatal periosteum (PP) can be a reliable alternative for tissue engineering applications since it can be easily harvested, healing time is faster with significantly less patient discomfort and risk of complications than invasive bone marrow or fat harvesting procedures. Use of serum and xeno-free (SXF) medium is essential to expand cells for clinical applications.
Objectives: To determine the location of MSC within the human PP, their frequency and ability to differentiate into mesenchymal lineage cells when cultured *in vitro* in SXF medium.
Methods: Human PP ($n = 3$), obtained from patients undergoing surgical exposure of palatally impacted canines, was double-immunostained with MSC-specific antibodies against CD105, CD90 and CD73. Extracted cells were cultured on SXF Essential 8™ medium and analysed for MSC and hematopoietic stem cell (HSC) markers (CD45, CD34, CD11b, CD19, HLADR) using flow cytometry and their multipotency determined *in vitro*.
Findings: MSC were detected within the PP tissue as single or small colonies of cells in close proximity to blood vessels. Flow cytometry analysis revealed that $79.93 \pm 1.25\%$ were positive for MSC markers with only $0.46 \pm 0.33\%$ positive for the HSC markers. MSC cultured in osteogenic medium were positive for nodule formation, alkaline phosphatase, Alizarin red S, and Von Kossa staining whereas Alcian blue positive micromass cultures and Oil Red O positive vesicles were evident when cultured in chondrogenic and adipogenic medium respectively.
Conclusion: This study showed that PP contains MSC which can be easily harvested and successfully expanded in SXF medium suitable for human tissue engineering applications.

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Autologous demineralised tooth matrix used as a biomaterial for alveolar ridge preservation

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Background: Various bone substitutes are employed for ridge preservation. Tooth has been attracting attentions as a material for alveolar bone regeneration. Several studies showed that tooth possessed osteoconductive and osteoinductive properties similar to bone.
Objective: To determine the efficacy of autologous demineralised tooth matrix (auto-DTM) in the preservation of alveolar ridge shape after tooth extraction.
Methods: 40 symmetrical premolar extraction sockets using split-mouth design were randomly filled with auto-DTM and covered with platelet-rich fibrin (PRF) [DTM group] or PRF alone (control group). The evaluation of alveolar ridge dimensional changes, marginal bone resorption and bone healing density were performed in two-dimensional computer-based analysis and periapical radiographs (immediate, two weeks, four weeks, six weeks and eight weeks).
Findings: Auto-DTM was well tolerated in all sites without incidences of postoperative complication. The dimensions of the ridges were significantly better preserved in DTM group than in control group. The radiographic resorption of marginal bone on the mesial side, distal side, as well as height of the sockets in the DTM group were not significantly different from those of the control group.
Conclusions: Auto-DTM can be a useful alternative graft material for ridge preservation. Extraction socket grafted with auto-DTM and covered with PRF can reduce buccal bone collapse and facilitate bone-healing density as shown clinically and radiographically for short term ridge preservation.

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Effects of autologous human serum on culturing primary osteoblast cells

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Background: Using engineered bone tissue for clinical trials encounters contamination of xenogenic components of fetal bovine serum (FBS) used for cell culture procedure. This study investigated the feasibility of using autologous human serum (AHS) for human cell culture instead of FBS.
Objectives: To comparatively evaluate growth and differentiation of human osteoblast cells cultured in mediums supplemented with AHS, FBS and serum free mediums (SFM).
Methods: Primary osteoblast cells harvested during orthognathic surgeries from six patients (two males, four females; age 36.25 ± 16.04 years) were cultured in three different groups of mediums including AHS group: Alpha-MEM mediums with 10% AHS from 50 mL venous blood of each patient; FBS group: the medium with 10% FBS; and SFM group: STEMPRO, United States of America. Proliferation and differentiation of the cells among the groups were comparatively assessed over 30 days using ELISA.
Findings: Growth of the cells in AHS group was comparable to FBS group, whereas the cells in SFM group had significantly lower proliferation (P 0.05), whereas those in SFM group were stable over the observation period.
Conclusion: The AHS used as the supplement in the culture medium was comparable to the FBS in terms of supporting growth and differentiation of the autogenous primary osteoblast cells.

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The ultrastructural features of re-epithelialisation process of surgical wounds on oral mucosa and facial skin

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Background: The question concerning migration process of keratinocytes within re-epithelialisation of surgical wounds is still debating. The aim of the present study was to investigate the dynamic relationship between keratinocytes itself and with connective tissue elements on ultrastructural level during re-epithelialisation process of surgical wound on facial skin and oral mucosa.
Methods: The model of full-thickness surgical wounds on skin and oral mucosa were created in domestic pigs under the general anaesthesia. The tissue taken from the wound was kept in fixating solution containing 2.5% paraformaldehyde, 2.0% glutaraldehyde and 0.1% picric acid in 0.1 M phosphate-buffered saline for at least 4 h and then processed using standard electron microscopy. Ultrathin sections were examined by using transmission electron microscopy.
Results: The "epithelial regeneration lingua" composed from different number of keratinocytes is forming on the wound edges with a further tendency to migration toward the bottom of the wound. In the area of beginning of epithelial lingua as well on the part directed toward bottom of the wound the main bulk of keratinocytes are losing their basoapical polarisation and because of their fattening are localising parallel to the edges of surround connective tissue elements. It is character by the forming of cytoplasmatic bridges on the background of existing desmosomes inbetween.
Conclusions: This novel study demonstrates that re-epithelialisation of surgical wound in oral mucosa and skin is associating with migration of keratinocytes not as single cell migration but as cell layer. These findings could be applicable in surgical wounds management.

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Beta-tricalcium phosphate with adjuvant bone-marrow stem cells for bone regeneration in calvarial defects: an *in vivo* microcomputed tomographic and histologic experiment in rats

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Background: Alloplastic biomaterials have been used for regeneration and reconstruction of osseous defects. The role of adjuvant bone-marrow mesenchymal stem cells (BMSC) in bone regeneration is still unclear.
Objectives: The objective of the present *in vivo* study was to assess bone regeneration in standardised rat calvarial defects using beta-tricalcium phosphate (β-TCP) with adjuvant BMSC.
Methods: A single full-thickness standardised calvarial defect (4.6 mm diameter) was created on the left parietal bone in female Wistar rats ($n = 40$) weighing approximately 300 g and aged about 12 weeks. The animals were randomly divided into four groups based on the biomaterial used to fill the defect: (1) control group ($n = 10$); (2) β-TCP group ($n = 10$); (3) BMSC group ($n = 10$); (4) β-TCP + BMSC group ($n = 10$). Real-time *in vivo* microcomputed tomography analyses were performed immediately postsurgery and at 2, 4, 6 and 10 weeks to determine volume and mineral density of newly formed bone (BVNFB, MDNFB) and remaining β-TCP particles (VRBP, MDRBP). At 10 weeks the animals were sacrificed and calvarial specimens were evaluated histologically.
Findings and Conclusion: Statistically significant increase in BVNFB and MDNFB were observed as early as 2 weeks, in the β-TCP + BMSC group in comparison to other groups. Histologic findings at 10 weeks revealed greatest amount of new bone with abundant osteoblasts, in the β-TCP + BMSC group. Based on this study, significant volumes of new bone with high mineral density is formed as early as two weeks following bone regeneration with β-TCP + BMSC in rat calvarial defects.

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Average mandibular dimensions of Malaysian population: a step towards virtual reconstruction of neomandible

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Background: The mandible is a very important structure in the facial region and is involved in several crucial functions and contributes to aesthetics of the face. Unfortunately, it can be affected by several problems, resulting in alteration of its morphology and function.
Objectives: The present study was undertaken to determine mean values of mandibular linear and angular measurements according to gender, ethnicity and age and to determine presence of difference between the right and left side within gender to ensure that the mandible is returned to its desired shape and form.
Methods: Linear and angular measurements of mandible were carried out virtually using Computer-Aided Design software (SolidWorks Premium 2012) on 150 patients, ranging from 21 to 70 years old with equal gender, ethnic and age group distribution. Statistical analysis was performed and level of significance was set at $P = 0.05$.
Findings: The mean values for linear measurements were higher in males but females had higher angular measurements. Mean values were generally lowest for Indians among the ethnic groups. Most of the linear measurements showed a slight downtrend with age. The gonial angles demonstrated an increase with age. The body height of mandible showed a significant difference between the right and left sides for both the males and females. Both genders also exhibited significant difference between the right and left gonial angles.
Conclusion: Mandibular dimension in Malaysian population differs between the genders, race and age. Therefore, the reconstructed dimensions have to be patient-specific to ensure optimum shape, form and function.

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Evaluation of accuracy of a novel elastic fusion algorithm — a prospective clinical study

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Background: Although rigid fusion is generally accepted as gold-standard method, it often stands for time consuming and manual registration procedure. A novel elastic fusion algorithm is introduced to overcome these drawbacks.
Objectives: To investigate image registration accuracy of bony structures and adjacent soft tissues provided by novel elastic fusion algorithm.
Methods: Five patients (3 male, 2 female, mean of 57 years) with outboard obtained computed tomography (CT) imaging of the head and neck were included in the study. For each, a 3-Tesla (3 T) magnetic resonance imaging (MRI; Philips Healthcare, Best, The Netherlands) of the same region was conducted. The MRI protocol included three-dimensional (3D), axial and sagittal two-dimensional scans showing different contrasts and was repeated three times with the patient in neutral, flexed and rotated head position. To verify accuracy of novel spine curvature correction method (embedded in the ImageFusion Element, Brainlab AG, Feldkirchen, Germany), 80–120 bony landmarks were defined in the CT image, transferred via rigid fusion and used as starting value for elastic fusion algorithm. Finally, Euclidian distances between rigidly and elastically transferred landmarks were determined.
Findings: Although the image data revealed strong translational and rotational displacements of vertebrae in both modalities (due to varying head positions), 95% of the landmarks showed an error below 3 mm. However, using 3D MRI data provides highest registration accuracy and co-registration of axial MRI acquisitions is superior than compared to sagittal MR images.
Conclusion: Generally, it can be stated that elastic fusion provides high MR-to-CT image registration accuracy and represents a considerable step towards soft tissue registration and navigation.

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Implant-oriented navigation approach in orbital reconstruction

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Intraoperative navigation is a frequently utilised tool to assess the acquired position of an implant during orbital reconstructive surgery. The novel contour of the orbital floor can be checked and related to the planned contour of the mirrored unaffected side. During navigation, the multiplanar views are reconstructed and changing through pointer movement. This hampers accurate assessment of implant position.

Integrated navigation markers and rulers offer an implant-oriented approach (Dubois et al., 2016; Rana et al., 2015). This feedback mechanism has proved to be superior in positioning the implant according to planning. The markers and rulers allow for a more realistic three-dimensional assessment of implant position, but may need further elimination of interpretation steps to be taken by the surgeon.

A novel intraoperative navigation approach will be presented, which actually tracks the implant in real-time in the OR. This allows for a more intuitive visualisation of the actual implant position to the surgeon, in three dimensions, as well as the relation between actual position and planned position. Adjustments in implant position can be evaluated instantly and interpretation steps are simplified. This method produces effective feedback mechanism.

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Bone regeneration with adipose stem cells and calcium phosphate ceramics in the human maxillary sinus floor elevation model using a one-step surgical procedure

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Background: In patients undergoing maxillary sinus floor elevation (MSFE) for dental implant placement, calcium phosphate (CaP) ceramics are used as alternatives for autologous bone. However, these bone substitutes have only osteoconductive properties and lack osteoinductive potential.
Objectives: In a phase I study the feasibility and safety of the procedure, and the potential additive effect of freshly isolated autologous stromal vascular fraction (SVF) of adipose tissue (containing stem cells) on bone regeneration in MSFE were evaluated.
Methods: From 10 healthy patients, adipose tissue was harvested from the abdominal wall; SVF was procured using automatic processing (Celution), seeded on either beta-tricalcium phosphate (β-TCP; $n = 5$) or biphasic CaP carriers ($n = 5$), and used for MSFE in a one-step surgical procedure. All 10 patients received CaP plus SVF on one side, whereas bilaterally treated patients (6/10) received CaP only on the contralateral side. Biopsies were taken from the augmented areas 6 months postoperatively, during dental implant placement, and were assessed by microcomputed tomography and histomorphometrical analysis.
Results: No adverse effects were reported during the procedures or during 3-year follow-up. Bone and osteoid percentages were higher in SVF-supplemented biopsies than in control biopsies, in particular in β-TCP treated patients. Paired analysis on six bilaterally treated patients revealed significantly higher bone and osteoid volumes throughout the complete biopsies.
Conclusion: This study demonstrated the feasibility, safety, and potential efficacy of SVF seeded on CaP ceramics for MSFE, providing the first step towards a novel treatment concept that might offer broad potential for SVF-based regenerative medicine applications.

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Effect of systemic administration of glucocorticoid on bone mineral density in the jaw bone of minipigs

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Background: Osteoporosis is discussed controversially to influence the osseointegration of dental implants.
Objectives: The aim of the study was to evaluate the effects of systemic glucocorticoid administration on bone mineral density of the jaw bone of minipigs.
Methods: 37 adult female minipigs (18–20 months) were randomly divided into two groups. Quantitative computed tomography of the lumbal spine as well as the mandible and maxilla was performed and blood was drawn. One group initially received 1.0 mg prednisolone per kg body weight daily for two months. The dosage was tapered to 0.5 mg per kg body weight per day thereafter. The other group served as control and received placebo. Computed tomographies and blood samples were repeated after six and nine months. Bone mineral density measuring Hounsfield units and serum levels of different bone metabolism markers were assessed.
Findings: Two minipigs of the prednisolone group died and were excluded from the analyses. A decrease in bone mineral density could be observed from baseline to nine months. It was more pronounced in the prednisolone group. Statistically significant differences were reached for the mandible (541.23 ± 151.83 to 402.89 ± 99.23 Hounsfield units) and the maxilla (421.91 ± 119.20 to 315.51 ± 71.23 Hounsfield units) in the prednisolone group.
Conclusions: The administration of glucocorticoids reduces the bone mineral density in the jaws of minipigs.

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The regeneration potential of amelogenin—towards translational study

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Trauma or diseases of mesenchymal tissues such as bone, periodontal tissues, muscles, ligaments and cartilage are prevalent, considerably debilitating and affect the quality of life among populations worldwide. Damage to most of these tissues cannot regenerate, and often the damaged tissue does not return to its original state.

We have shown that recombinant human amelogenin protein (rHAM), produced by our team, has the ability to regenerate damaged alveolar bone, cementum and periodontal ligament in a dog model.

In rat osteochondral fracture model, application of rHAM regenerated the hyaline articular cartilage and prevented the deterioration towards posttraumatic osteoarthritis and joint destruction.

In rat experimentally torn skeletal ligament model, application of rHAM regenerated torn skeletal ligament, which regained its mechanical strength and stiffness.

Our goal is to translate this novel *in vivo* biological therapy, for regeneration of damaged mesenchymal tissues, from animal model studies into clinical human studies, towards development of treatment. Our clinical studies will involve two major fields; the oral and maxillofacial field will aim at the regeneration of alveolar bone including atrophic, diseased and resected bone, and more specifically—vertical augmentation of alveolar bone. The orthopaedic field will aim at the regeneration of skeletal tendons, ligaments, cartilage and intervertebral disc.

We hope that this translational study will enable the development of an easy to use product, which after a single application will induce significant regeneration of the treated tissue.

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Surgical vision: enhancing training in oral and maxillofacial surgery

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Background: Surgical training is an apprenticeship system with trainees working under supervision until judged competent to operate independently. In the modern era advancements in technology have enabled surgical training to progress from simply assisting and performing a procedure under direct guidance. There have been developments in surgical simulation, with the production lifelike models progressing to virtual reality surgical simulation. Another such innovation is "Surgeon point of view recording". This enables the trainer to broadcast and record the performance of a surgery and also for the trainee to be recorded and critiqued when working independently on call. Wearable technology opens many doors to further our surgical training as well providing another means of supervision.
Objectives: To determine the use of surgical point of view recording using optical head-mounted display designed in the shape of a pair of eyeglasses as part of surgical training.
Methods: Numerous surgical procedures from the full spectrum of maxillofacial surgery were recorded. Trainees were given use of the technology to use when on call and operating independently.
Findings and Conclusion: Surgical point of view recording enhances the view of the surgical field especially in our specialty where conventional recording may not be able to visualise the full extent of the oral cavity or deep into the neck. Trainees found that critiquing operations where they worked independently greatly enhanced learning, especially for junior registrars (residents) and second degree students. It also provided an enhanced record of training to be used at their annual review of competence progression.

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Human mandible bone defect repair by the grafting of dental pulp stem/progenitor cells — a pilot study

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Background: Dental pulp is now proven potential source of autologous stem/progenitor cells.
Objectives: To demonstrate that dental pulp stem cells (DPSCs) can be used to repair alveolar defects secondary to wisdom tooth extraction in human mandible with optimal quality and quantity of bone. Hence, to define the merits and demerits considering future clinical applications of it.
Methods: A spilt mouth designed study was conducted with sample size of five patients who reported for removal of all wisdom teeth with closely comparable conditions; as Test (T) and Control (C) site. Dental pulp was harvested from extracted upper third molars in strict aseptic conditions and subjected to isolation, expansion and differentiation into osteoblastic lineage *in vitro*. Later, the confluent stem cell pellet was transplanted into the Test (T) site left by removal of third molar *in vivo*.
Findings: Clinically, normal with X-ray controls showed significant differences between T and C sites at end of month. Alveolar bone at T site had optimal vertical repair, better blending of margins, enhanced trabecular pattern with higher rate of mineralisation; substantiated by densiometric analysis at end of three months. Histological evaluation demonstrated well vascularised bone with lamellar architecture surrounding Haversian channels with osteocytes.
Conclusions: Dental pulp collection from third molars is remarkable and noninvasive procedure. Autologous transplantation of cultured DPSCs led to bone regeneration of superior quality and quantity. Results are encouraging; prompting further clinical trials on larger scale with long-term follow-up.

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Adipose derived stem cell on the regeneration of irradiated mandible of adult rabbit submitted to distraction osteogenesis

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Background: Irradiation can damage the regeneration of mandibles submitted to distraction osteogenesis.

Objectives: The aim of this study is to evaluate the effect of adipose derived mesenchymal stem cell (ADSC) on the regeneration of irradiated mandible submitted to distraction osteogenesis on adult rabbits.
Methods: Ten adult rabbits were selected and the dorsal fat penicle was harvested culture of mesenchymal stem cells. The mandibles were irradiated on a dose of 20 Gy. After 30 days the animals underwent mandibular distraction osteogenesis. The animals were divided in two groups. On the control group (CG) saline solution was injected and on the study group (SG) ADSC (106) was injected. After the 4 weeks the mandibles were removed and evaluated by tomography and histomorphometric. The specimens were prepared with for histology evaluation. Histomorphometric were analysed on imageJ program and statistic analysis by Mann–Whitney test ($P > 0.05$).
Findings: The tomography shows a significant improvement on Hounsfield scale for lateral fibrovascular zone (114.5 ± 9.7 CG to 148 ± 24; $P = 0.0045$ SG) and central fibrovascular zone (37 ± 13.4 CG to 96 ± 41.8 SG; $P = 0.0045$). The histomorphometric analysis demonstrated an increase in the mineralised bone. The area achieved was of $61.2 \pm 9.9\%$ in the SG and $31.3 \pm 10.6\%$ in the CG ($P = 0.0045$) for the central fibrovascular zone, $79.1 \pm 9.1\%$ in the SG and 39.1 ± 14.7 on CG of anterior fibrovascular zone ($P = 0.0001$) and $67.7 \pm 12.9\%$ in the SG and $38.4 \pm 12.9\%$ in CG in posterior fibrovascular zone.
Conclusion: The injection of ADSC was able to improve bone regeneration distraction callus on irradiated mandible.

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Impact of computed tomography venography on donor selection in submandibular gland transplantation

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Objective: A reliable anterior facial vein (AFV) is of critical importance for the success of microvascular submandibular gland (SMG) transplantation. The purpose of this study was to document the impact of preoperative computed tomography (CT) venography in determining AFV variations and facilitating donor selection for SMG transplantation.
Methods: Consecutive patients with severe dry eye referred to us for SMG transplantation were enrolled. CT venography was performed and bilateral AFVs disadvantageous variations for vascular anastomosis, including not draining the SMG and not matching the superficial temporal vein (STV) (calibers ratio of AFV to STV ≥ 3) were determined on CT images. When ipsilateral AFVs showed variations, the contralateral side SMGs would be evaluated as potential donors. The CT results were checked for the accuracy according to intraoperative findings.
Findings: 42 donor SMGs from 39 patients were included. The average calibres of AFV and STV between CT and intraoperative measurements had no significant differences. 10 of the contralateral SMGs (23.8%) were chosen as better donors according to the CT findings, which were all confirmed during operation. In determining the AFV variation of not matching the STV, the CT results showed both sensitivity and specificity equaling 100%. In determining the AFV variation of not draining the SMG, the CT results showed sensitivity of 94.7% and specificity of 100%. The surgical success rate of the 42 transplantations was 95.2%.
Conclusion: The preoperative CT venography was valuable in determining AFV disadvantageous variations for anastomosis, and choosing a reliable donor from bilateral SMGs.

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Methylation of p14ARF gene on oral squamous cell carcinoma patients with non-smoking history in Muwardi Hospital Surakarta, Central Java

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Background: Oral squamous cell carcinoma (OSCC) is the sixth cancer disease in the world. Epigenetic alteration of tumour suppressor gene has been postulated as an early step of carcinogenesis. The methylation of p14ARF gene might be one type of epigenetic alteration contributing to the carcinogenesis of OSCC.
Objective: The purpose of this study was to to examine the hypermethylation status of p14ARF gene.
Methods: Fresh tissue sample was obtained from four patients diagnosed with OSCC. Examination with bisulfite modification and the hypermethylation status was analysed using methylation-specific polymerase chain reaction method.
Findings: Methylation of p14ARF gene occurred in all of four samples of oral squamous cell carcinoma. The history of smoking actively or passively was denied by all patients. All patients were Javanese, and commonly lived in rural area with averagely less satisfactory oral hygiene.
Conclusion: this study indicated that methylation in p14ARF gene play a role in oral carcinogenesis, particularly the squamous cell carcinoma. The lack of smoking history among the patients suggested that bad oral hygiene as one condition that might become a risk factor for the development of OSCC other than smoking.

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Regeneration mechanism of mandibular cartilage defect using human umbilical cord mesenchymal stem cell and platelet-rich fibrin scaffold in rat model

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Background: Mandibular cartilage is a fibrocartilage tissue, as well as other articular cartilage have a limited regenerative capacity. The advantage of human umbilical cord mesenchymal stem cell such as ability to differentiate into osteogenic, adipogenic, and chondrogenic lineage, made hUCMSC a promising cell source in cartilage regeneration, however its regenerative mechanisms has not yet been understood.
Objectives: The aim of this study was to describe the mechanism of mandibular cartilage regeneration with implantation of hUCMSC over platelet-rich fibrin (PRF) scaffold.
Methods: Twenty Wistar rats were divided into 4 groups. Control group was mandibular cartilage defect only. First experimental group was implantation of hUCMSC on mandibular cartilage defect, second experimental group was implantation of PRF, and

third experimental group was implantation of hUCMSC over PRF scaffold. After 6 weeks, 20 experimental animal were sacrificed for histopatology and immunohistochemistry staining. Expression of fibroblast growth factor (FGF) 18, Sox 9, Ki67, chondrocyte counts, type II collagen, aggrecan, and cartilage thickness were analysed.
Findings: Expression of FGF 18, Sox 9, Ki67, chondrocyte counts, type II collagen, aggrecan, and cartilage thickness were significantly higher ini hUCMSC over PRF scaffold group showed that PRF as scaffold support chondrocyte differentiation of hUCMSC and the differentiated chondrocyte were able to form cartilage matrix in mandibular cartilage regeneration.
Conclusion: Regeneration of mandibular cartilage with implantation of hUCMSC over PRF scaffold established through increasing expression of FGF 18 that upregulated Sox 9 expression, enhanced chondrocyte differentiation of hUCMSC, thus the differentiated chondrocyte formed extracellular matrix such as type II collagen and aggrecan that form mandibular cartilage thickness.

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More than a diagnosis: the application of pocket-sized imaging device in oral and maxillofacial surgery

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Background: The use of ultrasound has grown rapidly and its presence within oral and maxillofacial surgery (OMFS) is now routine. While its radiation-free images provide valuable insight into numerous pathologies, hardware can be expensive and often rely on experienced head and neck radiologists. Recent technological advances have seen the size of this hardware decrease, providing the potential for its use directly by the surgeons themselves, not only for diagnostic purposes, but intraoperatively within the operating theatre. Pocket-sized imaging devices (PSIDs) are currently used in a number of specialties and we present our experiences using these devices within OMFS.
Discussion: PSIDs has been of great benefit in delineating of anatomy and allowing procedures with reduced risks to adjacent vascular structures. This includes ultrasound guided superficial cervical plexus blocks for numerous neck procedures and botox injection for masking and myofascial pain. Preoperative localisation of head and neck swellings prior to surgical drainage or biopsy, and perioperative evaluation and localisation of thyroid and parathyroid masses in minimal access surgery have been invaluable. Hence the use by surgeons intraoperatively provides immediate feedback and therefore influences decision making.
Conclusion: PSID is easy to carry, with reasonable screen resolution and light back up batteries with good battery life. It is intuitive to use with excellent functionality—thus worked well within the theatre environment. With the correct training and experience, the PSID can be a highly effective adjunct for oral and maxillofacial surgeons.

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Expression of BRAF, EGFR and CD10 in ameloblastoma: their potential role in local tumour invasiveness

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Background: Ameloblastoma is a slow growing but locally invasive odontogenic tumour and can recur locally despite adequate wide surgical resection. The most controversial behaviour of ameloblastoma is its invasiveness into the surrounding bone, despite its benign nature. The exact mechanism of bone resorption remains unclear. Hence, the need for more biomarkers to be identified to aid the prognostication and potential effective targeted therapy.
Objectives: The aim of the present study is to investigate the expression of BRAF, EGFR and CD 10 in ameloblastoma and determine the impact of these pro-invasive biomarkers on the biological behaviour of different ameloblastoma subsets.
Methods: BRAF, EGFR and CD10 expression were examined with immunohistochemical techniques in 39 cases of paraffin-embedded ameloblastoma (19 unicystic ameloblastoma [UA] and 20 solid/multicystic ameloblastoma [SMA]). Semi-quantitative score method was used to evaluate the immunoexpression which classified into pre-ameloblast-like cells (PA-cells), stellate reticulum-like cells (SR-like) and stromal cells in ameloblastoma.
Findings: The pro-invasive markers were significantly expressed in all three localisation for both UA and SMA ($P < 0.05$). Significant differences in the expression of these markers between either two epithelial components or stromal cells were observed. Immunoreactivity of EGFR in SMA was associated with ethnicity ($P < 0.05$).
Conclusion: BRAF, EGFR and CD10 were significantly expressed in SMA and UA which indicating their active local bone activity in ameloblastoma. These findings suggest their potential roles as prognostic markers of ameloblastoma and targeted therapy could be considered to treat the advanced unresectable ameloblastoma (Grant: PPPC/C1-2015/DGJ/02).

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Personalised neck collar manufacturing using three-dimensional scanning and printing in burn patients

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Background: Pressure treatment by a silicon neck collar can reduce the discomfort caused by hypertrophic neck scars in burn patients. Routinely, these collars are manufactured using a gypsum mould. Due to the negative impact of gypsum on wound healing, the manufacturing of the mould is frequently delayed. Moreover, the suboptimal fit of the neck collar based on the gypsum mould is keeping patients from wearing the collar.
Objective: To evaluate whether personalised neck collar manufacturing using non-contact three-dimensional (3D) scanning and printing in burn patients improves patient adherence for collar use.
Method and Findings: A detailed neck contour was obtained of six patients with neck burns using a 3D Artec Spider scanner. Due to the non-contact approach, these neck contours were obtained in

an earlier stage when compared to the conventional method. The resulting 3D computer model (Catia) was used for 3D printing of a gypsum mold (Z250 3D Systems Z-corp) and the nylon construct (EOS Formiga P110, Oceanz) that is integrated to improve collar stiffness. The mould was used to fabricate a silicon inlay. Due to the improved fit of the neck collar, patient adherence to wear the collar was greatly improved when compared to the gypsum mould approach.
Conclusions: Our approach resulted in early implementation of neck collar treatment of hypertrophic neck scars. Moreover, the personalised manufacturing approach improved patient adherence to wear the collar on a daily base. Our findings suggest that personalised manufacturing of neck collars could augment therapy in patients with hypertrophic burn scars.

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In vivo evaluation of microporous silk sponges with modified pulp for bone tissue engineering

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Background: Bone resorption following tooth extraction interferes dental implant replacement. Alveolar bone augmentation routinely facilitate to replace dental implant in a desired position.[1]
Objective: To evaluate bone formation improved by microporous silk sponges with modified pulp (MS-MP) in animal experiments for alveolar bone augmentation.
Methods: The microporous silk sponges (MS) were fabricated then coated with modified pulp. The 18 bi-circular defects in rabbit calvaria were used for experiments. They were divided in two groups randomly: MS-MP and MS. They were sacrificed at two, four, eight weeks postoperatively. The scanning electron microscopy, clinical healing, microcomputed tomography, histology were used to evaluate the sponges and their bone formation *In vivo*.
Findings: The MS-MP were fabricated in proper pore size and highly internal connective porosity for bone regeneration. All rabbits were good healing without any infection. MS-MP group enhanced more new bone and thicker than MS group. The forming bone of MS-MP group was mature faster than MS group.
Conclusion: The MS-MP showed good biocompatible and osteoconductive properties in animal experiments. The MS-MP may a novel biomaterial for alveolar bone augmentation.

Reference

Jensen, S. S., & Terheyden, H. (2009). Bone augmentation procedures in localised defects in the alveolar ridge: clinical results with different bone grafts and bone-substitute materials. *Int J Oral Maxillofac Implants*, *24*, 218–236.

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Correction of facial deformity with bespoke patient-specific polyetheretherketone implant: in-house manufacturing to virtual planning and navigational technology

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Background: Polyetheretherketone (PEEK) is a semi-crystalline linear aromatic polymer with properties that makes it a suitable material for craniofacial reconstruction. PEEK is versatile and is an alternative to the current implantable material available for craniofacial reconstruction. The advances in computer-aided design/computer-aided manufacturing (CAD/CAM) technology have made the implants accurate and reproducible.
Objectives: Case series to take you through the journey from making the PEEK implants in-house to using navigational technology.
Methods: 21 patients underwent reconstruction of facial deformity between 2012 and 2015 (19 were posttraumatic and 3 were congenital defects. Age ranged from 17 to 50 years.
Results: We performed 22 reconstructions (11 zygomatic, 8 orbital and 1 mandibular), of which 7 were manufactured with in-house techniques and 15 were manufactured using CAD/CAM technology. Navigation technology was used for placement of five orbital implants. Two implants manufactured using in-house technique required removal.
Conclusions: PEEK is a versatile material for craniofacial reconstruction. The in-house technique manufacturing technique had multiple steps and the needed adjustments for an accurate fit. The use of CAD/CAM for patient specific implants and use of navigation has given us accurate reproducible results. The multisegmented interlocking plates provided added advantage of additional stability with minimal fixation and ease of insertion.

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In vitro indirect responses of osteoblasts to polycaprolactone-ceramics scaffolds

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Background: Polycaprolactone (PCL)-ceramics scaffolds are successfully fabricated using melt stretching and compression molding (MSCM) technique. It processing allows any surgeon to instantly build three-dimensional scaffolds on the chair side of surgical operations.
Objectives: To evaluate effects of calcium and phosphate ions released from the scaffolds on osteoblast cells.
Methods: The groups of scaffolds included A; PCL-20% biphasic calcium phosphate (BCP) (%wt), B; PCL-30%BCP, C; PCL-20% tricalcium phosphate (TCP) and D; PCL-30% TCP. Indirect effects of calcium and phosphate ions released from those scaffolds on proliferation and differentiation of MC3T3-E1 osteoblast cell lines were assessed using enzyme-linked immunosorbent assay and mineralised matrix Alizarin red staining (AR) over 21 days.
Findings: The cell proliferation in all groups decreased on day 7 relating to the maximum releasing of phosphate ion, whilst, an increase of proliferation thereafter would relate to the releasing

profiles of calcium ion. Alkaline Phosphatase activities of groups A and D increased with time and the level of group A was significantly higher than the other groups on day 21($P < 0.05$). The levels of osteocalcin in groups A and B remarkably increased on day 21, whereas, those profiles of groups C and D were stable. Amount of AR of all groups were stable during the first 14 days, and then, remarkably increased on day 21.
Conclusion: The MSCM scaffold system can be effectively used as a bone substitute. Among the groups, the PCL-20% BCP scaffolds can release the optimum ion concentrations for enhancing the entire phased of the osteoblastic differentiation.

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Transforming growth factor-beta 3 and recombinant human bone morphogenetic protein-7 for the regeneration of segmental mandibular defects in *Papio ursinus*

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Background: The reconstruction of osseous mandibular defects remains a significant challenge. The use of autologous bone for mandibular reconstruction is associated with numerous limitations, and alternatives to autologous bone would provide significant benefits for patients.
Objectives: The aim of this study was to evaluate and compare binary application of recombinant human bone morphogenetic protein-7 (rhBMP-7) and recombinant human transforming growth factor-beta 3 (rhTGF-β3) to solo application of rhBMP-7 in full-thickness mandibular defects in the non-human primate *Papio ursinus*.
Methods: In four baboons, a 2.5 cm segmental defect was created in the mandible and stabilised with a 2.7 mm reconstruction plate. Two defects were implanted with rhBMP-7 solo, and the other 2 with rhBMP-7 and rhTGF-β3. All four baboons were euthanased at 180 days post implantation. All four specimens were radiographed prior to sectioning. Tissue processing and histomorphometry were done on the decalcified sections prepared from the harvested mandible specimens.
Findings: Radiographic examination confirmed that bone regeneration re-established bony continuity at six months, confirming that clinically significant osteoinduction was achieved. The mean area of the regenerate was $336 \pm 107.5\ mm^2$ (range, 229–444.7) in the solo cases and $312 \pm 63.5\ mm^2$ (range, 249–376.6) in the binary cases. The regenerated bone had a trabecular pattern consistent with mature mandibular bone and the defect interfaces were indiscernible.
Conclusion: This study confirmed that successful bone regeneration by tissue induction in surgically created mandibular defects in *Papio ursinus* can be achieved with osteogenic proteins of the TGF-β superfamily. In this sample size no performance advantage could be identified between the two treatment groups.

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A three-dimensional analysis of bicycle helmets in correlation with head injuries: a pilot study

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Background: In the Netherlands bicyclists continue to outnumber other road users in injuries and deaths. A helmet is not mandatory, while research has shown that the utilisation of bicycle helmets can reduce head and brain injuries by up to 88%.
Objectives: To assess the feasibility of three-dimensional technology in quantifying bicycle related head injuries and helmet protection. For this it was necessary to obtain accurate cone-beam computed tomography (CBCT) and multidetector computed tomography (MDCT) images of bicycle helmets of patients that had been involved in an accident.
Methods: Three patients involved in a bicycle accident while wearing a helmet and of whom an MDCT scan of the skull was available were included. The patients' helmets were scanned with CBCT and MDCT devices in order to assess the best imaging modality for helmets. The acquired helmet images were subsequently converted to STL (STereoLithography) files and imported to computer-aided design/computer-aided manufacturing (CAD/CAM) software and merged with the MDCT images of the patients' skulls. The skull fractures and helmet damages were made visible and quantified.
Findings: The MDCT device offered accurate helmet images. The merged skull and helmet images offered an excellent possibility of assessing the overall damages sustained to both skull and helmet. There were no relations between skull fractures and helmet damages.
Conclusions: It was feasible to obtain accurate images of bicycle helmets with MDCT. Novel CAD technology offers possibilities of assessing the bicycle helmet damages and resulting head injuries. This technology can be used to obtain data to design an optimal helmet concept.

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Site-specific effects of zoledronic acid on vascularisation in jaw bone versus femur

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Background: Medication-related osteonecrosis of the jaws (MRONJ) is a newly updated nomenclature after bisphosphonate-related osteonecrosis of the jaws, which is characterised clinically as an area of exposed bone in the maxilla or the mandible that has failed to heal within a period of six to eight weeks in a patient exposed to various drugs including bisphosphonate, denosumab, and antiangiogenic agents. Although all MRONJ presented as avascular lesions, the aetiology and pathogenesis have not been fully investigated. The reason why the necrosis was found in jaw bones only remains unknown.
Objectives: This study aimed to compare the effects of bisphosphonates on angiogenesis in jawbone and long bones using a Sprague-Dawley (SD)-rat model.

Methods: 72 SD-rats were treated with zoledronic acid (ZA) ($n = 36$) or saline ($n = 36$) for four weeks and then subjected to tooth extractions on mandibles and maxillas and creations of bone defect on femurs. The rats then were treated with zoledronic acid till sacrifice at week two, four and eight. The site of tooth extraction on jaws, and the defect on femurs were analysed by histomorphometry and microcomputed tomography (micro-CT) examination.
Findings and Conclusion: Micro-CT scanning showed higher bone density in ZA treated femur and jaw bones comparing with that in saline treated group. Necrotic bone was found only in the mandibles in ZA treated group. Vascular casts by micro-CT examination showed that the blood vessels in ZA treated group were denser but less structured than that in control group in jaw bones; however, the difference was not evident in femur site.

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The forkhead transcription factor Foxc2 stimulates osteogenesis in MC3T3-E1 cells

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Background: Foxc2 is one member of the forkhead/winged helix transcription factor family, which plays an important role in regulation of embryonic development, angiogenesis, adipose and lymphoid tissue generation. However, the role of Foxc2 in osteogenesis is not yet fully understood.
Objectives: The goal of this study is to explore the role of Foxc2 in osteogenesis of MC3T3-E1 cells.
Methods: Foxc2 expression pattern in MC3T3-E1 cells was observed under the stimulation of osteogenesis related factor (osteogenic induction medium (OIM), parathyroid hormone (PTH), simvastatin). Cell proliferation, cycle, apoptosis and differential abilities of Foxc2-MC3T3-E1 cells were observed. Small interfering RNA (siRNA) was used to construct si-Foxc2-MC3T3-E1 as a reverse validation. Microarray analysis was conducted for further global gene expression profiles evaluation.
Findings: Foxc2 expression was gradually upregulated by OIM, PTH and simvastatin. Overexpression of Foxc2 in MC3T3-E1 cells resulted in an acceleration of osteogenesis differentiation and a suppression of cell proliferation. Knockdown of Foxc2 expression remarkably increased cell proliferation and decreased osteogenesis differentiation in MC3T3-E1 cells. Moreover, the Microarray analysis data revealed a different expression profile of genes consistently up- or downregulated in Foxc2 overexpression MC3T3-E1 cells. Furthermore, we found that Foxc2 enhanced the expression of several negative regulation of cell proliferation, such as Ereg, which may involve in the down regulation of Foxc2 down-regulation proliferation.
Conclusion: Foxc2 plays an important role in MC3T3-E1 osteogenesis by promoting osteoblast differentiation and down-regulating proliferation. Ereg, may participate in Foxc2-regulates osteogenetic differentiation.

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Polymorphism analysis of rs1533767 gene Wnt11 of nonsyndromic cleft palate of Deutero Malay population in West Java

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Background: The WNT pathway regulates multiple developmental processes including craniofacial development and may play a role in cleft palate. Wnt11 is expressed at medial edge epithelium (MEE) palatal shelve, and stimulated the process apoptotic in order to improve the fusion of palatal shelves. Deleting or mutation on single-nucleotide polymorphism (SNP) rs1533767 gene Wnt11 in MEE caused defects in both palate shelf epithelium and mesenchyme and led to cleft palate.
Objectives: The aim of this study was to investigate the contribution of SNP rs1533767 of Wnt11 in nonsyndromic cleft palate (NSCP) of Deutero Malay population in West Java.
Methods: Fifteen individual (10 NSCP cases and 5 controls) was investigated using polymerase chain reaction (PCR) and sequencing of exon 3 of wnt11 gene. Statistical analyses were conducted using the software spss 15.0. A P value of 0.05 and confidence interval of 95% were used for statistical tests.
Findings: The patients with nonsyndromic cleft palate were characterised by similar distribution of SNP rs1533767 gene Wnt11 in comparison with subjects without oral clefts ($P > 0.05$).
Conclusion: The present study provides no evidence that SNP rs1533767 of Wnt11 play a major role in NSCP Deutero Malay population in West Java.

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Effect of different surgical procedures on bone healing in rabbit model treated with zoledronic acid

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Background: Medication-related osteonecrosis of the jaw (MRONJ) is a rare but serious complication of various drugs including bisphosphonates, denosumab, and antiangiogenic agents. Surgical intervention is known as a risk factor for MRONJ, however, the etiopathogenesis remains unclear. Whether different surgical procedures have different effects on bone healing needs further investigation.
Objectives: To compare the risk of different surgical procedures of mandibular tooth extraction in inducing MRONJ.
Methods: Twenty New Zealand White (NZW) rabbits received subcutaneous (s/c) injections of zoledronic acid (ZA; $n = 10$) or saline vehicle ($n = 10$) for four weeks until teeth extraction. The extraction was performed on the first premolar on both sides of mandible, the socket on one side was closed by sutures and the other side was left open. Rabbits then continued to receive zoledronic acid or saline till sacrifice at week four and week eight. After tooth extraction, rabbits were injected (s/c) with fluorochrome labeling solutions. The extraction sites were collected for microcomputed tomography and histomorphometric analysis.

Findings and Conclusion: Thinner periodontal ligament space and higher bone mineral density were found in ZA treated group. More data are still under analysis.

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Assessment of quality of life of caregivers for oral cancer patients in the dental faculty of university of Malaya: a pilot study

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The Caregiver Quality of Life Index-Cancer (CQOLC) is used widely to evaluate the quality of life (QoL) of caregivers of cancer patients. Oral cancer, the sixth common most cancer worldwide, and its treatment has significant consequences on the physical, mental, emotional and psychosocial wellbeing of the patients which significantly affects their daily life.

Cancer patients need family caregivers during treatment and post-treatment periods which significantly burdens those associated with providing care for loved ones with oral cancer. However, the QoL of the caregivers is often overlooked. A greater understanding of the factors contributing to caregiver psychological health may have important implications not only for improving caregivers' outcome but also for patient outcome and the healthcare system.

This study aims to assess the QoL of caregivers of oral cancer patients. The CQOLC was translated to Bahasa Malaysia by forward and backward translation and pre-tested on 5 caregivers. Pilot study was conducted with clinical consecutive convenience sampling of 32 caregivers from oral cancer clinic at Faculty of Dentistry, University of Malaya. The inclusion criteria include caregivers who were literate, aged 18 years and above, cancer-free and living with patients during caregiving. The translated CQOLC-Bahasa Malaysia demonstrated good internal consistency, Cronbach's alpha is 8.53 and test–retest reliability shows no significant difference ($P = 0.194$). The mean QoL in this study is 83.96, ranging from 109–60. The caregiving burden is influential and negatively affects the caregivers QoL. Therefore supportive care is needed to alleviate their caregiving burden and improve their QoL.

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Induction of apoptosis by inhibition of sonic hedgehog signalling pathway in ameloblastoma cell line: a pilot study for novel therapeutic approach

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Ameloblastoma is a benign odontogenic tumour which is characterised by locally invasive growth into the jaw and often recurs. The quality of life is reduced by resection of the jaw as a radical treatment. Therefore, development of new treatment is eagerly anticipated.

We demonstrate the necessity of the sonic hedgehog (SHH) signalling pathway in the growth of ameloblastoma. Suppression of proliferation by inhibitors of the SHH signalling pathway is possible.

Several hedgehog pathway inhibitors were used to examine. Cyclopamine and GDC-0449 (vismodegib) were used as SMO inhibitors, GANT-61 and JQ-1 as GLI inhibitors. We focused on the impact that each HH signalling pathway inhibitors have on growth in each cell line by WST-8 cell proliferation assay and BrdU uptake assay. We also examined the apoptotic cells by TUNEL assay, Annexin V assay and apoptosis related proteins (BCL2 and BAX).

Expression of SHH signalling pathway related genes and gene products were detected in AM-1 cells by immunocytochemistry. The addition of vismodegib (GDC-0449), cyclopamine and itraconazole suppressed proliferation of AM-1 cells. Gli inhibitors, Gant-61 and JQ-1, also suppressed the proliferation of AM-1 cells. The TUNEL positive rates in the cells treated by SHH signalling inhibitors were significantly higher than those in control. Annexin V positivity was significantly higher in the presence of SHH signalling inhibitors. BCL2 expression was decreased and BAX expression was increased in AM-1 cells.

Our study suggests that inhibition of SHH signalling pathway is a strong candidate of the novel treatment of ameloblastoma by growth inhibition and apoptosis induction.

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Modified L-shaped surgical approach to excision of the sublingual gland

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Objectives: One novel and appealing surgical approach to excise the sublingual gland is introduced.
Methods: We would like to present a series of 1131 patients who were treated between 1981 and 2013 suffering from excision of the sublingual gland, and describe the risks and benefits compared with the conventional approach.
Findings: A total of 365 patients were treated with the conventional approach, while the other 766 have been treated since 1991 using the modified approach. There were no serious complications or recurrences during or after the operation in the modified series. There were significant differences between the two approaches in terms of injuries to the submandibular duct ($P = 0.03$), incidence of ranula on the opposite side ($P = 0.02$), amount of intraoperative bleeding ($P = 0.000$), and duration of operation ($P = 0.000$).
Conclusion: The modified L-shaped incision is both viable and safe, and simplifies excision of the sublingual gland while protecting the submandibular duct.

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Minimally-invasive treatment of oral ranula with a mucosal tunnel

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We have developed a new method for minimally-invasive treatment of uncomplicated oral ranulas using a mucosal tunnel, and we report the clinical outcome. We constructed a mucosal tunnel for each of 35 patients who presented with an oral ranula, by making 2 parallel incisions across the top of the protruding ranula 2–3 mm apart, and dissected the soft tissue along the incisions to its wall. The fluid was removed and the cavity irrigated with normal saline. The wall of the ranula was not treated. The first mucosal tunnel was made by suturing the base of the mucosal strip to the deepest part of the wall of the ranula. The mucosal base of the tunnel and the deepest part of the base of the ranula were fixed with absorbable sutures. The two external edges of the incisions were sutured together to form the second mucosal tunnel, and apposing sutures were inserted between the two parallel incisions to form two natural mucosal tunnels. The duration of follow-up ranged from one to five years. One patient was lost to follow-up and 34 patients were cured. Outcomes were satisfactory without relapse during the follow-up period and the patients were satisfied with the outcome. The mucosal tunnel is a safe, effective, simple, and minimally-invasive treatment for oral ranula.

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Micromorphology study of bovine bone after ultrafast laser ablation

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Background: Ultrafast laser system is an alternative methods for osteotomy. However, the micromorphology and efficiency of ultrafast laser ablation is not biologically explained yet.
Objective: The objective of the study was to evaluate and characterise the effect of various ablation conditions, such as dry, air-suction, and water spray on the micromorphology and efficiency of laser ablation of bovine bone.
Methods: The ultrafast laser system used was a Ti:sapphire-based chirped-pulse-amplifier system (300 mW, 170 fs, 1 kHz at 800 nm). The bovine bone sample was ablated under dry, air-suction and water spray environmental conditions. The ablation process was monitored using a confocal monochrome charged-couple device camera, and a reflected-light microscope was used to investigate the ablated line to determine the efficiency. The main parameters of the pattern were 1000 μm line length and 100 μm/s cutting speed. Pulse energy was 65 μJ where the fluence was 8.59 J/cm^2.
Findings and Conclusion: Dry ablation exhibited excessive debris accumulation and lower efficiency. Higher ablation efficiency was obtained utilising air-suction and water spray conditions. However, the ablation surface was rough under water spray condition. Air-suction assisted ablation of bovine bone with femtosecond laser provided a smooth surface and higher ablation efficiency.

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The potential biological functions of microvesicles derived from adenoid cystic carcinoma

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Background: Microvesicles (MVs) are secreted by many tumour cells and play important roles in tumour progression and metastasis.
Objective: The aim of this study was to explore the effects of MVs derived from salivary adenoid cystic carcinoma (SACC) and to investigate its potential role in pathogenesis of perineural invasion of SACC.
Methods: We isolated MVs from ACC-2 cells (a human SACC cell line), and established differential gene expression profilings of these MVs compared with their donor cells to speculate their biological functions. Several candidate genes were also validated using real-time polymerase chain reaction. Then, we evaluated the effects of ACC-2 MVs on rat Schwann cells (RSC96 cells), which are the principal glia of the peripheral nervous system, by the phosphoantibody array performed on RSC96 cells transduced with ACC-2 MVs.
Findings: We found that ACC-2 cells could produce MVs. Microarray-based expression profiles between ACC-2 cells and their MVs identified 1355 genes involved in cell adhesion, development, regulation of apoptosis, and so on. Moreover, the extracellular regulated protein kinase (ERK) signal pathway in RSC96 cells induced by ACC-2 derived MVs could be activated.
Conclusion: These results may be of importance in elucidating the mechanism of perineural invasion of SACC and determining a promising tumour biological therapeutic target.

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Temporomandibular Joint Disorders and Surgery

Evaluation of two physiotherapy programs after temporomandibular joint arthroscopy in patients with acute closed lock

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Background: Arthroscopic lysis and lavage of the temporomandibular joint is considered a safe and efficacious intervention for the treatment of acute closed lock. Postoperative physiotherapy is an integral part of rehabilitation and is intended at gaining full range of motion, improving function, and decreasing pain. Few publications however, have been published on the post-arthroscopy physiotherapy.
Objective: To compare the efficacy of two post-arthroscopy physiotherapy programs.

Methods: A retrospective study. During the past two years, a new physiotherapy program was implemented for patients undergoing arthroscopy at our department, and 82 patients suffering from acute closed lock and undergoing arthroscopic lysis and lavage were rehabilitated according to this program. An equal number of consecutive patients treated before the initiation of the new program with similar diagnosis and arthroscopic intervention were included in the study as control group. Both physiotherapy programs consisted of self-exercises and guided manual therapy, however differed in the time of initiation of self-exercises (immediate versus after 1 week), duration of each exercise (1 versus 5 min), and number of exercises per day. The primary outcome variables were mouth opening and pain.
Findings: Patients treated by the new physiotherapy protocol exhibited a significantly more rapid rehabilitation and gaining of full range of motion compared to the patients treated by the old program. In addition, the overall success rate was higher in the new program group.
Conclusion: To achieve best results in treating acute closed lock, post-arthroscopy physiotherapy should consist of immediate mobilisation with short-duration exercises performed many times a day.

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Is facial symmetry attainable after "high condylectomy only" in patients with unilateral active condylar hyperplasia?

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Background: Condylar hyperplasia (CH) causes various degrees of facial asymmetry and occlusal changes. The treatment of inactive CH is orthognathic surgery, whereas active CH requires in addition, high condylectomy to stop the hyperplastic condylar growth. Some authors reported high condylectomy to be also effective in achieving facial symmetry with no need for additional orthognathic surgery.
Objective: To determine the degree of correction of facial asymmetry in CH after high condylectomy only.
Methods: Ten patients with unilateral active CH were treated by condylectomy (removal of superior 5–8 mm of condyle) that was not followed by orthognathic surgery. Preoperatively, patients were classified as mild, moderate, and severe facial asymmetry according to the triangular analysis of the PA cephalogram as described by Reyneke. PA cephalograms and en-face photographs taken approximately one year after surgery were compared to baseline records.
Findings: Four patients with mild facial asymmetry achieved excellent symmetry after high condylectomy and did not require further orthognathics. The other six patients with either moderate or severe facial asymmetry improved to various degrees after condylectomy, however, did not attain a satisfactory symmetric result, and three of them requested a secondary orthognathic surgery.
Conclusion: Active condylar hyperplasia with mild facial asymmetry could be treated sufficiently with high condylectomy only, whereas moderate and severe degrees of facial asymmetry will benefit from the addition of orthognathic surgery. Surgeons could predictably determine based on the PA cephalometric analysis which patients will be sufficiently treated with high condylectomy only and which will require the addition of orthognathic surgery.

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Comparison of interpositional arthroplasty using dermis fat graft with gap arthoplasty (GA) in the management of temporomandibular joint ankylosis

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Background: Over the past 150 years, much has been said and done as far as temporomandibular joint (TMJ) pathologies are concerned, of particular importance is TMJ ankylosis. It is an age old affliction that causes problems in mastication, digestion, speech, function, cosmesis, and maintenance of oral hygiene. Today, both gap arthoplasty (GA) and interpositional arthroplasty (IA) have become the acceptable standards for the primary surgical management of TMJ ankylosis.
Objectives: We compared GA with IA using dermis fat with our primary outcome as maximal mouth opening, and secondary outcomes as pain during mouth opening, fate of the dermis fat graft and patient satisfaction.
Methods: Twenty patients with clinical and radiological diagnosis of TMJ ankylosis were randomly divided into two groups. One group underwent GA while the other group received dermis fat as an interpositional material. Both groups were followed up to two years and maximum mouth opening was recorded. Additionally, magnetic resonance imaging was done for dermis fat group to calculate the volume of the graft.
Findings: The mean mouth opening after one year of follow-up was 37.4 and 38.9 mm in IA and GA group respectively. No significant difference was found between the two groups ($P < 0.05$).
Conclusion: Both the modalities are successful in surgical management of TMJ ankylosis. However, clinically, compliance of the dermis fat group in jaw exercises was found to be better than the gap arthroplasty group as suggested by lower pain scores in this group.

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The outcome of trigger point therapy using bupivicaine injection as a primary treatment for myogenic temporomandibular disorders

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Objective: Assess effectiveness of trigger point therapy with bupivacaine local anaesthetic injected into painful muscles of mastication as a primary treatment for patients with myogenic temporomandibular disorders (TMD).
Methods: Patients with myogenic subdivision according to the Research Diagnostic Criteria for TMD, severe pain according to the pain-visual analogue scale (VAS) and sever jaw dysfunction according to the Helkimo index were selected to receive the injections as primary treatment. None of the patients received conservative treatment.

Intraoral local anaesthetic (bupivacaine) administered into painful muscles of mastication. Masseter, temporalis and lateral ptyrigoid muscles were targeted. Temporalis muscle was approached intraorally at the Coronoid process with mouth fully opened and injected with 1 mL bupivicaine. Masseter muscle identified with the patient clenching and injected superiorly and inferiorly with 2 mL of bupivicaine. Lateral ptyrigoid muscle approached behind the tuberosity by sliding a long needle medially and superiorly with semi-opened mouth and injected with 1 mL bupivicaine. Procedure was repeated on a weekly basis twice or three times according to patient response. Patients was re-examined after one month to assess effectiveness and followed up for at least 6 months.
Findings: 88 patients who received trigger point therapy out of 90 patients included in the study reported significant improvement of pain (according to VAS) and function (according to Helkimo index). None had any significant complication.
Conclusion: The minimally invasive trigger point bupivacaine injections into painful muscles of mastication are safe, simple and successful treatment modality. However, this promising observational finding of this case series needs to be confirmed with studies of higher level of evidence with longer follow-up.

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Aetiology and treatment of mandibular hypomobility cases in Omani patients: retrospective case series of eight years

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Background: Mandibular hypomobility is generally defined as limitation of mouth opening, which can be a sign of many underlying aetiologies.
Objective: Investigating the aetiology of mandibular hypomobility in Omani population through a period of 8 years, with the treatment undertaken.
Methods: Data was collected and analysed from patients' records in Al-Nahda hospital computer system in Muscat, Oman, from the period of June 2008 till June 2016.
Findings: Majority of the cases of mandibular hypomobility were due to intra articular causes like traumatic disc displacement without reduction (220 cases) managed primarily by temporomandibular joint (TMJ) arthrocentesis or arthroscopic lysis and lavage. Large articular eminence managed by emenictomy (four cases). Dentofacial deformity managed by orthognathic surgery (11 cases). Prolonged mandibular dislocation (two cases) managed by surgical reduction. Traumatic and septic TMJ ankylosis (10 cases) managed by surgical release of ankylosis followed by gap arthroplasty or costochondral graft. Coronoid hyperplasia (three cases) and pseudoankylosis of the coronoid process with zygoma and skull base (five cases) managed by intraoral coronoidectomy. Inflammatory arthritis (four cases) and TMJ fibrous dysplasia (one case). There have also been some cases of severe mandibular hypomobility as an initial manifestation of systemic diseases, which have been treated medically after diagnosing the underling cause.
Conclusion: Aetiology of mandibular hypomobility is variable with wide range of causes, and tailored management is usually required for satisfactory outcomes.

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Outcomes of coronoidectomy as treatment of coronoid pseudoankylosis and hyperplasia: case series

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Background: The coronoid process may play an important role as an underlying cause of trismus due to its anatomical position in relation to the zygomatic arch, however patients rarely present with coronoid related underlying causes. We are presenting a case series of seven patients with mandibular hypomobility due to coronoid hyperplasia and traumatic coronoid pseudoankylosis.
Objectives: To evaluate the effectiveness of coronoidectomy as a treatment for severe mandibular hypomobility in cases of developmental coronoid hyperplasia and traumatic coronoid pseudoankylosis.
Methods: Seven patients clinically diagnosed with severe mandibular hypomobility (10–20 mm) were treated in our hospital from 2008 till 2015. Four patients had pseudoankylosis of the coronoid process with the untreated-fractured zygoma. Three patients had bilateral coronoid hyperplasia, with one case forming a bilateral joint articulation with the zygoma (Jacob's disease). All patients underwent coronoidectomy. Surgery was followed by vigorous jaw physiotherapy. Patients were evaluated using interincisal distance at maximum mouth opening, preoperatively and postoperatively for a period ranged between 6 months and 2 years.
Findings: Mandibular mobility improved significantly in six patients postoperatively and was maintained throughout the follow up period with satisfactory range of motion (30–42 mm). Postoperative recovery was uneventful, however two patients had significant iatrogenic postoperative deranged occlusion, and one had re-pseudoankylosis six months postoperatively despite initial improvement.
Conclusion: Coronoidectomy is an effective measure for treatment of coronoid hyperplasia and coronoid pseudoankylosis, with minimum complication.

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Long-term effect of condylar prosthesis replacement in the treatment of traumatic temporomandibular joint ankylosis

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Background: If management of mandibular condylar fractures is not timely or improper, it often results in traumatic temporomandibular joint (TMJ) ankylosis, condylar replacement is one surgical treatment method.
Objective: The aim of this study is to summarise long-term effects of condylar prosthesis replacement for traumatic TMJ ankylosis.
Methods: From 2006 to 2010, five patients with traumatic TMJ ankylosis were treated with titanium condylar process. Preoperative computed tomography (CT) examinations were obtained, three-dimensional skull models were produced and simulated operations were performed. According to preoperative design, the artificial condyles were put in place.
Findings: 3 cases were followed up for 6–10 years. 1 male patient received unilateral condylar replacement and were followed up for 10 years. The mouth opening was 30 mm. CT scan showed that new bone was formed on the inner and outer sides of the artificial

condyle. The other male patient received bilateral condylar prosthesis replacement, and was follow up for 7 years. The mouth opening was 6 mm, CT scan showed significant new bone was found on the medial sides of bilateral condyles. The female patient received unilateral condylar replacement, the longest follow-up period was six years. The mouth opening was 35 mm. CT scan showed that ectopic bone was formed on the inner side of the artificial condyle and articular fossa had obvious bone resorption. Her left lower molar teeth were missing.
Conclusion: From long-term follow-up observation, ectopic bone was a common phenomenon in condylar prosthesis replacement. If posterior occlusal relationship was unstable, bone resorption may be occurred at the articular fossa.

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Simultaneous correction of temporomandibular joint ankylosis, facial asymmetry and obstructive sleep apnoea — the middle path

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Background: Temporomandibular joint (TMJ) ankylosis is a morbid condition that not only results in hypomobility of the joint but also cause considerable facial asymmetry and obstructive sleep apnoea (OSA). Many approaches have been proposed to correct these. However, the importance of a simple procedure, genioplasty, is often under estimated.
Objectives: Providing a single-staged management plan for such patients to release their ankylosis, improve their symmetry and OSA.
Methods: 15 patients of TMJ ankylosis age ranging from 15 to 46 years underwent release of TMJ ankylosis with simultaneous advancement genioplasty. Results included achievement of an average of 27 mm of increase in mouth opening, 8.3 mm projection, 7.1 mm translation, 38.25% increase in Pharyngeal Airway space in a mean follow up of 18.5 months (range 6–32 months).
Results: Simultaneous genioplasty performed with TMJ ankylosis release serves to improve mouth opening and hence restore function, correct facial asymmetry although not completely, but significantly, reduce episodes of nocturnal desaturation and by increasing the pharyngeal airway space, provides an added advantage of subsequent ease of intubation, if secondary surgery is required. Also, genioplasty does not interfere with subsequent osteotomies.
Conclusion: This treatment plan serves as a middle path between single staged addressing only TMJ ankylosis and two staged surgery considering correction of facial asymmetry following ankylosis release.

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Mandibular pseudoprognatism secondary to non-reduced temporomandibular joint dislocation: a case report

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It is reported the case of a female patient who suffered a bilateral non-reduced temporomandibular joint (TMJ) dislocation for 14 years.

During that the time the TMJs underwent an anatomical adaptative reshaping, leading to a false glenoid fossa, eminence; at that point the condyles could only rotate, allowing just mouth opening and closure.

This also provoked a significant change at the facial contour and occlusion, mimicking a dentofacial skeletal class III.

The case was planned and managed as the correction of a class III dentofacial deformity, with associated bilateral TMJ damage, which was treated with customised TMJ prosthesis with the aim of achieving proper TMJ function and normal occlusion.

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Distraction osteogenesis with a primarily vertical vector in facial deformity: a case series

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Background: Many forms of facial deformity have a strong underlying vertical deficiency. Traditionally, attempts at addressing the vertical deficiency of mandibular ramus have been rife with significant relapse. Distraction osteogenesis has emerged as a predictable and safe method to address vertical deficiencies in the facial skeleton.
Objectives: To find out if correction of the vertical dimension through distraction osteogenesis allows for an appropriate aesthetic and functional correction of facial deformity, with an acceptable rate of complications.
Methods: Records of 12 patients with facial deformity with a significant vertical component who underwent distraction osteogenesis of the mandibular ramus using internal distractors, placed through an extraoral approach, were assessed retrospectively. Data was collected for distraction distance, effectiveness of vector and complications encountered and analysed accordingly.
Findings: All distracted bone segments achieved successful bone union. An average of 19 mm distraction distance was achieved. All except one were able to be managed subsequently with orthodontics or a common orthognathic procedure. Only significant complication encountered was one case of marginal mandibular nerve weakness.
Conclusion: Distraction osteogenesis in a primarily vertical vector allows one to achieve adequate stability and to allow occlusion to reach a stage where it can be predictably managed with orthodontics, in conjunction with a regular orthognathic procedure.

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Alloplastic reconstruction of bilateral type IV temporomandibular joint ankylosis with Zimmer-Biomet stock temporomandibular joint systems

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Objectives: Sawhney type IV temporomandibular joint (TMJ) total ankylosis is a challenging situation in which fusion of the mandibular condyle to the glenoid fossa, to the skull base generally occurs. The current well documented concept is using TMJ prosthesis following gap arthroplasty to re-establish the function.
Methods: Between 2009 and 2016, simultaneously, bilateral TMJ gap arthroplasty and Zimmer-Biomet Microfixation stock TMJ Replacement System performed for 30 joints in 15 patients. The demographic data, number of previous TMJ operations, complications and maximum interincisal opening (MIO), were evaluated via nonparametric Mann–Whitney *U* test and Spearman's rho correlation analysis ($P < 0.05$).
Findings: The follow-up was 12–91 months. There were 5 female and 10 male patients. Mean values were; 39.4 (standard deviation [SD], 17.5) for age; 3 (SD, 1.8) for previous operations; 3.6 (SD, 2) mm for preoperative MIO; 34.6 (SD, 6.1) mm for immediate postoperative MIO and 31.5 (SD, 6) mm for postoperative late MIO.

The occlusion was unchanged in 12 patients out of 15. In one patient occlusion worsened with less stable functional contact. MIO relevantly improved in all cases ($P < 0.05$). The neuropraxia occurred on temporal branch of facial nerve. In one patient paraesthesia of the lower lip on one side observed.
Conclusions: In the era of custom-made TMJ replacement systems, the stock total TMJ replacement system is still a good option. Although it is cheaper and ready to be used immediately, it still needs to have a topographically prepared receiving site and elongation of operation time.

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Open surgery assisted with arthroscopy to treat synovial chondromatosis of temporomandibular joint

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Background: Open surgery and arthroscopy have their pros and cons in treating synovial chondromatosis (SC) of temporomandibular joint (TMJ). The purpose was discussing the application effect of two methods combination application effect and indications.
Methods: Patients from 2010 to 2015 with magnetic resonance imaging (MRI) confirmation of SC were included. For whose tumours in upper articular cavities and expanded margin of medial groove still in between medial crest of condyle and infratemporal space on coronal MRI, arthroscopy was chosen to assist open surgery cleaning loose bodies and affected synovium.
Results: All 36 patients firstly went through open surgery. Proceeding examinations with arthroscopy indicated loose bodies were contained in medial groove, the anterior or posterior recesses (14 patients), which were removed using a cup-shaped clamp. In an average of 33.3 months follow-up of 33 patients indicated no recurrence.
Conclusions: This technique has benefits in a complete elimination of diseased tissues with minimal osteotomy and surgical time.

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Temporomandibular joint reconstruction in non-oncological patients. Long-term follow-up

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Objective: Our purpose is to evaluate a long-term follow-up of a group of patients with non-oncological pathology. Different surgical strategies were performed for the reconstruction of the temporomandibular joint (TMJ).
Methods: We review a series of eight patients operated for TMJ reconstruction. Follow-up was performed for 15 years. The indications for surgery were: perinatal posttraumatic ankylosis, post-perinatal infection ankylosis, hemifacial microsomia, posttraumatic bilateral ankylosis, condylar osteochondroma, condylar osteoma, Proteus syndrome and osteopetrosis. We analyse the underlying pathology and the possible therapeutic options for each patient.
Results: The eight patients underwent TMJ surgery, achieving, among others, immediate postoperative mouth opening and stable occlusion. We also found interincisal opening more than 40 mm with lateral deviation no greater than 4 mm and the presence of excursive movements. No TMJ pain or evidence or neocondylar reabsortion were found.
Conclusions: Reconstruction of the TMJ is still, in our days, a great challenge for maxillofacial surgeons. Some of the surgical alternatives include: osteogenic distraction, free grafts (such as costochondral grafts), free flaps (fibula flap) or alloplastic grafts. The aim of the surgery is not only to achieve acceptable functional results (mouth opening, good stability and improvement in pain) but also the correction of an associated dentofacial deformity.

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Custom-made appliance for mouth opening exercises following temporomandibular joint surgery

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Background: Temporomandibular joint ankylosis is a challenging condition, which results in partial or complete inability to open the mouth due to either fibrous or bony union between the head of the condyle and the glenoid fossa. Early postoperative manual stretching exercises and physiotherapy starting a few days following the surgery have been advocated by most surgeons to prevent reankylosis. The mouth opening exercises had been made by means of different appliances like wooden wedges and abeslangs in the past.
Objectives: Objective of our study is to present our custom-made mouth opening exercise device for postoperative physical therapy.

Methods: A custom-made mouth exerciser, like a spring retractor, was designed by us and fabricated by a technician. In addition to its special design, a soft prosthetic material specific to the patient was placed into the mobile part of the appliance. Patient was directed to use the appliance regularly for 1 year.
Findings: The appliance corresponding to the patients' teeth could be used easily by the patient as an aggressive manual stretching device to prevent reankylosis. Patient continued follow-ups for one year. Formation of reankylosis was prevented and mouth opening was within normal limits at the end of year one.
Conclusion: Because of pain from the operation field and related muscles and additional harmful effect for the teeth, most patients reject postoperative aggressive exercises following surgery. We are of the opinion that our appliance is a beneficial and easy to use device for the postoperative period of ankylosis surgery.

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Temporomandibular joint arthroscopy — a review

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Background: Temporomandibular joint (TMJ) dysfunction associates pain, limited mouth opening and joint noise. In case of failure of conservative treatments for articular lesion, surgery may be performed.
Objectives: The aim of our study was to evaluate arthroscopy.
Methods: Using the keywords "TMJ" and "Arthroscopy", 1668 articles were found in the ScienceDirect database. We selected among these 17 papers published between September 2012 and May 2016. Six questions were asked: (1) What treatment should be given to patient suffering from TMJ disorders? (2) Which interventional surgery should be performed for TMJ disorders, if conservative treatments have failed? (3) Does the Wilkes staging change the surgical technique proposed? (4) What should be performed in case of arthroscopy failure? (5) Can disc position be improved after surgery? (6) Should the disc position be improved?
Findings and Conclusion: (1) Conservative treatment should always be prescribed in first intention. (2) In case of TMJ lesions, after failure of conservative treatments, surgery, as less invasive as possible, can be proposed. (3) Whatever Wilkes stages, surgery can be indicated but should be as less invasive as possible. (4) In case of arthroscopy failure, TMJ arthrotomy can be indicated. (5) Disc can be repositioned with long-term results after arthroscopical suturing technique, but is complicate to perform (only one paper published). (6) It is not proved that disc repositioning is necessary.

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Masticatory myofascial pain and dysfunction treated with intramuscular botulinum toxin injections

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Background: Myofascial pain and dysfunction (MPD) is the most common cause of orofacial pain, and it is broadly categorised by the Diagnostic Criteria for Temporomandibular Disorders into a localised pain pattern and a referring pain pattern. Botulinum toxin (BT) was first proposed as a treatment for MPD some 20 years ago, and today there still exists a debate in the literature regarding its efficacy due to mixed results from clinical trials.
Objectives: To evaluate the efficacy of BT intramuscular injections in improving MPD, and whether the different subtypes of MPD respond differently to the toxin.
Methods: 25 consecutive patients treated at our department with BT injections were included in the study. All patients suffered from chronic MPD and were resistant to physical, occlusal, and drug therapy. Primary outcome variable was subjective pain reduction as reported by the patients. Secondary outcome variables were reported analgesic use, and patients' needs for re-treatment after treatment effects subside.
Findings: 13 patients suffered from localised MPD and 12 patients suffered from referring MPD. At the two-months follow-up evaluation, nine patients of the localised MPD (70%) reported on significant improvement whereas only two patients of the referring MPD (16%) reported on significant improvement ($P = 0.015$).
Conclusion: Intramuscular BT injections proved efficacious in reducing pain in patients with localised MPD while was much less predictable in patients with referring MPD. Future studies should use strict diagnostic criteria to further identify the patients most likely to benefit from this treatment modality.

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Is fine-needle aspiration cytology for salivary gland neoplasms a worthwhile investigation?

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Background: The aim of this study was to analyse the management and outcomes of salivary gland tumours (benign and malignant) at a regional maxillofacial unit over the last 33 months. This presentation will debate the value of fine-needle aspiration (FNA) cytology.
Methods: A database was formulated containing all salivary tumour cases treated. Data entered in the database was done prospectively. All patients had ultrasound guided needle biopsy.
Results: 133 patients were treated of which there were 101 benign and 32 malignant tumours. Of the malignant tumours, 5/32 (16%) were initially diagnosed as benign and 3/32 (9%) were inconclusive. The sensitivity for malignant tumours was 79%. The malignant tumours were managed by total parotidectomy (28%), superficial parotidectomy (22%), extracapsular dissection (25%), wide local excision (13%) and partial parotidectomy (6%). The cases managed by extracapsular dissection, were as a result of FNA being nondiagnostic, suggesting the lesion is benign or a lymphoma.
Conclusion: The sensitivity of FNA is around 79%. In this series 16% of malignant tumours were wrongly diagnosed as benign. Therefore there may be a justification to consider core biopsy for all inconclusive FNAs or those clinically suspicious for malignancy.

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Intraoral treatment of ankylosis on the temporomandibular joint and reconstruction with a custom made joint prosthetic

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Background: Gun shot wounds (GSW) to the temporomandibular joint (TMJ) generate comminute fractures that cause sever complications such as temporomandibular ankylosis. This in turn generates pathological changes to the anatomical and physiological integrity of the joint, causing severe limitations to the mandibular joint movement. The conventional focus on treating ankylosis consists of extraoral surgical procedures to expose and visualize anatomical structures. Due to the proximity to vital anatomical structures, there are inherit risks associated with this procedure, including injury to the facial nerves and salivary fistulas.
Objectives: Describe a case of intraoral surgical release of TMJ ankylosis, followed by a second surgery to reconstruct de TMJ with a custom-made Hoffman articular prosthesis.
Methods: We present a 37-year-old male with a five-year history of a GSW to the left TMJ that was not treated at the time of the initial trauma. The patient presented TMJ ankylosis as a result of multiple unsuccessful surgical interventions to release the joint. In 2015, the patient was treated at Centro Policlínico, where he received intraoral surgery to release the ankylosis on the left TMJ and subsequent joint reconstruction using custom-made joint prosthetics in a second procedure. An intraoral approach was selected in order to preserve tissue that would allow fitting a TMJ prosthesis.
Conclusions: Intraoral ankylosis release is a valid surgical technique with successful results in highly selected cases when performed by experienced surgeons. This technique spares tissue that can be later used to reconstruct the TMJ with a prosthesis.

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Modified eminoplasty revisited

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Background: Eminectomy has been the gold standard of surgical procedures to manage chronic recurrent dislocation (CRD) of the temporomandibular joint (TMJ) while other augmentation techniques were not as popular mainly due to hardware complications.
Objectives: The present study revisits modified eminoplasty as an alternative augmentation technique to manage CRD of the TMJ.
Methods: Six bilateral CRD patients (two males and four females) with a mean age range of (32.5 ± 5.36 years) were treated in this study. The technique comprised wedging of a rectangular chin bone wedge graft into the obliquely osteotomised eminence using a specifically designed instrument (Moez Graft Tucker) to create a green-stick fracture preserving the elastic bone recoil that aided in graft stabilisation. Patients were maintained in maxillomandibular fixation for two weeks and followed-up clinically and radiographically using cone-beam computed tomography for six months postoperatively.
Findings: After six months, there was a total gain of ($12.98 \pm 4.19\%$) in the mean peak amplitude of the eminences. There was a net reduction in the maximum interincisal opening and protrusive measurements of ($25.29 \pm 8.11\%$) and ($28.93 \pm 19.08\%$), respectively. No motor nerve deficit was documented. Recurrence of dislocation occurred only in one TMJ for a couple of times and was self-reducible without further complications.
Conclusions: Modified eminoplasty proved to be an effective and a technique sensitive procedure preserving the TMJ anatomy and providing free excursions without the risk of further dislocation while obviating the need for osteosynthesis hardware.

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Primary chronic osteomyelitis of the jaw in children: case series and literature review

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Background: Primary chronic osteomyelitis (PCO) of the jaw is a rare presentation which can lead to pain, trismus, and swelling. Only sparse cases with onset during childhood or adolescence have been reported in the literature. We report the largest series of PCO of the jaw in children and review their management; whilst examining the available current evidence.
Methods: Retrospective analysis of patients diagnosed with PCO and treated at Great Ormond Street Hospital.
Results: 15 patients were identified satisfying the selection criteria. Median age was 8 years and 3 months (7 months–15 years). Male to female ratio was 1:3. Site of distribution; right to left: 1:1. All patients had a biopsy confirmed diagnosis of osteomyelitis and treated with antibiotics. 5 patients needed surgical intervention.
Conclusion: PCO of the jaw in children requires careful examination and appropriate investigations, which should be complemented with a clinical treatment plan formulated following a multidisciplinary team discussion.

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Aetiology of temporomandibular disorders: do we have support for current treatments?

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Background: Temporomandibular disorders (TMDs) affect around one-third of the population and associated with significant morbidities. Nevertheless, their aetiology is poorly understood, and there is a great deal of interindividual variability in the signs and symptoms of the affected individuals.
Objectives: This study aims (1) to evaluate the potential etiological/risk factors associated with TMDs, (2) to investigate the most common TMDs symptoms reported and (3) to look for the common clinical oro/facial manifestations in patients with TMDs.
Methods: A survey-based study accompanied by a clinical screening for 1361 participants. The questionnaire contains two axes; the

first somatic evaluation and the second is psychological evaluation via the Hospital Anxiety and Depression (HAD)-scale.
Findings and Conclusion: More than one-third of the participants reported at least one symptom of TMD(s), with a morning headache being the most common with a prevalence of 41.7%. More than half of the participants reported an elevated HAD-scale. Furthermore, about a fifth of the later individuals also reported sleep disturbances and parafunctional habits especially nocturnal bruxism, this was also clearly associated with TMDs symptoms.

The symptoms were highly prevalent among the studied multiethnic population. There was a significant relationship between the elevated HAD-scale and the incidence of parafunctional habits, which in turn have a strong association with the presence of TMD symptoms. On the other hand, there was no correlation between TMD symptoms and dentofacial abnormalities like malocclusion, loss of teeth, tongue indentation, etc. This outcome may support the central mechanism of the problem and question the value of peripheral therapies.

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The use of computer-aided design/computer-aided manufacturing temporomandibular joint prosthesis and orthognathic surgery in patients with craniofacial anomalies

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Background: The integrity and normal function of the temporomandibular joint (TMJ) is crucial to assure a normal breathing, eating and socialisation of the patient at any age. There are some indications for early reconstruction of the TMJ such airway obstruction, masticatory dysfunction and psychological aspects always preserving the potential of growth of the younger patients. The classic reconstruction of the anatomy of the TMJ implies the use of autologous tissues and orthodontic support, but the indications of the new computer-aided design/computer-aided manufacturing (CAD/CAM) TMJ prostheses individualised for each patient and their anatomy and the orthognathic surgery are now an open field with new and interesting applications in our younger patients with extreme conditions.
Objectives: Demonstrate the utility of the CAD/CAM TMJ prosthesis and orthognathic surgery in patients with craniofacial anomalies.
Methods: We present four patients with ages under 20 years old, two with hemifacial microsomia, one of TMJ ankylosis and one Hadju-Cheney Syndrome. The treatment combined the use of CAD/CAM TMJ prosthesis and orthognathic surgery with counterclockwise rotation of the occlusal plane. Follow up period was at least of 10 months.
Findings and Conclusion: All the patients improved in aesthetic and functional aspects. No severe infections or major complications were recorded and all the prosthesis remains in good function. CAD/CAM prosthesis in combination with orthognathic surgery is a valuable technique in younger patients with extreme conditions.

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A five-year retrospective study on the clinical outcomes of open temporomandibular joint surgery

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Background: Internal derangement of the temporomandibular joint (TMJ) is a common presentation in all oral and maxillofacial surgery departments across the world. Open joint surgery is considered in our department for the few patients who fail to respond to conservative advice, steroid injections, arthrocentesis and arthroscopy.
Objectives: To assess the clinical effectiveness of open TMJ surgery in patients under the care of one surgeon.
Methods: A total of 20 consecutive patients were identified who attended between 2011 and 2016. 19 patients were treated with meniscopexy or meniscectomy and one with open joint cryotherapy. Clinical outcomes of pain scores (0–10) and interincisal opening (mm) was compared preoperatively and 6 months post-surgery.
Findings: 15 out of 20 patients (75%) were considered to have a successful outcome with significant improvement in both pain and interincisal opening post surgery; there was a mean reduction in pain score of 5 and mean increase in opening of 12 mm. Five patients did not show improvement in both clinical outcomes and were subsequently referred to tertiary care. Of these, three patients were treated with joint replacement, one with Botox in masseter muscles and another failed to attend their appointments.
Conclusion: There is a high success rate of open TMJ surgery when compared against the literature and should therefore be considered in specific clinical scenarios. This study suggests reasons for those cases considered unsuccessful providing useful information when obtaining consent for such procedures in the future. Further work should incorporate a longer follow up period with a larger patient base.

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Efficacy of platelet-rich plasma versus hyaluronic acid intraarticular injection in arthroscopic management of Wilkes V temporomandibular joint patients

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Background: Temporomandibular joint (TMJ) degenerative diseases are steadily increasing. A variety of noninvasive solutions have been proposed for pain treatment, improvement in function, such as hyaluronic acid (HA), and platelet-rich plasma (PRP). PRP is a minimally invasive method to obtain from the blood a natural concentrate of autologous growth factors that would stimulate healing.
Objectives: To compare the efficacy of platelet-rich plasma and hyaluronic acid intraarticular injections for the management of TMJ Wilkes V patients.
Methods: Patients with Wilkes V TMJ pathoses had been subjected to TMJ arthroscopic surgical procedure with intraarticular injection of either PRP or HA, in Miamioms, Baptist Hospital, Miami, Florida. Data was assessed through the general outcome of the procedure using clinical assessment of pain and function.

Findings: 178 subjects (229 TMJ), with a mean age of 50.43 years were divided into HA group (122 joints) and PRP group (107 joints). Demographic characters and preoperative measured variables were not significantly different between the two groups. There was no statistical significant difference between the two groups regarding the success rates 65.6% in the HA group versus 69.9% in the PRP group, $P = 0.31$. Both groups showed significant improvement of TMJ pain, function and noise.
Conclusion: Autologous PRP injections showed to be effective in reducing pain and symptoms and increasing range of motion and comparable to HA.

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Short-term comparison of success-rate between costochondral graft interpositional arthroplasty and transport disc distraction osteogenesis in treatment of children with unilateral temporomandibular joint ankylosis

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Background: Temporomandibular joint (TMJ) ankylosis in children causes facial deformity and has various treatment modalities. This study compares transport disc distraction osteogenesis (TDDO), with the considered gold standard costochondral graft (CCG) for ramus condyle unit (RCU) reconstruction.
Objectives: Comparison of success-rates between the two groups (CCG/TDDO) through mouth opening and reankylosis as primary objectives; secondary objectives being chin deviation, open bite and neo-disc formation.
Methods: Buccal fat pad interposition and CCG/TDDO reconstruction was done in 12 unilateral TMJ ankylosis patients according to random table and followed-up for 6 months. Parameters of age, gender, treatment given, mouth opening (mm), open bite (mm), reankylosis (opg), neo-disc formation (magnetic resonance imaging [MRI]) were noted.
Results: In CCG and TDDO groups respectively, mean mouth opening preoperatively was 9 mm, 9 mm which improved to 40 mm, 47 mm at six months; male:female = 2:1 ($n = 6.6$); mean age = 11.4 years (standard deviation, 2.9 years). In both groups, neocondyle seen in 100% while reankylosis and open bite in 0% patients. In TDDO group, chin deviation and facial asymmetry correction noticed earlier than CCG group. Hypointense shadow at disc region seen in MRI of 100% cases.
Conclusions: Both modalities are effective reconstruction methods. TDDO seems a better modality than CCG as corrects facial asymmetry over shorter time-period. Contrast enhanced MRI can be considered for better recognition of neo-disc formation. Long-term study is needed for growth evaluation.

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Platelet-rich plasma in the therapy of osteoarthritis of temporomandibular joint

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Background: Platelet-rich plasma (PRP) application uses the effect of changes in cell proliferation and regulation of cellular metabolism. In the temporomandibular joint (TMJ) is this effect desirable in treatment of osteoarthritis: regeneration of cartilage, bone and synovial tissue.
Objectives: The presented study compares effect of intraarticular injection of PRP and hyaluronic acid in patients after ineffective previous conservative and mini-invasive treatment. The study includes 60 patients with arthroscopically proved degenerative changes of TMJ (grade I and II chondromalacia).
Methods: All the 60 patients were randomly divided into two groups: group A received 1 mL PRP intraarticular and group B received 1 mL of hyaluronic acid (standard group). At the point of 1, 3 and 6 months after procedure the pain score and maximum interincisal opening were evaluated.
Findings and Conclusions: Study proved PRP application as an effective treatment method with significant pain level decrease.

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The management of facial arthromyalgia at the University Hospital of Wales. How does it improve the patients quality of life?

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Background: Facial pain is responsible for a large proportion of referrals to the Oral and Maxillofacial Unit from general practitioners and surgical specialities. The differential diagnosis includes ear pain, sinusitis, dental pain, temporomandibular joint (TMJ) disorders, migraines and trigeminal neuralgia. The author believes that the most common cause of such pain is facial arthromyalgia; which is characterised by pain in the facial muscles and the incidence of trigeminal neuralgia is small and usually made solely on the description of the pain; often without complete orofacial examination.
Methods: At initial consultation for a patient with facial pain, a specific pro-forma was distributed with seven specific requirements. The patients were reviewed after three months for improvements in symptoms. A clinical audit over a six-month period was carried out, where all patients presenting with facial pain were analysed.
Findings: The study was able to positively correlate an improvement in the quality of a patient's life following the treatments listed on the pro-forma sheet, avoiding the use of bite raising appliances and especially avoiding neurosurgical intervention.
Conclusion: The pain experienced by the presenting patients cannot be underestimated and is often caused by muscle spasm from abnormal opening/movements or occlusal instability. We were able to highlight that by increasing the blood flow in and out of the facial muscles, by following simple instructions listed on our pro-forma, was more effective than any clinical or surgical

intervention. It also was cost saving by preventing the construction of bite raising appliances.

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Pain after total joint replacement of temporomandibular joint

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Complication of total joint replacement (TJR) may be a malfunction of the facial nerve, bleeding, bad position prosthetic components, luxation compensation, poor bite, infection, reankylosis. One of the most common complications is pain.

The authors evaluated postoperative pain in patients undergoing TJR. The group consisted of 45 patients (62 prosthesis; 17 bilateral TJR, 28 unilateral TJR). Evaluation of pain (visual analogue scale 0–10) was in all cases one year after TJR.

Pain was observed in 18 patients (40%). Authors compared patients with pain and without pain. Significant difference was in gender, pain before surgery, psychiatric disorders in history. Age, number of previous surgeries, autoimmune illness was without significant difference.

Risk patient for TJR are women, with degenerative changes, with pain before surgery and with psychiatric disorders in history.

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Re-arthroscopy of the temporomandibular joint — retrospective study of 600 arthroscopies

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Background and Objectives: It is known that arthroscopic surgery is an effective treatment for patients with temporomandibular disorders. However, arthroscopic surgery is not always successful. In patients with poor arthroscopic outcomes, several option of treatment can be regarded such as conservative nonsurgical therapy, open surgery, or a second arthroscopy. The purpose of this study was to evaluate our results after 600 arthroscopies.
Methods: The clinical data of 360 patients (600 joints) who underwent arthroscopies from 1997 to 2014 were reviewed retrospectively. The outcome assessment was based on reduction in pain measured using 4 criteria (no pain, soft, moderate and intense pain), and improvement of the maximal interincisal opening (MIO). The minimum follow-up period was 24 months. During this time 11 patients with unfavourable outcomes underwent a second arthroscopy.
Results: The proportion of re-arthroscopies was 3.05% with a mean time between surgeries of 69.45 months. Results showed improvement between presurgical and postsurgical pain and presurgical and postsurgical MIO at months 6 and 12. The mean of preoperative MIO was 29.67 mm, which increased to 35.42 mm 1-year postsurgery. Only two patients (0.6%) who had an unsuccessful result after a second arthroscopy underwent open surgery for total replacement of the joint and discectomy.
Conclusion: In most of the cases the answer after a new arthroscopy is satisfactory without the need of an additional open surgery. Therefore, re-arthroscopy of the TMJ is an effective method to surgically manage patients after a first unsuccessful arthroscopy.

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Arthroscopic infiltration of the pterygoid muscle with botulinum toxin instead of standard myotomy to reposition the disc in the temporomandibular joint — preliminary results

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Background: Operative arthroscopy is an efficient therapy to manage the internal derangement of the temporomandibular joint (TMJ). Standard myotomy of pterygoid muscle has been the classical technique to reposition the disc back in place. However, this manoeuvre is very aggressive to the joint with a higher risk of bleeding, clots and adhesions.
Objective: The aim is to report a new method to avoid myotomy and minimise its negative effects. Infiltration of botulinum toxin (BT) through a direct view during arthroscopy can offer similar results with less damage. This neurotoxin induces a maximum relaxation of the muscle that last up to six months.
Methods: We describe the technique with a direct infiltration of 25 units of BT in each upper belly of the lateral pterygoid muscle after exposing an anteromedial capsulotomy through the working cannula with a long spinal needle. We analyse the results obtained in 25 consecutive patients, 7 of them bilateral and compare them with control cases treated with standard myotomy. Variables as Wilkes stage, discal roofing, arthroscopic findings as well as pain visual analogue scale, oral movements and noises were recorded. MR were analysed.
Findings: No significant differences were found between both groups in clinical variables. This technique seems to be more simple than standard myotomy with less risk. A proper management of BT is mandatory.
Conclusion: Infiltration of the lateral pterygoid muscle under direct view during arthroscopy of the TMJ can be a good alternative to the standard myotomy to reposition and fixation of the disc, diminishing its deleterious effects.

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Synovitis of the temporomandibular joint in arthroscopy — a retrospective analysis in 378 cases

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Background: Before the advent of arthroscopy of the temporomandibular joint (TMJ), synovial pathology was unknown, since there were no diagnostic methods to indicate their existence. Synovitis is an inflammatory process that occurs when synovial levels of cellular debris and inflammatory agents reach such a level that cannot be processed and eliminated by the synovial membrane. At

that time, an inflammatory response occurs by superficial synovial capillaries and acute synovitis is established.
Objective: Our aim is to describe the arthroscopic findings of synovitis and analyse its relationship with other arthroscopic findings.
Methods: A retrospective study was carried out by analysing 189 patients in whom 378 arthroscopies were performed at the Department of Oral and Maxillofacial Surgery, Hospital Clinico San Carlos, Madrid, Spain between the period of January 2005 and January 2016. In all cases an operative arthroscopy was done with different techniques and anatomical structures were evaluated objectively under arthroscopic vision and four patient groups were established according to the severity of synovitis presenting (grade I, II, III and IV).
Findings: An important relationship between the presence of advanced stages of synovitis and articular disc status is observed. Therefore, early diagnosis of this entity is important to carry out therapeutic measures indicated and prevent the gradual deterioration of the articular surface.
Conclusion: The treatment tries to reduce inflammed synovitis tissue. By washing arthrocentesis we can only clean the inflammatory agents within the joint. Arthroscopy provides a direct means of treating the inflamed synovial tissue.

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Growth factors application in combination with arthrocentesis and lavage in internal derangement of the temporomandibular joint and degenerative joint disease: an effective treatment option with satisfactory clinical outcomes

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Objectives: The aim of this study was to evaluate the effectiveness of injection of plasma rich in growth factors (PRGF) in combination with arthrocentesis and lavage in patients with internal derangement (ID) of the temporomandibular joint (TMJ) and degenerative joint disease (DJD).
Methods: Five hundred patients with in ID of the TMJ and DJD associated to chronic pain received injections of PRGF. They were treated with Arthrocentesis and Lavage (I.V., L.A.), 2 needle puncture, 200 mL lactated Ringer's solution, 2 mL of rich plasma at the superior joint compartment (PRGF/ENDORET/GFs PROTOCOL/BTI Implant Co), mandibular manipulation, non-steroidal antiinflammatory drugs and an occlusal splint. Pain intensity on a visual analogue scale (VAS) and maximum mouth opening (MMO, mm) were measured before and after procedure and compared. The mean age of patients was 29.3 years (range, 14–61 years); 450 were female.
Findings: Significant reductions in pain were noted after injections: pain VAS 7.8 preoperative and 1.7 at 24 months postoperative. MMO increased after procedure: 26.2 mm preoperative and 51.4 mm at 24 months postoperative. Masticatory function and mandibular range of motion significantly improve achieving better clinical results at 24 months postoperative.
Conclusions: In conclusion, our results demonstrated the efficacy of articular injections of PRGF to control pain and to enhance TMJ mobility with a significant improvement to clinical outcomes at 2 years in patients with ID and DJD.

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10 years of experience in temporomandibular joint replacement with alloplastic prosthesis in the Hospital Universitario la Samaritana, Bogota, D.C., Colombia

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Objective: This research study was held at Hospital Universitario la Samaritana and evaluates the effectiveness of the total alloplastic temporomandibular joint (TMJ) replacement in 22 patients, with 36 prosthesis (Biomet Microfixation, Jacksonville, FL, United States of America), diagnosed with ankylosis, internal derangement of TMJ Wilkes V stage, facial trauma and facial abnormalities.
Methods: The evaluation was carried out taking into account the therapeutic objectives of surgical success of TMJ surgery by the American Association of Oral and Maxillofacial Surgeons, 2012; having a positive effect on pain decreasing according to visual analogue scale, mouth opening $\geq$40 mm, occlusal stability and tolerance normal diet, which was evaluated in pre- and postsurgery stages lasting between one month and six months. A statistical analysis was conducted by using the McNemar Test for binary variables, Stuart–Maxwell Test for categorical variables and Signs Test with Wilcoxon Rank for ordinal or quantitative variables.
Conclusions: As a result, the study proves there is a significant improvement in mouth opening and occlusal stability, which are connected to an adequate tolerance to normal diet. Furthermore, it conveys there is a significant reduction in pain on a visual analogue scale, with a $P < 0.05$; and it was determined that there is an effective surgical procedure in the sixth postsurgery month according to the evaluation criteria assessed with a success rate of 86.36%.

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Effectiveness of single puncture arthrocentesis in temporomandibular joint disturbances

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Background: Traditional arthrocentesis of the temporomandibular joint involved using two needles inserted through two separate puncture sites. To overcome the unwanted clinical situation of conventional technique, we have followed a simple technique of introducing both the needles through a single puncture to accomplish the procedure of arthrocentesis more effectively.
Objectives: To demonstrate a modified technique of temporomandibular joint arthrocentesis that will make the procedure easier for the surgeons and comfortable for the patients and to evaluate the short-term efficacy of single puncture arthrocentesis.
Methods: An *in vivo* prospective interventional study was conducted in 20 subjects. The study involved both males and females of age ranging from 20 to 60 years who were diagnosed with temporomandibular joint disorder. All the subjects underwent single puncture arthrocentesis using a fabricated device. Pre- and postoperative data were recorded at regular intervals over six months and analysed statistically using SPSS software version 10.

Results: In all the subjects the procedure was uneventful and there was no evidence of recurrence. There was a clinically significant improvement in mouth opening, lateral movements, clicking and deviation with $P < 0.001$ and also there was a remarkable reduction in pain over a period of six months.
Conclusion: From the above results and statistical analysis it is possible to conclude single puncture arthrocentesis to be very effective and less invasive procedure with minimal complications. Future studies with larger sample size and longer duration of follow-up will test the true efficacy of this technique.

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Lateral arthroplasty versus conventional arthroplasty in Sawhney's type III temporomandibular joint ankylosis: a comparison

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Background: Temporomandibular joint (TMJ) ankylosis is a challenging condition leading to fusion of the mandibular condyle with base of the skull causing distressing conditions which leads to facial disfigurement, compromise airway, aesthetics, function and psychological stress. Sawhney's type III ankylosis involves an improperly treated or displaced condyle process fracture. A clear bridge of bone is present between the ramus and zygomatic arch and after the bony bridge is excised the upper articular surface and the articular on deeper surface are intact. A condyle of reduced size and slightly medial to normal anatomical exists and is functional.
Objectives: To compare the effectiveness between lateral arthroplasty and conventional arthroplasty in Sawhney's type III TMJ ankylosis.
Methods: A total of 20 patients were included in this study. Lateral arthroplasty was done in 10 patients preserving the medial condyle. Conventional arthroplasty was done in 10 patients.
Finding and Conclusion: Patients were followed up to maximum of six months and following conclusions were drawn. The maximum intercisional mouth opening was slightly better in control group (42 + 3 mm) as compared to lateral arthroplasty group. Protrusive and lateral movement was better in lateral arthroplasty group. In lateral arthroplasty group deviation in mouth opening was almost nil in the cases as the vertical relation of mandible was maintained. The present follow up of lateral arthroplasty technique is a superior technique as compared to conventional arthroplasty technique based on the clinical outcomes in Sawhney's type III ankylosis and lateral arthroplasty also has the advantage of being a conservative procedure.

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Postoperative complication of mandibular condyle fracture associated with osteosynthesis material treated with total temporomandibular joint reconstruction: case report

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Total condylar resorption and failure of bone synthesis material as postoperative complications of condyle fracture are condyle fracture complications seldom related in the literature. When these occur, they may make temporomandibular joint function unfeasible, with indication for reconstruction of this joint, which can be achieved by means of alloplastic prosthesis. The aim of this article was to report a rare case of impaction of osteosynthesis material in the region at the base of the skull, with the result of complication of the mandibular condyle fracture treated with rigid internal fixation that evolved with condylar resorption, in which alloplastic temporomandibular joint reconstruction was performed in a single surgical session.

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Demographic features in unilateral condylar hyperplasia: an overview of more than 300 asymmetric cases and presentation of an algorithm

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Background: Unilateral condylar hyperplasia (UCH) is an acquired mandibular deformity, which can influence facial symmetry due to its progressive nature. Definition, classification and treatment are subject to discussion.
Objectives: The study aim is to evaluate the clinical characteristics, demographic features, classification and follow-up in a large cohort of suspected UCH patients. From this evaluation, a uniform diagnosis and treatment algorithm is established.
Methods: The charts of asymmetric patients with suspected UCH from 3 Maxillofacial Centers (Academic Medical Center, VU Medical Center and Spaarne Gasthuis) from 1994 to 2014 were retrospectively evaluated. Patients were referred by orthodontists, dentists, general practitioners or maxillofacial surgeons. Demographic features, bone scan outcomes, laterality, diagnosis (elongation/hyperplasia/hybrid) and follow-up were noted. Secondarily, all patients were retrospectively diagnosed by one surgeon (JN), using available documentation. Missing data and follow-up were additionally retrieved from orthodontic offices.
Findings: 394 asymmetric patients were evaluated. The mean age at presentation was 20.7 years, with a male/female ratio of 176:218. A condylectomy was performed in 175 patients; 106 of these had a positive bonescan. In 114 patients, orthognathic surgery was performed. In only 70% of the cases, secondary screening was in agreement with the initial diagnosis and laterality.

Conclusion: Clinically, it is difficult to objectively classify patients. Uniformity in documentation and measured parameters is obligatory in order to reach evidence-based conclusions and be able to compare treatment outcomes from different centres. An algorithm is presented to facilitate this.

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Infections and cancers mimicking temporomandibular disorders

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Background: Jaw pain and trismus are common clinical symptoms among temporomandibular disorders (TMD) patients. These symptoms by a reason other than TMD may puzzle clinicians. Chronic dental infection can provoke the symptoms. Cancer is a rare cause but serious scenario. This report analysed 4 cases presenting TMD-like symptoms: two with chronic dental infections and two with malignancies.
Objectives: This report stresses the importance of differential diagnoses of TMD with imaging diagnostics.
Methods: The four patients were initially diagnosed with TMD and referred to TMJ clinic.

Chronic dental infections: Case 1 and Case 2 with jaw pain and trismus without response to TMD treatment.

Malignancies: Case 3 and Case 4 with progressive symptoms in spite of TMD treatment.
Findings: Chronic dental infections — computed tomography (CT) scan revealed infection of dental origin into the infratemporal space in Case 1, and postsurgical infection of infra-masseteric space secondary to maxillary dental extraction in Case 2. Surgical drainage and antibiotics successfully resolved the symptoms in both cases.

Malignancies — magnetic resonance imaging and/or CT scan disclosed a destructive mass in the condyle in Case 3, and in Case 4 a large cancer mass occupied the sinus and spreading into the adjacent structures. Pathologic examination confirmed lung metastatic adenocarcinoma in Case 3 and squamous cell carcinoma in Case 4. Both patients underwent chemoradiation, but passed away after four and six months, respectively.
Conclusion: It is indispensable that oral surgeons be on the alert to symptoms mimicking TMD. Once any underlying disease is suspected, advanced imaging diagnostics should be considered immediately.

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Long-term unilateral temporomandibular joint dislocation — a case report

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Background: Chronic long-term temporomandibular joint (TMJ) dislocation is rare. It occurs when a case of acute dislocation is left untreated or is inadequately treated. This long-term anterior positioning of the condyle will caused fibrosis of soft tissue and spasm of the muscle. Therefore the management is complex and controversial.
Objectives: To present the experience in managing this particular long-term unilateral TMJ dislocation and to review the literature related to the management of this rare condition.
Methods: A 28-year-old male patient complained of being unable to close his mouth, chew food and speak properly for one month. He was unable to close his mouth after yawning and did not seek treatment immediately. Clinical examination showed an open bite with right side deviation of mandible, excessive salivation and palpable condyle with depression in the left preauricular area. Imaging investigation confirmed of left TMJ dislocation. Manual manipulation was attempted, followed by acrylic blocks with elastic traction placed on arch bars but were unsuccessful. Finally, open reduction technique was carried out under general anaesthesia using wire traction at the angle of mandible to reposition the left condyle back to glenoid fossa.
Findings: The left dislocated condyle was successfully disengaged inferiorly and positioned into it glenoid fossa after few attempts. Intraoperative maxillomandibular fixation with wires was done and patient was extubated.
Conclusion: Conservative treatments should be the first line approaches before utilising the more invasive surgical methods when managing a long-term unilateral TMJ dislocation.

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Facial trauma: epidemiology, demographics and fracture patterns

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Background: Trauma of the maxillofacial region has a variety of causal mechanisms and can be seen across a wide variety of patient demographics. There is a variation in the aetiology and fracture patterns within different patient populations within published literature.
Objectives: To examine the aetiology, incidence, anatomical patterns, demographics and treatment types associated with patients admitted with facial fractures.
Methods: The Victoria Admitted Episodes Dataset of all facial trauma in Victoria between 2004 to 2014 was requested from Turning Point Drug and Alcohol Centre. The dataset was de-identified. Factors relating to aetiology, anatomical distribution, admission funding, patient demographics and regions within the Australian state of Victoria were analysed. Descriptive statistics and regression analysis were performed to identify factors relating to admission.
Findings: Over the 10-year period analysed, there were 54,730 patient admissions for facial trauma. Within this patient cohort there were 73,797 facial fractures. Causes for facial fractures were identified and categorised, with facial trauma from falls (29.5%), interpersonal violence (23.7%) and transport accidents (14.9%) being the three main causes for facial trauma within our patient population. Facial fracture pattern types varied depending on the patient demographic, including sex and age of the patient. Various factors were found to be associated with an increase in length of stay for facial trauma admission as well as operative as opposed non-operative management of fractures. Facial fractures were noted to have distinct peaks in the third and eighth decades of life.

Conclusion: This retrospective population study demonstrates an insight into the demographics and fracture patterns in facial trauma patients.

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Mandibular distraction osteogenesis preceding interpositional arthoplasty — a novel protocol in management of temporomandibular joint ankylosis

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Background: Temporomandibular joint (TMJ) ankylosis leads to a significant amount of facial deformity in the affected individuals, more so in adult patients with long-standing bony union. Correction of facial deformity by distraction osteogenesis has now become a mainstay for the treatment of craniofacial syndromes with mandibular hypoplasia including TMJ ankylosis. There is an increased risk of reankylosis when the facial deformity due to TMJ ankylosis is attempted to be corrected by the distraction osteogenesis after release of ankylotic mass. To overcome this potential problem we have attempted the correction of facial deformity by distraction prior to release of ankylosis.
Objectives of this study: To evaluate the benefits of distraction osteogenesis prior to release of TMJ ankylosis.
Methods: 50 patients of TMJ ankylosis were treated using our protocol i.e. distraction first and then ankylosis release subsequently. Patients included in this study were aged between 5 and 50 years. Both extraoral and intraoral distractors were used depending on the requirement and socioeconomic status of the patient. Minimum follow-up period was 6 months.
Findings and Conclusion: The combination of correction of facial deformity as the primary procedure and ankylosis release as secondary procedure provides good functional and aesthetic results in patients with facial deformity due to TMJ ankylosis.

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Effectiveness of vitamin b complex in reducing chronic temporomandibular joint disorder pain — double blind randomised clinical trial

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Background: Chronic temporomandibular joint disorder (TMD) pain management has always been challenging and usually requires long-term analgesics. Commonly used analgesics have a potential for adverse effects in long-term usage, thus there is a need to look for a safer alternative analgesic option.
Objectives: To evaluate efficacy of vitamin B complex (VBC) [B1, B6, B12] in reducing chronic TMD pain.
Methods: 26 patients with chronic TMD pain secondary to arthralgia, osteoarthritis and disc displacement were included. The patients were allocated randomly into two groups and received either VBC tablet (B1: 242.5 mg, B6: 250 mg, B12: 1 mg) or placebo once per day for six weeks. Clinical measurements were recorded at week 0 and week 2, week 4, and week 6 to evaluate the efficacy of the treatment. Pain intensity was measured by visual analogue score (VAS) and mandibular range of movement was measured by maximal comfortable mandibular opening and lateral excursion. Adverse effects and compliance rate towards treatment were also assessed.
Findings: In this 6-week clinical trial, both groups showed significant VAS pain reduction (VBC 2.49 ± 1.71; placebo 1.41 ± 1.53; $P < 0.05$). The amount of VAS pain reduction in the VBC group was significantly higher than in the Placebo group at week 2 (1.19 ± 1.28 versus 0.23 ± 0.90) and week 4 (2.32 ± 1.42 versus 1.25 ± 0.75; $P < 0.05$). No statistically significant difference was noted in mouth opening improvement. Both VBC and placebo medications were well tolerated with minimal adverse effects.
Conclusion: In this study a dose of VBC (B1: 242.5 mg, B6: 250 mg, B12: 1 mg) was significantly better than placebo in reducing chronic TMD pain at week two and week four.

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Frequency and morbidity of temporomandibular joint involvement in adult patients with a history of juvenile idiopathic arthritis

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Background: The majority of patients with juvenile idiopathic arthritis (JIA) have involvement of the temporomandibular joints (TMJs), but little is known about the natural history of TMJ disease as these children enter into adulthood.
Objective: To evaluate adults with a history of JIA in order to document the frequency and severity of TMJ abnormalities and TMJ-related morbidity.
Methods: This is a cross-sectional study including adult patients with JIA who were managed at Boston Children's Hospital as children and at Brigham and Women's Hospital as adults. Subjects completed a study questionnaire, physical examination and maxillofacial cone-beam CT (CBCT). Additional data was obtained from medical records. We examined the associations between our primary outcome variable: TMJ abnormality on CBCT, and components of the arthritis history, arthritis severity, dental/orthodontic history, TMJ pain, maximal incisal opening (MIO), facial asymmetry, physical examination findings and cephalometric analysis.
Findings: 21 subjects (42 TMJs) with mean age 26.06.1 years and a mean duration of care for JIA in our institution of 13.76.5 years were enrolled. 62% had TMJ pain, 43% had functional limitation, and 76% had lower facial asymmetry. TMJ abnormalities were found on 55% of CBCTs, with 79% bilateral. 81% had one cephalometric measurement relating to mandibular size or position >1 standard deviation from normal.
Conclusion: TMJ abnormalities and related morbidity are common in adult patients with a history of JIA. Therefore, an early screening protocol for TMJ involvement may be sensible and long-term follow-up in to adulthood is necessary.

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Temporomandibular joint lower compartment surgery

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The temporomandibular joint is divided into upper and lower joint compartments by the intraarticular cartilage. Significant pathology occurs in the lower joint compartment and therefore the arthroscopic procedure is incomplete without the ability to operate in both upper and lower joint compartments. Pathology found in the lower joint compartment is as follows: synovitis, effusion, adhesions, osteoarthritic bone changes, stuck disc Essential to this technique is that the joint be suitably distracted. Steinman pins and special distractor is used for this purpose. Three portal surgery is necessary: An anterior portal, a posterior portal and an intermediate portal to enable manipulation of the disc with a fine probe. The procedures that can be carried out in the lower joint compartment are as follows: Investigation of lower joint compartment pathology lysis and lavage in the lower joint compartment high condylar shave. An anterior release incision made in combination with the lateral disc access incision enables the disc to be reduced and stabilised with the Prolene endaural plication suture and cauterisation. Injection of Marcaine and steroid can be done into the lower joint compartment and posterior attachment by direct vision. In severely arthritic joints where a thorough lysis and lavage of adhesions in the lower joint compartment is carried out, with postoperative physiotherapy and occlusal splint management the joints can be rendered functional and comfortable for the patient without undergoing major arthroplasty procedures.

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Is total joint replacement along with fat grafts a new protocol for adult temporomandibular joint ankylosis treatment?

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Objective: To record the outcomes of stock total joint replacement (TJR) along with fat grafts in adult temporomandibular joint (TMJ) ankylosis treatment and develop a protocol.
Methods: A prospective study to evaluate the outcome of stock total TMJ replacement along with fat graft (buccal pad fat) in adult TMJ ankylosis patients. Aetiology, duration of ankylosis, maximal incisal opening (MIO), pre- and postoperative occlusion, mandibular movements, quality of life and recurrence was evaluated. Three-dimensional plastic models were fabricated for proper planning and measurements. Ankylosis was released and stock total joints were fixed through preauricular extended temporal incision in the same sitting. Concomitant orthognathic correction of facial asymmetry was carried out in two patients.
Results: 11 patients (six females, five males) with 17 ankylosed joints (five unilateral, six bilateral) and mean age of $18.82 + 2.7$ years were operated and followed up for 12–30 months. Sawhney's type III ($n = 8$) and type IV ($n = 7$) were predominant ankylosis types. The MIO ranged from 0 to 4 mm preoperatively. The mouth opening improved to $38\,\text{mm} \pm 6\,\text{mm}$. No change in occlusion, no incidence of open bite encountered in any case. The dietary scores and quality of life improvement was marked ($P < 0.01$) No recurrence was noted.
Conclusions: Smooth mouth opening and ability to keep the occlusion unchanged together with no recurrence and ability to address the functional and aesthetic requirements by concomitant orthognathic surgery in adult TMJ ankylosis patients leads to a conclusion that TJR is probably the new protocol for the management of adult TMJ ankylosis.

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Oral mucosa rete ridge elongation is dependent, but not impact on integrin signalling

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Background: Epithelial rete ridges contribute to the adhesion of epithelium by enlarging the contact areas between epithelium and lamina propria. Integrin family promotes the epithelial adhesion via tying epithelial cells to the basement membrane.
Objectives: This study aims to explore whether elongation of rete ridge links with the integrin expression and signalling pathway.
Methods: 40 Sprague Dawley were averagely divided into 5 groups, control, phosphate-buffered saline (PBS), keratinocyte growth factors (KGF), HYD-1 (a competitive antagonists of integrin), and KGF+HYD-1 group, respectively. The length of rete ridges, the expression intensity of integrin subunit alpha 6 (α6), beta 4 (β4), α3, and β1, as well as the strength of epithelial adhesion were measured after rat was topically injected with corresponding reagent in the venture of rat tongue.
Findings: Oral mucosa rete ridges of rats of KGF group were longer that those of the control, PBS, HYD-1, and KGF+HYD-1 group. However, the expression of integrin α6, β4, α6 and β1 of KGF group was not upregulated compared to the other groups. *In vitro* studies demonstrated that stimulating the HaCat cells with KGF did not impact the expression of integrin subunit α6, β4, α6, and β1. Oral epithelium of KGF group exhibited stronger, whereas those of HYD-1 and KGF+HYD-1 groups showed weaker adhesion strength compared with those of control and PBS groups.
Conclusions: Rete ridge elongation does not impact the expression of integrin, but depends on the integrin function and strengthen the epithelial adhesion.

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Condylectomy and gap arthroplasty using fascia of temporal for treatment unilateral bone ankylosis of temporomandibular joint — a case report

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Ankylosis is a condition of temporomandibular joint which clinically shows limitation or total restricted of mouth opening. Ankylosis is classified by severity (total or partial ankyloses), location (capsular and intracapsular) and the type of tissue involvement (fibrous, osseous and fibre osseous). Complication of ankylosis can be vary as the limitation of mouth opening may cause disturbance on speech, chewing and oral hygiene.

The aetiology of the ankylose of temporomandibular joint can vary, but most due to the fracture on condylar head. Besides trauma or infection can also be the cause of the ankylose.

The treatment of osseous ankylosis is surgery. The procedure of condylectomy and gap arthroplasty is a treatment choice.

The case is of a 17-year-old girl who presented to our clinic with the main complaint of mouth opening restriction since two years. The procedure of condylectomy and gap arthroplasty was performed, followed by mouth opening training treatment. The result of normal mouth opening and normal mouth and jaw function was achieved.

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The effect of Herbst treatment on amount and direction changes of temporomandibular joint growth: a short-term investigation of cone-beam computed tomography

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Objective: To evaluate the amount and direction of temporomandibular joint (TMJ) growth changes with a Class II malocclusion treated with the Herbst appliance via cone-beam computed tomography (CBCT).
Methods: Twelve Class II malocclusions were treated with the Herbst appliance. CBCT images obtained one week before treatment (T1), three months during treatment (T2), six months during treatment (T3) and after treatment (T4) were analysed.
Results: (1) Signs of 'double contour' were observed during T2 or T3 in all objects. Condylar remodelling was analysed: the maximum amount was 2.26 mm, the minimum was 0.80 mm and the mean was 1.77 mm. (2) During the treatment, the growth of condyle was active and the region of remodelling was located at the posterosuperior area of condyle. The condyle was stimulated to remodel toward posterosuperior. (3) The relationship between condyle and glenoid fossa did not change significantly before and after treatment. (4) The remodelling pattern of glenoid fossa was similar with condylar, but the amount of the remodelling of glenoid fossa was less than that of condylar. The anterior incline of postglenoid tubercle was stimulated to remodel toward anteroinferior.
Conclusions: Herbst appliance can not only stimulate the posterosuperior border of condyle to remodel toward posterosuperior, but also have effect on glenoid fossa; it can stimulate the anterior incline of postglenoid tubercle to remodel toward anteroinferior; CBCT evaluates the effect of the Herbst appliance intuitively and accurately which has a significant value in the study related to TMJ remodelling.

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Comparison between buccal fat pad and temporomyofascial flap as an interpositional graft material after gap arthroplasty in temporomandibular joint ankylosis cases — a clinical study

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Background: Although the buccal fat pad (BFP) and temporomyofascial flap (TMFF) have been used as an interpositional graft materials in temporomandibular joint (TMJ) ankylosis, the long-term fate of both is not known. This study assesses the efficacy of both the interpositional grafts post gap arthroplasty in TMJ ankylosis.
Objective: To procure an easy to harvest graft with longevity and low relapse rate in TMJ ankylosis patients.
Objectives: (1) To compare the ease of harvesting graft during gap arthroplasty procedure and behaviour of the graft during intraoperative, postoperative and follow up period. (2) To compare complications if any; during and post-placement of the graft and also the efficacy to prevent reankylosis.
Methods: 20 subjects with unilateral bony ankylosis of TMJ in the 10–20-years age group over a period of five years were included in the study. After routine preoperative evaluation, the surgical treatment included gap arthroplasty along with interposition of BFP and TMFF in 10 patients each, respectively. Other parameters evaluated were mouth opening, facial weakness, reankylosis and any other complications.
Findings: Intraoperative surgical ease of handling and time taken was noted and postoperatively all the patients were analysed for functional morbidity, relapse rate over a follow up period of two to five years.
Conclusion: Every interpositional graft materials have their pros and cons. Priority should be given to that graft which is simpler, less technique sensitive, less invasive, involves less risk of complications and reach their goals within the shortest time frame.

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High accurate positioning after implantation of the patient specific Groningen temporomandibular joint prosthesis: a cadaver studies for assessment of accuracy

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Background: For patients with severe temporomandibular joint (TMJ) dysfunction surgical treatment with a total joint prosthesis could be indicated. The Groningen-TMJ prosthesis was developed as a stock prosthesis and applied successfully in multiple cases.[1] This prosthesis included an original design with a mathematically determined lower pivot point, accounting for both rotational and translational movement of the joint.
Objectives: Customisation of medical implants, based on three-dimensional planning, leads to improved positioning accuracy and predictability of outcome. This study aims to develop a validated custom TMJ prosthesis, including fully guided surgical implantation, based on the Groningen principles.

Methods: Based on previous design of the TMJ prosthesis, an optimised prosthesis was developed using a computer-aided design/computer-aided manufacturing workflow. Patient specific fit, including placement guides, was realised for both the fossa and mandibular part. Using a series of five human cadavers ($n = 10$ prostheses), the design was optimised for surgical use and implantation accuracy. Based on pre- and postoperative computed tomography images, the accuracy of implantation was evaluated.
Findings: All prosthesis could be inserted using routine preauricular and retro-mandibular surgical approaches. Preliminary analysis shows an average deviation from planned position of 0.87 mm at the mandibular part and 0.83 mm at the fossa part.
Conclusion: The patient specific TMJ prosthesis, developed in this study, enables high-accurate positioning after implantation, and thereby accurate planning of the translational-rotation point.

Reference

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Temporomandibular joint arthroscopy technique using a single working cannula

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Background: The traditional arthroscopy technique includes the creation of three ports in order to enable visualisation, operation and arthrocentesis.
Objectives: To introduce an operative single-cannula arthroscopy (OSCA) technique. It is an advanced temporomandibular joint (TMJ) arthroscopy technique which requires only a single cannula, through which a one-piece instrument containing a visualisation canal, irrigation canal and a working canal is inserted, as an alternative to the traditional double-puncture technique.
Methods: Trocar with a 1.6 mm (or 2 mm) cannula was introduced into the superior joint space, using a standard superior posterolateral technique. Arthroscope was inserted through the middle handle of the three female Luer-Lock connections, for irrigation and instrumentation. A 'one-track arthrocentesis' was performed by irrigating (saline) through the irrigation canal and rinsing through the working canal. Next, an outflow tract using 18-gauge needle was done to enable execution of a standard arthrocentesis under diagnostic visualisation. Finally, OSCA was performed by introducing hand or mechanical instruments or Holmium:YAG 230 μm fiber laser through the working canal. Visually guided surgery included lavage and removal of the fibrillated or degenerated fibrocartilage and redundant synovial tissue, sclerosis of the retrodiscal tissue, laser discoplasty and disc mobilisations.
Findings: The OSCA technique proved effective in improving mouth opening, and reducing pain. Operation time was approximately half that of the traditional technique.
Conclusion: The OSCA technique is as efficient as the traditional technique, yet simple to learn and simpler to execute.

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Clinical application of condylectomy via intraoral approach under computer-assisted surgical navigation

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Background: Different surgical approaches have been used to do the condylectomy. The preauricular and submandible approach has risk of facial nerve injury and skin scars. The intraoral vertical ramus osteotomy approach has obvious condyle resorption.
Objective: To assess the application of computer-assisted surgical navigation in condylectomy via intraoral approach through coronoid process osteotomy and its clinical results.
Methods: From May 2011 to July 2016, 46 patients were treated by condylectomy via intraoral approach through coronoid process osteotomy under computer-assisted surgical navigation, age ranged from 16 to 57 years. 21 patients were condyle osteoma and 25 patients were hemimandibular hyperplasia and condylar hyperplasia. Most patients had concomitant Le Fort I osteotomy, bilateral sagittal split ramus osteotomy, genioplasty and mandible contouring to recover the facial symmetry.
Results: All patients had got good occlusion, oral function and facial symmetry after the operation. The temporomandibular joint (TMJ) dysfunction syndrome alleviated or disappeared. No relapse of osteoma or facial asymmetry was found during the 3 months to 5 years follow-up period. The postoperative mandible ramus height was increased in most cases because of the regrowth of the condyle process.
Conclusion: Computer-assisted surgical navigation can precisely accomplish the condylectomy via intraoral approach through coronoid process osteotomy. It has no skin scars, no risk of facial nerve. Furthermore it has less trauma to the patient than traditional condylectomy, and can better preserve the TMJ structure and function.

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A newly proposed classification on traumatic temporomandibular joint ankylosis

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Background: Traumatic temporomandibular joint (TMJ) ankylosis is a severe disease with a typical symptom of limited mouth opening and facial deformity. But so far no classification was tested to have a link to the clinical presentation.
Objectives: A new classification of TMJ ankylosis based on computed tomography was put forward to differentiate the severity of clinical manifestations and pathological changes.
Methods: From 2012 to 2015, 73 patients with 104 ankylosed joints were divided into 4 types: type I — non-bony ankylosis of the joint; type II — lateral bony ankylosis of the joint; type III — complete bony ankylosis of the whole joint; and type IV — extensive bony ankylosis. The disease courses, maximal mouth opening (MMO), facial deformities and histopathological changes corresponding to each type were analysed.
Findings: There were 11 patients type I; 17 patients type II; 30 patients type III; and 15 patients type IV. A negative correlation was observed between types and age of TMJ trauma ($r = -0.493$),

between types and MMO ($r = -0.588$), while a positive correlation was found between types and time after TMJ trauma ($r = 0.708$). Among the 73 patients, mandibular asymmetry was only found in type II, III and IV; mandibular retrusion was only found in type III, and IV; and obstructive sleep apnoea syndrome was mainly found in type IV. Pathological features of different types varied significantly.
Conclusion: The newly proposed classification is efficient in evaluating the disease severity and clinical developmental course.

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An individually designed custom-made mandibular condyle prosthesis using selective laser melting: finite element analysis

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Background: In adults, alloplastic reconstructions are a predictable option for reconstruction of mandibular condyle defects. Additive manufacturing techniques have recently been developed to fabricate structures for tissue engineering, which could be used for individually designed condyle prosthesis.
Objectives: A novel individually designed selective laser melting (SLM) three-dimensional printing custom-made mandibular condyle prosthesis was proposed.
Methods: The head of an adult beagle dog was scanned to get the computed tomography image used as the condyle reconstruction model. The mandible, bilateral discs and bilateral temporal bone were constructed using ANSYS software. The material of the mandibular condyle prosthesis was titanium-6 aluminum-4 vanadium (Ti-6Al-4V). An optimised quadrihedron open-porous scaffold with combined connection structures, an inlay rod and an onlay plate, between the prosthesis and remaining mandible was designed as the mandibular condyle prosthesis. The biomechanical behaviours of the mandible and contralateral temporomandibular joint (TMJ) in two models, intact mandible and mandible with prosthesis, were compared after the bite force had been applied.
Findings and Conclusion: The magnitude of the compressive strain on the condyle neck with the prosthesis was low, except around the screws, while the magnitude of the strain on the scaffold-bone interface was relatively high. Reconstruction of the mandibular condyle with prosthesis would affect the contralateral TMJ. The finite element analysis model of the mandibular condyle prosthesis also showed the prosthesis could transfer the bite force appropriately.

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Multidisciplinary approach for surgical treatment of temporomandibular disorder patients using multipotent mesenchymal stromal cell synovial implant

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Background: Despite the many views on the problem of temporomandibular disorders (TMDs), currently the most popular is a combined approach. Under combined approach assumed the use of different methods of treatment temporomandibular joint (TMJ) pathology, conservative and surgical, simultaneously and sequentially. Most often we use arthroscopic surgery of TMJ, as very effective surgical method, decreasing trauma and improving the prognosis of surgical treatment. In addition to the research in area of TMJ minimally invasive surgery, we carry out research work aimed at improving the regeneration of synovial tissues after surgery: HA (hyaluronic acid), PRGF (plasma rich in growth factors), MMSC-gel as an implant of synovial liquid.
Objectives: Improvement of TMJ tissues regeneration after TMJ arthroscopy using MMSC synovial implant.
Methods: The study involved 64 TMD patients underwent arthroscopic procedure under general anaesthesia. In 32 cases we used fluid MMSC-gel, other patients received HA. In all patients clinical indicators, such as pain, swelling, mouth opening have been recorded before and different periods after surgery. We used magnetic resonance imaging 1.5 Tesla in research before and six months after treatment.
Results: Patients in the MMSC-group showed significantly better results in MRI findings compared to HA-group. As for clinical indicators — only mouth opening in MMSC-group was higher, compared to HA-group.
Conclusion: Combined surgical treatment of TMD patients using MMSC-gel implant is an effective method and recommended for further research in CMFS.

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Others

Oral squamous cell carcinoma as a second primary after treatment for breast carcinoma: a case report

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Oral squamous cell carcinoma is a malignant neoplasm of the squamous epithelium. It has a very strong association with tobacco and betel quid use. Breast cancer on the other hand is a malignant neoplasm and most common life threatening malignancy in women. Oral squamous cell carcinoma occurring after breast cancer treatment raises the question as to what are the underlying causes of the development of a second primary.

A 65-year-old female presented to the maxillofacial OPD because of a non-healing ulcer in her mouth. The patient has no underlying comorbid and was negative for a history of tobacco or quid use. The patient had undergone treatment for breast carcinoma previously. General physical examination yielded no significant findings. The ulcer was extending from the buccal to the lingual side involving the alveolus. An incisional biopsy was performed of the ulcer which proved to be oral squamous cell carcinoma. Wide local excision with selective neck dissection was planned. The patient was prepared and informed about the procedure and possible complications. The surgery was performed and postoperative wound care and medical management was ensued. The patient recovered without and untoward complications.

This case reveals the possibility of oral squamous cell carcinoma after breast cancer treatment. The gap in our knowledge is evident as to whether the cause of the second primary is genetic

make-up, environmental factors or iatrogenic factors that include therapies for breast cancer.

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Clinical and histopathological parameters for cervical lymph node metastasis in oral squamous cell carcinoma

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Objective: To find useful markers for predicting late cervical metastasis in patients with oral squamous cell carcinoma.
Methods: The clinicopathological features of 50 consecutive patients treated at Dow University Ojha Campus Hospital. Four patients had T1 disease, 19 had T2 disease, and 7 had T3 and 20 had T4a disease. All patients were treated with extended or modified type of neck dissection. Clinicopathological factors were analysed to determine the factors predicting cervical lymph node metastasis.
Results: The clinicopathologic factors significantly associated with the development of cervical lymph node metastasis were tumour size, tumour depth, differentiation (moderate, microvascular invasion, bone involvement, muscle invasion.

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e Fort I access for juvenile nasopharyngeal angiofibroma treated without angiographic embolisation

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Objective: Le Fort I for access for juvenile nasopharyngeal angifibroma.
Result: Total number of 18 male patients, age ranging from 9 to 20 years. Epistaxis was the commonest complaint of patient followed by facial deformity, nasal obstruction, ophthalmologic symptoms, patient was staged according to Fisch classification with most of the patient in stage IVb. Other parameters to be seen in the study were intraoperative blood loss and postoperative recurrence in 2 patients seen.
Conclusion: Le Fort I provides good access to the base of skull tumour without any scar or fistula formation.

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Methotrexate-associated lymphoproliferative disorder considered as neck metastatic cancer: a case report

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Objective: Methotrexate-associated lymphoproliferative disorder (MTX-LPD) has been reported these days. However, the development of MTX-LPD in the neck lymph nodes has not been previously described. We report a case of MTX-LPD considered as neck metastatic cancer.
Case: A 60-year-old man presented to our hospital with the chief complaint of a severe swelling of the submandibular area. He had a swelling for 2 months, but did not seek treatment at all. Due to rheumatoid arthritis, he had been taking MTX 16 mg/week and prednisolone 2 mg/day for 3 years.

Facial view showed asymmetric face showing a pus discharging mass in the neck. Blood tests showed slightly elevated C-reactive protein 2.0, highly elevated soluble interleukin-2 receptor (sIL-2R) 1804. MTX was discontinued at initial visit because his haematologist advised us watchful observation for 3 months considering high possibility of MTX-LPD.

2 months after MTX withdrawal, the patients condition worsened abruptly. Computed tomography revealed multiple swollen lymph nodes in the neck. Consequently, biopsy of the neck was performed to establish definitive diagnosis. The pathological diagnosis was diffuse large B-cell lymphoma, and MTX-LPD. The result of fluorodeoxyglucose-positron emission tomography was malignant lymphoma, stage I.
Results: 9 months after discontinuance of MTX and undergoing chemotherapy, the multiple swollen lymph nodes had completely disappeared.
Conclusions: Recently, the incidence of MTX-LPD may increase in oral surgery field because MTX therapy is the standard treatment for rheumatoid arthritis. This case of neck MTX-LPD suggests that the possibility of MTX-LPD should be considered even for neck metastatic cancer in the patients treated with MTX.

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Clinicopathological profile of squamous cell carcinoma presenting in a tertiary care hospital, Karachi

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Objective: To assess the frequency of neck metastasis in different staging and grading of squamous cell carcinoma (SCC).
Methods: This study carried out in a tertiary care hospital and included 60 patients from the year 2012–2015. Patients with recurrence disease and distant metastasis were excluded. 35 males and 25 females with SCC of different sites and stage were evaluated. Clinically patients were staged as stage I, stage II, stage III and stage IV and comprised of 30, 20, 2 and 8 patients, respectively. Site distribution was buccal mucosa (31 patients), retromolar region (12 patients), maxillary alveolus (8 patients), tongue (2 patients), floor of mouth (4 patients) and lip (3 patients). Right side was most common (48 patients) as compared with the left side (12 patients), while lip cancer was in the upper lip in all patients including commissure. All patients had undergone modified radical neck dissection along with excision of primary tumour with 1 cm safe margin. The tissue obtained and sent for histopathological analysis and results obtained.
Results: In stage I patients we observed that level I was positive in 25 patients, level II was positive in 4 patients and no level was positive in 1 patient. In stage II patients level I was positive in 8 patients, level II in 4 patients, levels I and II in 2 patients and no level involvement in 1 patient. In stage III patients level I, II, III, and IV was involved in both patients. In stage IV patients level II

was involved in three patients, level IV in two patients and level V in three patients. Two patients had lymphovascular invasion. Six patients had perineural invasion and 12 patients had perinodal invasion of tumour.
Conclusion: As the stage of tumour increased, the levels involved in neck also increased. In stage I, II and III patients level II was consistently involved by tumour and in stage III and IV level IV was consistently involved.

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Frequency, pattern and treatment modalities of mandibular fracture

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Objective: To compare the frequency, pattern and treatment modalities of mandibular fracture.
Methods: Study January 2012 to December 2016. Total 88 patients (61 males and 27 females) with mandible fracture.
Result: Of the 88 patients road traffic accident was the common most cause. Age of the patients ranged from 1–70 years with 32 patients in their second decade, condyle was commonest (23 patients) followed by parasymphysis in 21 patients. Open reduction was done in 49 patients and observations in 3 patients.
Conclusion: The common most cause of mandibular trauma is road traffic accident with condyle being the most common. With advances in bone plating and technique the paradigm is shifting towards the open reduction.

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Quantitative assessment of the effect of manipulation on stock miniplates applied to simple angle fractures — a laboratory study

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Background: Angle fractures, with an average incidence of about 30%, are the most frequent among all mandibular fractures. Intraoral fixation of the fractured angle became a predictable technique after the proposal of Champys lines of osteosynthesis in 1978. But the technique requires adaptation of a miniplate to the ascending ramus. The unique architecture of this region requires artistic bending of the plate into a curvilinear as well as twisted implant which is not often possible without multiple attempts and a probable compromise on the catalogue strength.
Objectives: 1. To quantitatively assess the effect of manipulation on stock miniplates applied to simple angle fractures. 2. To compare these effects against unaltered (U) and pre-bent (P) plates.
Methods: Three versions of a four-holed straight miniplate with gap (2 mm diameter) namely the U, the manually bent (M) and the P were compared. These plates were subjected to linear and torsional forces using an Instron 3365 servohydraulic mechanical testing unit.
Findings: Our investigation showed statistical differences in three parameters: yield load (U, 686.99 N; P, 684.83 N; M, 672.54 N), stiffness (U, 43.24 mN-m/deg; P, 36.12 mN-m/deg; M, 30.96 mN-m/deg), and yield rotation (U, 12.37°; P, 19.38°; M, 25.49°). These results indicate increased biomechanical stability in U plates, closely followed by P plates.
Conclusion: The manipulation of stock miniplates causes irreversible damage to their biomechanical architecture, leading to unpredictable functional recovery and plate fractures.

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Vascular anomalies of head and neck

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Background: Vascular malformations affect the head and neck in almost 50% of the patients. Usually they become evident during the childhood, some conditions like pregnancy, trauma, puberty may trigger the growing of the lesion.
Objectives: We present our experience based on the treatment of more than four thousand cases of vascular malformation and our protocol of treatment. Interdisciplinary collaboration is required to understand and treat patients with the broad spectrum of vascular anomalies. Treatment choice is difficult and many times the only goal is control of shunting and palliation of the clinical manifestations.
Methods: We present two patients with life-threatening bleeding, functional and cosmetic deformity and progressive growth which were treated with radical surgery and previous embolisation. The first patient had an arteriovenous malformation in the frontal area that affect orbit, nose, frontal encephalic lobe and cheek. Our concern about an intracranial bleeding, that would have been mortal, obliged us to operate. The second patient had an arteriovenous malformation over the parotid gland area which affected the facial nerve. We decided to remove completely the malformation and reconstruct the defect with anterolateral free flap at the same time we performed a nerve graft to reconstruct the facial nerve.
Conclusions: Vascular malformations require a multidisciplinary approach, It is crucial to do a precise diagnose to treat them accordingly. In severe cases of venous or arteriovenous malformation that it is possible to remove the malformation completely, surgery is a good option, since they are typically progressive and spontaneous regression is almost never seen.

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Le Fort I approach for excision of odontogenic lesions near posterior maxillary sinus wall cases series

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Enucleation alone and marsupialisation (Partsch operation) followed by enucleation have been the most common modalities for complete eradication of jaw bone cysts. However, it is sometimes difficult to do so when the location of the lesion cannot be easily accessed. Although Le Fort I osteotomy is a well-known procedure for correction of dentofacial deformities, it has also

been applied in removal of skull base and midface tumours by craniomaxillofacial surgeons since 1989.

We present four cases of surgical excision of benign odontogenic lesions near posterior maxillary sinus wall using Le Fort I approach. The first case is of an 18-year-old female who suffered from recurrent keratocystic odontogenic tumour at right posterior maxilla after conservative Partsch-I and II operation. The second case is of a 24-year-old female with recurrent infection of dentigerous cyst at right posterior maxilla after Partsch-I operation. The third case (20-year-old female) and fourth case (47-year-old male) were dentigerous cyst at posterior maxillary area, both surgically removed without preceding Partsch operation.

This approach offered clear surgical field and effective access to help complete removal of pathologic lesions. Routine plates fixation at canine pillar/zygomatic buttress and application of short term light guiding elastics rendered uneventful healing of osteotomy sites and stable occlusion with minimal postoperative morbidities.

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Induction training of dental core trainees in oral and maxillofacial surgery in the United Kingdom

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Background: Obtain training in oral and maxillofacial surgery (OMFS) as junior trainees (used to be called senior house officers) in the United Kingdom (UK) require hospital posts. Trainees have to learn on the job with steep learning curves as hospital attachment during dental training is reducing. Theoretical and practical induction courses have become popular among dentally qualified junior trainees in OMFS.
Basic Surgical Skills or 'Dentist on the Ward' Courses: Two all-day theoretical and hands-on practical courses covering principles in communication, OMFS career structure, accident and emergency, trauma, hospital admission, consent, fluid balance, fascial space infection and others. Work stations in arterial stab, intravenous cannulation, blood culture, tracheostomy tube change, nasogastric tube insertion, ophthalmoscope, otoscope, suturing skills, urinary catheterisation, electrocardiograph, imaging of facial skeleton, plating and free flap monitoring. In our courses at Royal London Hospital for more than 60 dental core trainees in OMFS in the London area, we also provide them our book 'Dentist on the Ward' for background reading.
Feedback: Over the last 21 years in over 50 courses (>20 surgical skills courses and >30 Dentists on the Ward courses), feedback from participants has been helpful in confirming the value these induction courses and in improving the content and work stations of these courses.
Conclusions: Structured induction theoretical and hands-on practical training is essential to dentally qualified junior trainees in OMFS. Some trainees are enthused to follow the career of OMFS by obtaining a medical qualification and subsequent specialist OMFS training.

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Oral and maxillofacial surgery in Seychelles

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The Seychelles is an archipelago of islands lying East of the African Mainland in the Indian Ocean and is part of the African Union. With a population of approximately 100,000 the Government provides 100% primary health care. As with the majority of specialities, Oral and Maxillofacial Surgery is mainly provided in Victoria the capital city situated on the main island Mahé, and providing support to smaller dental units on the remaining islands.

The major bulk of the work carried out by our unit is related to trauma and dentoalveolar surgery followed by benign pathologies and minor dentofacial deformities. Visiting specialists perform surgeries for congenital abnormalities and malignancies. Cases requiring complex management are sent overseas.

The Unit continues to strive towards all round excellence with the ultimate goal of providing treatment across all modalities to the population.

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Comparative study of analgesia between bupivacaine 0.25% and 0.5% in cases of third molar removal under general anaesthetics

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Objectives: Main purpose of study was to compare the effectiveness and duration of action of two concentrations of bupivacaine with adrenaline in the patients undergoing the surgical removal of all four third molars under general anaesthetics for postoperative pain.
Methods: Thirty patients each group underwent surgical removal of the four wisdom teeth using 0.5% and 0.25% bupivacaine. Visual analogue scale chart was used to document the severity of pain immediately in the recovery, 2 h after before discharge, and 24 h postsurgery were recorded. Differences were assessed with Box and Whisper plot and Student's *t* test.
Results and Conclusion: Comparative study showed higher concentration 0.5% was marginally better in pain control in recovery after immediate postop but after 2 h and 24 h there was no significant difference in degree of pain.

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Reorganisation of the somatosensory cortex after partial glossectomy: why isn't there a phantom pain?

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Objectives: First-line therapy of oral squamous cell carcinoma (OSCC) of the tongue is resection of the carcinoma according to a partial glossectomy. The tongue, with its multiple functions and

broad innervation, is situated as a large area in the somatosensory cortex of the human brain. Extremities also maintain a large area of the brain's cortex. After amputations of extremities, phantom pain has often been described. After (partial) amputations of the tongue phantom pain has never been observed.
Methods: The tongues of 10 patients after partial glossectomy due to carcinoma and those of 10 healthy controls were electrically stimulated on both sides below the pain-threshold by an individual electronic sensor. Blood-oxygen-level-dependent (BOLD) magnetic resonance responses were then recorded.
Results: In healthy individuals bilateral signals in the expected cortical regions were registered, whereas patients after partial glossectomy only showed a response in the right cortical hemisphere corresponding to their handedness. These signals were weaker and compared to the healthy individuals localised more medially.
Conclusion: The data suggest a cortical reorganisation of the adult human brain in response to a partial glossectomy with deafferentation and neuronal change. The BOLD signals in the more medially located cortical regions during the stimulation of the tongue may also suggest the existence of another area representing the tongue in the human brain which could correspond with the handedness. The unmasking of neuronal structures during the stimulation of the tongue may represent the important joint work of the tongue and the hand for food intake.

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Embryonic mouse submandibular salivary gland morphogenesis and the Wnt/beta-catenin signal transduction pathway

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Background: *Ex vivo* organ culture of mouse submandibular salivary gland (SMG) has been used as a model for studying of branching morphogenesis, a process that is reiterated in multiple-organ development. The Wnt/beta (β)-catenin signalling pathway mediates critical functions in cell fate determination and differentiation. However, its functions during branching morphogenesis of SMG have remained unclear.
Objectives: We were interested in whether the Wnt/β-catenin signalling pathway regulates the process of branching morphogenesis of embryonic SMG.
Methods: Embryonic day 12.5 (E12.5, plug day = day 0 of gestation) mouse SMGs were harvested and cultured *ex vivo*. The spatial and temporal expression pattern of β-catenin was studied by whole mount immunofluorescence. LiCl, acting through inhibiting GSK-3-β enzyme to mimic Wnt/β-catenin signalling, or Dkk-I protein, a specific inhibitor of this signalling pathway, was added exogenously to culture mediums to investigate whether the signalling pathway was active during the branching process of SMG.
Findings and Conclusion: The developmental expression of β-catenin in pseudoglandular (∼E13.5), canalicular (∼E14.5) and terminal bud (E16.5) stage SMGs were investigated and we found a significant 25% decrease in transcript levels between the canalicular and terminal bud stages. E12.5 SMGs were cultured *in vitro* for 72 h. LiCl or Dkk-I protein was added exogenously to SMG culture mediums. And results of significantly inhibited and stimulated end buds formation were found respectively. So we concluded that the activity of Wnt/β-catenin signalling pathway plays an important role in regulating the process of the embryonic mouse SMG's branching morphogenesis in early stages.

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The Scandinavian osteonecrosis of the jaw cohort study — what have we learned during the first five years of research collaboration?

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Background: The Scandinavian ONJ (osteonecrosis of the jaw) study has since 2011 registered patients with ONJ in Norway, Sweden and Denmark. Uniform data are collected into three national databases, with contribution from oral and maxillofacial surgeons and other clinicians involved in care of these patients.
Objectives: To uniformly register all ONJ cases in patients treated with antiresorptive drugs for osteoporosis and malignant diseases in Norway, Sweden and Denmark from 2011 to 2019.
Methods: The study utilises a research infrastructure set up for an ongoing Scandinavian epidemiologic study of incidence rates of ONJ among cancer patients treated with antiresorptive agents, in 2011 and 2019. The ONJ databases include patients with cancer and osteoporosis treated with antiresorptive drugs.
Findings: By August 2016 the three national databases enrolled 797 ONJ cases: Norway (245), Sweden (211) and Denmark (341). The number of cases among patients with osteoporosis and cancer were 384 (48%) and 413 (52%), respectively. Among patients with cancer, majority of the ONJ cases were among patients with cancers of breast ($n = 160$, 40%) or prostate ($n = 123$, 30%).
Conclusion: The Scandinavian ONJ cohort study is a research collaboration in which uniform data on patients with ONJ related to antiresorptive treatment are prospectively collected on a large-scale, with contribution from oral and maxillofacial surgeons and other clinicians. The Scandinavian ONJ cohort is an important tool for future international studies of outcomes in patients with ONJ.

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Peer teaching amongst junior staff in oral and maxillofacial surgery — our experience

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Background: The benefit of peer assessment is well established. Many individuals have reservations about discussing minor cases with their senior colleagues however they are content to openly examine and debate the same issues in a peer group setting.

Training within surgical specialities is largely gained through clinical experience. The multitudes of clinical cases encountered by each senior house officer (SHO) often vary considerably in nature. When combined, this variety provides a rich pool of experience and presents an invaluable opportunity for both teaching and learning amongst junior staff.
Objective: The objective of this project is to assess the merits of post on-call case analysis amongst junior staff in our oral and maxillofacial department.

Methods: The on-call duties of an oral and maxillofacial SHO are discharged in the emergency department, in theatre and on the surgical and medical wards of the hospital. At weekly intervals following on-call activity an SHO presents an interesting or challenging case they encountered. A peer assessment proforma was created to record parameters of the discussion. Key conclusions were documented for future reference.
Results: A number of themes have arisen as a result of this learning initiative including best practice, current guidance, clinical technique, interdepartmental relations, patient safety, medicolegal concerns and accurate communication. We recorded the main outcomes of each session on a Microsoft® word document, which could be readily accessed and revisited at a later stage.

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Assessment of postoperative complications using Estimation of Physiologic Ability and Surgical Stress and Acute Physiology and Chronic Health Evaluation II in patients undergoing oral and maxillofacial surgery

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Background and Objectives: The prediction of postoperative complications is important for oral and maxillofacial surgeons. We herein aimed to evaluate the efficacy of the Estimation of Physiologic Ability and Surgical Stress (E-PASS) and Acute Physiology and Chronic Health Evaluation (APACHE) II scoring systems for predicting postoperative complications in patients undergoing oral and maxillofacial surgery.
Methods: Thirty patients (22 males, 8 females; mean age, 65.1 ± 12.9 years) who underwent major oral surgeries and stayed in the intensive care unit for postoperative management were enrolled in this study. Postoperative complications were discriminated according to the necessity of the therapeutic intervention by the Medical Department according to the Clavien–Dingo classification. E-PASS and APACHE II scores as well as laboratory test values were compared between patients with/without postoperative complications.
Findings: Postoperative complications developed in seven patients. The comprehensive risk score (CRS; 1.13 ± 0.24) and APACHE II score (13.0 ± 2.58) were significantly higher in patients with than in those without postoperative complications ($P < 0.01$, $P < 0.05$, respectively). The CRS showed an appropriate discriminatory power for predicting postoperative complications (area under the curve, 0.814). Furthermore, a correlation was detected between APACHE II scores and postoperative data until C-reactive protein levels decreased to <1.0 mg/L ($r = 0.43$, $P < 0.05$).
Conclusion: The E-PASS and APACHE II scoring systems were both shown to be useful for predicting postoperative complications after oral and maxillofacial surgery.

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Antibiotic resistance in severe orofacial infections

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Background: Questions regarding antibiotic resistance loom large in an era when empiric therapy is commonly employed and antibiotic prescribing is commonplace.
Objectives: To assess the antibiotic resistance profile in severe orofacial infections treated at a single institution between 2009 and 2014. Factors contributing to resistance were studied. The resistance profile was compared to a cohort treated a decade earlier. The effect on in-hospital course was studied.
Methods: This is retrospective cohort study. Inclusion criteria were: orofacial infections requiring hospitalisation, surgical drainage and availability of complete records. Incomplete data and outpatient cases were excluded. 60 patients were identified. Demographic data, medical and dental history and hospital course details were obtained. The data was analysed statistically.
Findings: The cohort was 60% male with mean age of 45 years. Average hospital stay was 5.5 days. Penicillin resistance was found in 32.5% of aerobes and clindamycin resistance in 29.3%. *Streptococcus viridans* and staphylococci showed significantly increased resistance to both clindamycin and erythromycin compared to controls. Younger age, surgical history and number of aerobes showed significant correlation to antibiotic resistance. Changes in antibiotics, repeat surgical drainage and increased blood urea nitrogen (BUN) levels correlated with longer hospitalisation.
Conclusion: A significant increase in clindamycin and erythromycin resistance was demonstrated for strep viridans and staph species. Age, past surgical history and number of cultured aerobes were associated with antibiotic resistance. Resistance did not correlate significantly to prolongation of hospital stay. Rather, BUN, need for change in antibiotics and repeat drainage were associated with longer hospitalisation.

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Are there predisposing factors for obstructive salivary glands pathologies?

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Objectives: Investigation of the predisposing factors that might be related to obstructive salivary glands pathologies.
Methods: The medical charts of 321 patients that were diagnosed with obstructive symptoms of their salivary glands, between the years 2010–2014, were analysed. A comparison was done between two groups of patients. The 1st group of patients suffered from obstructive symptoms in their salivary glands due to sialolithiasis and the 2nd group of patients suffered from obstructive symptoms in their salivary glands due to obstructive pathologies in their ductal system other than sialolithiasis. The parameters that were statistically analysed were: age gender, medical condition and habits as smoking and alcohol consumption.
Results: Out of 321 patients, 156 patients suffered from sialolithiasis as an obstructive cause. 165 patients suffered from other obstructive pathologies as stenosis polyps or blocking mucus plugs. There were more males than females in the sialolithiasis group (51.9% versus 36.4%, $P = 0.007$). Patients who suffered

from sialolithiasis have more tendency to smoke than patients without sialolithiasis (45% versus 27.5%, $P = 0.001$). We found a positive correlation between systemic condition as nephrolithiasis and cholelithiasis and sialolithiasis. Positive correlation was found also between reflux or thyroid disease and stenosis. No correlation was found between alcohol consumption an obstructive condition.
Conclusions: The aetiology and predisposing factors for obstructive salivary gland pathologies are still ambiguous. According to this study there is a statistically significant tendency for male or smoking patients to develop sialolithiasis more than stenosis in the salivary glands.

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Interventional sialendoscopy for removal of salivary glands stones in one treatment session without fragmentation

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Objectives: Discuss our experience with interventional sialendoscopy for the treatment of salivary glands stones.
Methods: A retrospective analysis of 140 patients that were treated by sialendoscopy due to salivary gland stones, between the years 2010 and 2014 at the department of oral and maxillofacial surgery in Rambam health care campus was done.
Results: 15% of the stones were located in the parotid gland and the other 85% in the submandibular gland. 30% of the patient showed more than one stone in the duct. 64 cases were treated by pure sialendoscopy and 76 cases were treated by sialendoscopy combined approach, fragmentation was avoided. Only 6 patients suffered from major postoperative complications as a lingual neural damage or the necessity for gland removal. No correlation was found between stones size, stone location in the duct or multiple stones in the duct and complications incidence. No correlation was found between complications and the sialendoscopy technique that was implemented (pure versus combined approach).
Conclusions: Sialendoscopy is a minimally invasive organ sparing technique that with the aid of the combined approach assisted surgical technique can treat safely salivary gland stones in one treatment session without a preliminary fragmentation.

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Prognostic value of glucose transporter-1 expression in oral squamous cell carcinoma: a PRISMA-compliant meta-analysis

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Background: A variety of studies have evaluated the correlation between glucose transporter-1 (GLUT-1) expression and prognosis of oral squamous cell carcinoma (OSCC), however, the results were inconsistent and inconclusive. A meta-analysis was performed to assess the prognostic significance of GLUT-1 in OSCC.
Methods: Electronic databases of PubMed, EMBASE and Web of Science were searched for relevant studies till July 2016. Odds ratio (OR) and 95% confidence interval (CI) were pooled to evaluated the relationship between GLUT-1 and clinical features and hazards ratio (HR) and 95% CI were combined to measure the effect of GLUT-1 on overall survival (OS). Meta-analysis was carried out using STATA version 12.0.
Results: A total of 13 studies with 1301 subjects were included for meta-analysis. The pooled data showed that high GLUT-1 expression was associated with advanced tumour stages ($n = 7$; OR = 2.99; 95% CI, 2.01–4.46; $P < 0.001$), higher tumour grade ($n = 5$; OR = 3.34; 95% CI, 1.12–9.94; $P = 0.031$), tumour size ($n = 5$; OR = 3.36; 95% CI, 2.04–5.51; $P < 0.001$), lymph node metastasis ($n = 5$; OR = 3.15; 95% CI, 1.89–5.25; $P < 0.001$), tobacco use ($n = 3$; OR = 2.18; 95% CI, 1.18–4.01; $P = 0.013$) and distant metastasis ($n = 2$; OR = 3.06; 95% CI, 1.19–7.9; $P = 0.02$). Furthermore, increased GLUT-1 expression was also correlated with shorter OS ($n = 8$; HR = 1.88; 95% CI, 1.51–2.33; $P < 0.001$). No significant publication bias was detected in this meta-analysis.
Conclusions: GLUT-1 overexpression was in connection with aggressive clinical features and worse OS in OSCC. However, further studies are still needed to verify whether GLUT-1 could serve as a prognostic biomarker for OSCC.

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Keratocystic odontogenic tumour and marsupialisation: a preliminary result of 19 cases

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With the plethora of recent literature suggesting lesser invasive treatment modalities for keratocystic odontogenic tumour (KCOT), we publish our observations in 19 cases treated with marsupialisation at first stage followed by removal of lesion and overlying mucosa at the second. The age of patients ranged from 24 to 47 years with a predominant male predilection. All these cases were diagnosed by an incisional biopsy. For mandibular cystic tumours, a window was created in the alveolus and a sterile radiopaque tube was inserted and sutured in place. Maxillary lesions were accessed via vestibular incision and nasal antrostomy was performed following which antiseptic paraffin soaked ribbon gauze was placed and tailed into the nasal cavity for removal at three weeks. After a mean follow-up of five months (range, four to nine months), the remaining lesion was removed along with the overlying mucosa (for mandibular lesions only). These cases were further followed on three monthly regular visits (eight months to four and half years). Bone fill as well as recurrence was assessed. In two cases, the lesion recurred and was enucleated and peripheral ostectomy was performed. In one of these recurring lesions, transformation into plexiform ameloblastoma was recorded. Although the follow-up period is limited, the results predict a promising response.

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Decompression of keratocystic odontogenic tumours: an effective treatment strategy based on clinical evidence!

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Background: Keratocystic odontogenic tumour (KCOT) is a pathological entity with a significant destructive potential in oral and maxillofacial region. Aggressive treatments were routine till recently because of its high rate of recurrence and the degree of destruction it had already caused. These aggressive treatments usually involved enucleation of cysts leaving behind a very weak bony scaffold and at times resections that had to be reconstructed subsequently. Recently there has been an increased interest of the surgeons in decompression of these cysts to restrict their destructive activity causing significant decrease in the size of these lesions which are enucleated at a later stage without causing much morbidity.
Objectives: To assess the role of a modified decompression procedure for preservation of bone and vital structures in large KCOTs.
Methods: A total of 14 patients with large biopsy proven KCOTs were followed clinically after a modified decompression procedure. Two patients had multiple KCOTs in both jaws while remaining 12 had single cystic lesions in mandible. All patients were followed-up for a period of 8–20 months (depending upon the response of the decompression procedure) after which they underwent routine enucleation procedure while safely preserving the bone and teeth involved.
Findings: Decompression resulted in significant bone repair around the cystic lesion in all 14 patients. Three patients had the complication of dislocation of decompression device and had to be reoperated to make the openings patent again. All patients were safely treated with enucleation after significant reduction in size of the lesion.
Conclusion: Decompression of large KCOTs is an effective treatment method for the management of lesion that have caused significant bone destruction on primary presentation.

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Ultrasound guided botulinum toxin injections into salivary glands: minimal invasive and safe treatment for drooling

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Drooling, the unintentional loss of saliva from the mouth, creates major hygienic and psychosocial problems. It may be caused by excessive production of saliva (due to antipsychotics and cholinergic agonists) or by poor swallowing function (neurologic diseases, post-laryngectomy patients, etc.). The prolonged excessive drooling can cause various health conditions ranging from perioral skin infections to lung aspirations.

Traditionally, drooling was treated by pharmacologic agents, holding many adverse effects while presenting questionable success rate. Surgery was considered in recalcitrant cases or in cases with intolerable drug reactions, with obvious morbidity and mortality issues. Lately, the use of botulinum toxin injected into salivary gland has been proposed as another treatment method for drooling.

Botulinum toxin was introduced into medicine 30 years ago and became the first bacterial toxin used as a drug. It is a potent neurotoxin that temporarily inactivates release of acetylcholine from nerve endings and thus blocks nerve stimuli to target areas. Only few publications explored the efficacy and safety of botulinum toxin injections into salivary glands as a treatment for drooling.

This presentation describes our experience with ultrasound-guided intraglandular injections of botulinum toxin into the submandibular and parotid glands for the treatment of drooling. During a 1-year period, twenty patients were treated using this technique. We describe patient's characteristics, operative technique, outcome of treatment, onset and duration of effect, and adverse events.

Ultrasound-guided intra-glandular botulinum toxin injection is a simple, safe, and efficacious therapeutic modality that should be considered by oral and maxillofacial surgeons treating patients with drooling.

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Digital implant data customisation and creation of virtual reference points in orbital trauma planning and navigation-assisted surgery — a case series

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Background: Navigation-assisted orbital surgery has been shown to improve surgical outcome. Implant-oriented navigation technique has also been described. However, introduction of physical markers in prefabricated implant may inadvertently cause modification and suboptimal placement. We describe a method of implant data customisation and creation of virtual reference points during surgical planning in navigation surgery.
Methods: From October 2015 to June 2016, twelve patients who sustained orbital blowout fracture were treated using this method. Uninjured contralateral orbit was used as reconstruction reference by using iPlan CMF (Version 3.0, BrainLab, Germany). The optimal implant position and size were determined to achieve best possible fit to the defect area, followed by implant data customisation using CloudCompare (Version 2.6.1, Cloudcompare). Following data import, three virtual reference points in triangular fashion were created for the implant to serve as surgical reference points. The orbit was approached via a subciliary incision. Physical implant was carefully pre-adjusted to exact its virtual manipulation prior to the surgery and positioned under all four multiplanar views. Postoperatively, the accuracy of implant placement was assessed by image fusion. Clinical assessment for diplopia and enophthalmos was also carried out.
Findings: Image fusion showed an ideal positioning and consistent surgical reproduction according to the virtual planning. Slight overcorrection in the anterior extension below the globe is seen in a few cases. However, its clinical correlation cannot be established. No patients developed any untoward diplopia and enophthalmic complications.
Conclusion: Digital implant data customisation and creation of virtual reference points in orbital trauma planning may further improve orbital navigation-assisted surgery.

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The mentor survey of oral and maxillofacial surgery senior house officers in South Wales

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Background: Mentoring allows the sharing of professional and personal skills, and development by encouragement, constructive comments, mutual respect, as well as a will to learn and share so successes and failures are evaluated. The Royal Australasian College of Dental Surgeons (RACDS) has an oral and maxillofacial surgery (OMFS) mentoring scheme that may be adaptable to training in the United Kingdom.
Objectives: Evaluate the mentorship experience of senior house officers (SHOs) in South Wales (SW) using a validated survey technique and the 6 MENTOR domains (D1-6) of the RACDS.
Methods: An online questionnaire was sent to SHOs in three SW Hospitals. Using a Likert scale to grade their mentorship experience with each consultant. Each SHO-consultant mentorship experience was regarded as a consultant-SHO-interaction (CSI) [$n = 56$].
Domains: D1 — match trainees with role models, D2 — expand trainee's potential, D3 — network with professional community, D4 — translate teaching into practice, D5 — offer professional guidance and D6 — reinforce learning in clinical environment.
Results: Presented as % strongly disagree (SD), disagree (D), unsure (U), agree (A) and strongly agree (SA). D1 — SD 2%, D 28%, U 32% and A 38%; D2 — SD 2%, D 6%, U 9%, A 79% and SA 4%; D3 — D 42%, U 14% and A 44%; D4 — D 6%, U 29%, A 63% and SA 2%; D5 — SD 2%, D 29%, U 10% and A 59%; and D6 — SD 2%, D 10%, U 2%, A 84% and SA2%.
Conclusions: Educational and clinical exposure perceived satisfactory but inadequate role modelling and mentorship; need for incremental exposure to more complex clinical scenarios.

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Investigating the effect of a nasal decongestant on post-adenotonsillectomy respiratory complications in paediatric patients with obstructive sleep apnoea

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Background: The risk of postoperative respiratory morbidity increases when the indication for paediatric adenotonsillectomy is obstructive sleep apnoea (OSA). Otrivine (xylometazoline hydrochloride) is an alpha-adrenergic agonist that constricts the nasal blood vessels, thereby decongesting the mucosa of the nose and neighbouring regions of the pharynx.
Objectives: The aim was to test the effect of intraoperative Otrivine (xylometazoline hydrochloride), a nasal decongestant, on postoperative respiratory morbidity in children undergoing adenotonsillectomy for obstructive sleep apnoea (OSA).
Methods: Data was prospectively collected in the first hour post-surgery from paediatric patients undergoing adenotonsillectomy for OSA. 24 patients were given intraoperative Otrivine and 24 patients were not.
Findings: Without Otrivine: adenoidectomy technique was suction diathermy (33%), coblation (46%), curettage (21%). Adenoids were grade 2 (42%), 3 (50%), 4 (8%). Tonsillectomy technique included bipolar diathermy (33%), coblation (46%), cold steel dissection/ties (21%). Tonsils were grade 2 (25%), 3 (58%), 4 (12.5%). Simple medical intervention (oxygen supplementation/suctioning) was required in 11 patients (46%), intermediate intervention (nasopharyngeal airway) in 3 (12.5%) and major intervention (intubation/PICU) in 3 (12.5%).

With Otrivine: adenoidectomy and tonsillectomy technique was coblation (100%). Adenoids were grade 1 (21%), 2 (33%), 3 (46%). Tonsils were grade 1 (4%), 2 (17%), 3 (42%), 4 (42%). Simple intervention was required in 18 patients (75%), intermediate intervention in 1 (4.2%) and major intervention in 0 (0.0%).
Conclusion: Intraoperative Otrivine reduced intermediate and major interventions in theatre recovery paediatric patients with OSA. Intermediate and major interventions were associated with higher adenoid/tonsil grading.

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Deep neck infections in southern Israel — our experience in Soroka Medical Center

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Background: Deep neck infections (DNI) mean infections in the fascial planes of the neck with abscess formation or cellulitis. The most common primary source of DNI is odontogenic (38.8–49%); the most dramatic appearance is Ludwig's angina. Clinical manifestation of DNI includes odynophagia, dysphagia, trismus, dysphonia, dyspnoea and variety of other inflammatory symptoms. DNI is an emergency; it includes a management of the airway, immediate surgical treatment for drainage of infected spaces, removal of the infection source and long-term appropriate antibiotic treatment.
Objectives: The aim of our work is to demonstrate the hazardousness of some dental community treatment, provide tools for identification of critical turning points in the life treating condition and identification of the proper time to refer the patient for continue treatment.
Methods: We describe four cases of DNI from our experience. The patients were in range of ages, both genders and different ethnicities.
Findings: Each patient was individually unique in their clinical manifestation but had common community dental doctors delay.
Conclusion: DNI are serious and potentially life threatening infections of odontogenic origin with a significant morbidity despite that the prevalence and the complications incidence of it has been reduced with the new technology in the diagnostic filed and widespread availability of antibiotics. It should be treated on emergency basis, early diagnosis is crucial. It is essential for dentists to know the anatomy of head and neck deep spaces that are likely to be affected so they would be able to prevent it on time.

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Excision of arteriovenous malformation of lower lip without embolisation

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Generally, vascular malformations can be categorised into low-flow lesions and high-flow lesions according to their blood flow volume. Arteriovenous malformations in the extracranial region are rare, and haemodynamically they are generally high-flow lesions.

Presently, the mainstay of treatment of an arteriovenous malformation are embolisation, surgical excision or a combination of both. Preoperative endovascular embolisation is widely accepted, but there are limitations to the treatment. Severe haemorrhage as well as difficult reconstruction is frequently encountered.

We reported a case of arteriovenous malformation of the lower lip, which was empirically removed by complete excision and reconstruction with a nasolabial flap without preoperative embolisation in a 52-year-old woman. There were no procedure related complications and morbidity. Lip functions were preserved and cosmetic results were excellent.

Our opinion is that these lesions can be excised without preoperative angiogram and/or embolisation as long as they are accessible with predictable haemostasis control, well circumscribed and do not have clinical evidence of extensive collaterals.

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Versatility of modified neck incision

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Background: Neck incisions has undergone various. All the modifications where done to improve the exposure of surgical field as well to reduce the complication rates. The rationale for neck dissection has undergone a major change reducing it to selective levels based on the primary tumour. Based on this rationale modified neck incision can be used in various situations.
Objective: To discuss the versatility of modified apron incision with its advantages and applications.
Methods: The modified apron incision was used for all the patients undergoing neck dissection for clearance of metastatic lymph nodes up to level 4. The lymph nodes were staged and removed from level 1 to level 4 in descending order. The same incision was used in a case of carotid body tumour.
Findings: The exposure of the surgical field was good enough and wound healing was uneventful in all the cases. Wound complications where very minimal limited to scar which is aesthetically acceptable and hidden. Even in post-irradiated neck the wound healing was uneventful. Above all the incision closure was rapid and time saving.
Conclusion: Modified apron incision is a highly versatile approach for neck dissection especially for staged neck dissections. Even if combined with other incisions of face the vascularity is not compromised and wound dehiscence is nil in our experience. The same incision can be used for any other pathology in neck with minimal acceptable scar.

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Comparison of single versus double noncompression miniplates in the management of subcondylar fracture of the mandible

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Objective: To compare the functions and complications of subcondylar fracture after fixation with single and two noncompression miniplates.
Methods: Total 30 patients who required open reduction of a subcondylar fracture of mandible were selected in the study. Randomly divided into two groups of 15 patients each. Group A for single plate and group B for two plates. The patients were assessed for malocclusion, lateral deviation, mouth opening, infection, plate bending, plate removal, facial nerve function and time taken in the surgery. All parameters were statistically using Chi squared test.
Result: Of the 30 patients inadequate reduction was noticed in one patient in group A. In group A, screw loosing occurred in one patient followed by infection and need for removal of the plate. Plate bending occurred in one case in Group A. When two plates were used no screw loosing or plate bending was observed in group B.
Conclusion: Two plates for subcondylar fracture represent the best solution to obtain osteosynthesis but needs further evaluation as our number of patients and follow-up period was short in our study.

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Effect of application of honey in chemoradiation-induced mucositis and to assess its clinical benefits in improving quality of life in patients of head and neck cancer

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Background: The cytotoxic effects of chemoradiation, in addition to their intended effects on cancer cells, unfortunately extents to normal tissue as well, such as gastrointestinal mucosa and bone marrow. This is mainly brought about by the oxidative damage caused by the generation of free radicals.

For the head and neck cancer patient, the most crippling ill-effect of chemoradiation is oral mucositis. In addition to being a potentially dose limiting complication of chemoradiation, oral mucositis lends a devastating blow to patient's daily activities and brings about marked reduction in their quality of life (QoL).

Resurgence in the use of honey for wound management coupled with research into its excellent antioxidant and antiseptic profile has urged some researchers to investigate its role in amelioration of radiation mucositis.

Investigation into the viability of honey as a therapeutic agent for chemoradiation-induced mucositis and to find whether it

causes quantifiable improvement in QoL forms the crux of this study.
Methods: A total of 50 patients of head and neck cancer (25 cases, 25 controls) were enrolled in the study and their QoL was recorded, at regular intervals during radiotherapy. The study group received oral honey along with radiotherapy while the control group received standard oral hygiene instructions only.
Results: The QoL scores were significantly better in the study group compared to controls after completion of radiotherapy.

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An overview of microvascular diversion and bypass techniques for salvage of lethal and sublethal intracranial neurovascular lesions — a collaborative maxillofacial/neurosurgical enterprise

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Background: Over the past 5 decades developing open cranial access, improved imaging and vascular contrast studies recognise conditions with lethal or life limiting effects.

Aneurysm, complex vascular malformation, giant aneurysm (>2.5 cm diameter), Moya Moya disease and other conditions can be managed by import of blood supply locally, by vessel diversion, or by distant harvested artery interpositional bypass. Following the groundwork of Tulleken, Spetzler and more recent exponents, we show how a collaborative team approach and utilising craniotomy, orbitozygomatic osteotomy, sophisticated imaging techniques, computed tomography navigational localisation of vessels, artery harvest and the skills in neck access and microvascular anastomosis brought by maxillofacial expertise facilitate our neurosurgical colleagues' surgical treatment of these conditions.
Methods: We overview the indirect and direct blood supply augmentations to the neuroaxis, in management of the progressive ischaemic injury of Moya Moya disease. Valuable lessons have been learned in approach, task allocation and coordination, brain protection with anaesthetic agents and cooling techniques, and subtle improvements in craniotomy design, vessel protection during harvest and prevention of dangerous vasospasm during interpositional bypass.

Improved tunnelling of bypass grafts from cranial cavity to neck vessels is shown, with details of the anastomosis sequence and tips on maintaining critical patency — and some 'spinoff' developments useful in head and neck reconstructive microsurgery which have resulted are outlined.
Results: 32 procedures; 23 low-flow, one PICA to PICA, one unsuccessful.

Nine high-flow interpositional bypasses — eight radial artery, one saphenous vein, one occluded and one death perioperative (pre-bypass).

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New nanoantioxidant approach to improve healing of oral surgery wounds: a randomised, pilot placebo-controlled, double-blind clinical trial

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Background: The wound healing (WH) is a part of any surgical procedures. Oxidative stress plays important roles in WH. Antioxidants can be very important weapon in the fight against inflammation. Nanotechnology produced antioxidants can surpass the moist intraoral environment, enter the cells and support healing of oral surgery wounds.
Objectives: The aim of this pilot study was to compare the efficacy of newly nanoantioxidant gel (NAG) with a placebo gel (PG) in improving of the WH after surgical incisions in the oral cavity. The hypothesis was that no difference was present in WH between the both groups. The present study is designed according to the CONSORT rules.
Methods: Using MinimPy software for allocation through minimisation ninety patients after suturing were instructed to use either NAG or PG applying three times daily. Outcomes measured were: assessment of WH on third and seventh day postoperatively with Modified index score of Landry and the index used by Galli. Reproducibility was assessed by evaluating agreement between two independent operators using the weighted Kappa statistic.
Results: There were statistically significant differences for wound healing between the groups assessed clinically by the blinded operators in the Landry index after the third day and in the index Galli after the third and seventh day. There was a substantial agreement between operators in the wound scoring. No complications or side effects encountered.
Conclusion: The new formulated gel does appear that can improve oral wound healing particularly in the first three days after suturing.

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Mandibular advancement for patients with obstructive sleep apnoea syndrome: a comparison of bilateral mandibular distraction osteogenesis and bilateral sagittal split osteotomy

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Background: Maxillomandibular advancement (MMA) is a well-established surgical treatment for patients with obstructive sleep apnoea (OSA). The advancement of the mandible could be achieved by bilateral sagittal split osteotomies (BSSO) or bilateral mandibular distraction osteogenesis (BMDO). It is important to know their treatment outcomes, effectiveness of both techniques.
Objectives: This study aims to evaluate effectiveness of both techniques in terms of airway functions, skeletal stability, changes in airway dimensions, clinical morbidities and complications, neurosensory disturbance and temporomandibular joint functions, facial aesthetics and quality of life (QoL).

Methods: Eighteen subjects with moderate to severe OSA were recruited in a randomised controlled trial and allocated in the BMDO and BSSO groups for mandibular advancement in MMA.
Findings: Airway functions were significantly improved in terms of reduction in apnoea/hypopnoea index and increase lowest oxygen saturation. The overall success rate was 88.9%. Patients with BMDO had less skeletal relapse in large advancements of 10–15 mm (6.7% versus 13.6%) but they experienced more complications and morbidities. The degrees of neurosensory disturbance and associated functional impairment were similar and were reduced to near-normal levels. All patients reported improved facial aesthetics after MMA and the general-health related and OSA-specific quality of life were significantly improved.
Conclusion: Maxillomandibular advancement with BMDO or BSSO is highly effective treatment for OSA patients. Surgeons have to be aware of the pros and cons of both techniques to make the correct clinical judgment in choosing the correct technique and to allow patients to be well informed.

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The effect of two packing types for throat pain and postoperative nausea and vomiting during maxillofacial surgery

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Operations of oral maxillofacial surgery cause the blood escape into stomach and trachea. Therefore, throat packing is applied. Endotracheal tube cuff is not protective from aspiration. While packing is preventing blood leakage, it may cause postoperative pain due to the pressure. Postoperative nausea and vomiting (PONV) occurs in 30% of patients receiving general anaesthesia. Ingested blood is also emetic factor. Packing placed between oropharynx and hypopharynx before surgery to prevent leakage to stomach and trachea.

The aim of this pilot study is to compare the efficacy of two packing types in throat pain. The secondary aim is to compare in preventing PONV in two groups.

13 patients were evaluated. Seven patients' packs soaked with isotonic sodium chloride (Group1) and 6 patients' packs soaked with chlorhexidine gluckonate/benzydamine hydrochloride (Group2). All patients throat pain evaluated with visual analogue scale and Likert Pain Score at 2, 4, 6, 12 and 24 h. Also PONV was evaluated. Mann–Whitney *U* test and Spearmans rho test were used for statically analyses.

The mean operation time was 261.92 min. No significant difference was found in the incidence of PONV. Significant difference was found in the incidence of throat pain at 12 and 24 h (P 0.02, P 0.05). Packing with chlorhexidine/benzydamine was found more effective at long-term for throat pain. Our research continues for better results, we planned as 100 patients to finish this study.

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Retrospective study of oral and maxillofacial cases treated in university of dental medicine, Mandalay, Myanmar

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Background: University of Dental Medicine, Mandalay is one of the two dental universities in Myanmar, which was established in 2000. The other one is in Yangon and it was established in 1964. Patients treated in the Department of Oral and Maxillofacial Surgery, University of Dental Medicine, Mandalay between 2015 and 2016 were analysed in this study. The patients were recorded into mainly two groups: out patients and in patients. Records of outpatients treated in the university and those of patients hospitalised and operated in the nearby 300-bedded teaching hospital were checked.
Objectives: To access the patient types treated in the Department of Oral and Maxillofacial Surgery, University of Dental Medicine, Mandalay. To check the treatment outcome.
Methods: Retrospective study of the patient records.
Findings: In out patient section, 15–26% came for tooth extraction, 1.5–2% were for biopsy and oral submucous fibrosis patients were 4–5% came for steroid injection. Other patients are due to fracture, infection, impaction and some are for postoperative check up and dressings. Among the in patients, majority of the patients are squamous cell carcinoma patients who need to be treated by primary tumour removal and level I, II, and III neck dissections. Radical neck dissection and reconstructions are rarely done. Some of the cases have recurrence.
Conclusion: Proper recording system and continuing training program are necessary.

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Sialendoscopy-assisted treatment for chronic obstructive parotitis related to Sjögren's syndrome

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Objectives: Chronic obstructive parotitis related to Sjögren's syndrome is not uncommon, but it is rarely reported in the literature. The aim of this study was to describe our experience of treating chronic obstructive parotitis related to Sjögren's syndrome.
Methods: Seventeen patients with chronic obstructive parotitis related to Sjögren's syndrome who were treated with sialendoscopy from June 2014 to June 2015 at the Department of Oral and Maxillofacial Surgery, School of Stomatology, China Medical University were retrospectively reviewed. The cohort underwent ultrasonography, salivary gland scintigraphy (SGS) examinations and sialography before sialendoscopy. All patients were asked to undergo a visual analogue scale (VAS) evaluation before and six months after surgery. A paired t test was conducted, and $P < 0.05$ was considered statistically significant.
Results: The 17 patients (27 parotid glands) successfully underwent interventional sialendoscopy under local anaesthesia. Compared with the mean preoperative VAS score of 6, the mean VAS score six months after sialendoscopy was 4.5, which was significantly lower than the preoperative VAS score ($P < 0.05$).

Conclusions: Interventional sialendoscopy plays a significant role in the treatment of chronic obstructive parotitis-related to Sjögren's syndrome.

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The application of interventional sialendoscope in oral and maxillofacial region – our treatment strategy with 406 patients

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Objective: Interventional sialendoscope is widely used nowadays. The aim of this study was to describe our experience with interventional sialendoscopy for the management of disease in oral and maxillofacial region.
Methods: 406 patients treated with sialendoscope from December 2011 to December 2015 at the Department of Oral and Maxillofacial Surgery, School of Stomatology, China Medical University, were retrospectively reviewed. The cohort included 186 cases of chronic obstructive parotitis (COP), 53 cases of Sjögren's syndrome, 42 cases of radioiodine induced parotitis, 70 cases of parotid ductal stones, 54 cases of submandibular gland ductal stones, one case of ductal injury. The sialendoscope was introduced from the orifice to dilate and lavage the ducts. Lithotomy under sialendoscopy was considered the treatment of choice for stones 5 mm. Proximal stump of injured Stensen duct was distinguished under sialendoscope. Comparison was made between postoperative visual analogue scale score and preoperative ones to evaluate the efficacy of sialendoscope.
Results: With follow-up of six months, 180 patients (96.8%) of COP gained lower score than the preoperative ones; 40 patients (75.5%) with Sjögren's syndrome showed lower score; 30 patients (71.4%) with radioiodine induced parotitis gained lower score. Stones were successfully removed and proximal stump of injured Stensen duct was easily distinguished under sialendoscope.
Conclusion: Interventional sialendoscopy may be an effective technique for the treatment of disease in oral and maxillofacial region.

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Cleft and Craniofacial Anomalies

Management of nasal dermoid in children — a two centre experience

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Nasal dermoids are the most common congenital midline cysts accounting for 4–12% of all head and neck dermoids. Nasal dermoid may appear as a cystic mass or sinus opening on the midline nasal dorsum between the glabella and columella at birth, or during early childhood. Complete excision of the cyst regardless of extension, is essential to prevent recurrence, and nasal deformity.

Many approaches have been advocated in the surgical management of these lesions. We describe a very comprehensive approach in the surgical management of nasal dermoids in two children, one in Libya and the other child from India, both with complex deformities and reconstruction of these defects with a costochondral graft harvest.

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Management of Pierre Robin sequence our experience and long-term follow-up

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Pierre Robin described a congenital condition that was once considered a syndrome, but is now known as Pierre Robin sequence. The main features of this condition include micrognathia, glossoptosis and paroxysmal respiratory obstructions. This can lead to feeding difficulties, failure to thrive, growth retardation and cardiac failure. Therefore, it is crucial to manage this airway problem as early as possible. There are numerous potential treatment options and they range from conservative nonsurgical interventions to invasive surgical procedures including distraction osteogenesis. We report our experience and long-term follow-up using different treatment modalities.

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Bioabsorbable osteofixation devices in craniosynostosis — clinical experience of 14 cases over three years

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Background: The open surgical treatment for craniosynostosis is a standard surgical treatment, with few complications and safe surgical technique. The pattern of skull deformities associated with each suture has fusion, what the skull pattern is predictable in restriction of growth, this could increase intracranial pressure. The optimal surgical timing for these approaches must balance both the desire for early intervention to reduce the effects of bone restriction on brain growth and the ability of a child to withstand the rigors of surgery.
Methods: We reviewed 14 consecutive patients who underwent surgical treatment of craniosynostosis between 12 October 2013 and 5 June 2016. They were divided into nine groups by suture involvement: fronto-orbital advancement, sagittal, suboccipital, outcome was analysed in terms of residual deformities, complications, mortality, as well as the need for additional surgery.
Findings: There were 12 males (85.7%) and two females (14.2%), with most of the male preponderance accounted for by the large sagittal synostosis group with six cases (42.8%), and five cases in advancement of fronto-orbital (35.7%), one patient of associated syndrome (Apert). There were no deaths.
Conclusion: After follow-up we had observed the bioabsorbable fixation system provided good stable fixation during bone healing period with low complication, and for long-term, and no interference with normal growth.

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Analyse blood loss in controlled hypotension for open repair fronto-orbital advancement

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Background: Transoperative blood loss is a serious challenge during correction of craniosynostosis. Open cranial remodeling is standard treatment for craniosynostosis. 1917 cushing controlled hypotension is defined as a reduction in systolic blood pressure to 80–90 mmHg, proposed benefits of reduced blood loss, better surgical visualisation, less operative time and less requirement of transfusion.
Objectives: To analyse blood loss and requirement of transfusion using hypotension for open repair fronto-orbital advancement.
Methods: This institutional review analysed the records in infants with craniosynostosis who required fronto-orbital advance between 2013 and 2016 in Hospital Regional Materno Infantil de Alta especialidad. Five patients were selected for this study — two patients were four years old, one was one year old, one was nine months and one seven months.
Findings: Five infants underwent fronto-orbital advancement, just one patient had an associated syndrome: Apert syndrome, intraoperative transfusion was required in all patients, with controlled systemic hypotension did not affect intraoperative blood loss, and requirement of transfusion.
Conclusion: Fronto-orbital advancement is safe and acceptable treatment for correction of craniosynostosis whit few intraoperative complication, however use hypotensive anaesthesia did not affect intraoperative blood loss.

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Surgical treatment of Eagle's syndrome with help of three-dimensional printing model navigation: a case report

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Background: Eagle's syndrome is a rare condition (0.16%) caused by the elongation of the styloid process (>3 cm) or calcification of the stylohyoid ligament. Patients with Eagle's syndrome typically present various symptoms, such as headache, facial pain, neck pain, pulsating pain, sore throat, foreign body sensation, dysphagia, dysphonia, cough, voice changes, otalgia or vertigo. Three-dimensional (3D) printing refers to processes in which successive layers of material are formed from 3D computer tomography data to synthesise a 3D object. This new diagnostic technique of rapid prototyping technology led to innovative new applications in biomedicine.
Case Report: In our poster presentation, we report a case of a patient who initially presented a combination of symptoms like headache, sore throat, neck pain which exacerbated with the movement of the head. This case report provides a brief review of the diagnosis and surgical management of the Eagle's syndrome with the help of 3D model navigation.
Conclusion: Eagle's syndrome is difficult to diagnose due to its wide variability in symptoms. The inherent accuracy and other properties of 3D printing have allowed it to have exciting applications in anatomy education and surgery, with great benefit to the maxillofacial surgery. With the assistance of 3D technology, it is much easier for the surgeon to plan the surgery and faster to navigate during the procedure.

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Two plane distraction osteogenesis for midface and occlusal advancement in a patient with Crouzons syndrome in a developing country

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A 22-year-old female with Crouzons syndrome and sleep apnoea was brought in by her family to the hospital Loayza in Lima Peru for treatment of her midface/maxillary hypoplasia. The patient had severe obstructive sleep apnoea and had been ridiculed as a child due to her deformity. The patient had been previously seen by doctors, but surgical treatment was delayed due to concern over developing corneal ulceration as well as lack of technology and funding.

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Case report — glial choristoma of the tongue

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The occurrence of congenital anomalies such as glial choristoma in the newborn in Nigeria is extremely rare. Depending on location, these anomalies can be life threatening and require urgent intervention.

We report a case of glial choristoma on the tongue of a neonate seen in our centre and highlight the role of prompt surgical intervention with minimal imaging in low resource settings.

A 48-h-old, 3.0 kg, 50 cm male neonate presented with a pinkish coloured mass on the tongue with complaints of difficulty with feeding and breathing. Examination revealed mild respiratory distress with a fleshy mass measuring about 5 cm × 2 cm in the junction between anterior and posterior tongue which appeared to be blocking the airway of the neonate. Differentials included lingual thyroid, neurofibroma and double tongue. The mass was later excised, sent for histology and confirmed to be glial choristoma. At 30 months follow-up, there is no recurrence.

Glial choristoma is a developmental malformation of heterotopic central nervous tissue with limited growth potential. It is usually found in the head and neck region and when present usually in nasal cavity. It is one of the very rare choristomatous lesions involving the oral cavity. It can be seen on the palatopharyngeal area or the tongue such as the present case leading to complications of dyspnoea and dysphagia.

The complications of oral glial choristoma depend on the site of occurrence and size of the lesion. Once it is excised, recurrence is rare.

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Maxillary expansion assisted with midline palatal osteotomy in adult patients

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Background: The skeletal deformations of upper jaw cause biting and chewing disorders, defective speech, worsen aesthetics of the face and smile. To correct severe constriction of the upper jaw in adults it is recommended to conduct rapid maxillary expansion, assisted with osteotomy, with further orthodontic treatment.
Objectives: Apply in clinic and explore surgically assisted rapid maxillary expansion method in patients with skeletal constriction.
Methods: Planning the treatment, we conducted anthropometric assessment of deformations, analysed diagnostic casts and computer tomography. Considering the age of the patients, midline palatal osteotomy was performed under local anaesthesia and Hyrex expansion appliance was fixed. The desired extension was achieved within 3 weeks on average, keeping the appliance for another 3 months.
Findings: Midline palatal osteotomy is painless and atraumatic. In all cases, the needed amount of expansion was achieved, despite the persistence of such buttresses as zygomaticoalveolar crest and the sphenoid bone. The patients felt slight pain only during activation of the expansion device.
Conclusion: Despite the ossification of median palatine suture, it is possible to achieve good results in adult patients with skeletal maxillary constriction, using rapid maxillary expansion method, assisted with midline palatal osteotomy.

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Large clot mimicking a haemangioma-like lesion in the mandible

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After tooth extraction, the blood flow coming from the inferior alveolar vessels and from the periodontal ligament vessels will form the clot, which is subsequently invaded by fibroblasts, resulting in the formation of a connective tissue rich in vessels and cells; then this tissue matures decreasing the number of cells and blood vessels and increasing the amount of collagen fibres.

We report a case of an 11-year-old female patient who was referred to the maxillofacial surgeon due to a chief a progressive swelling of the gums in the region of the left first mandibular molar, which was extracted 10 days before because of extensive dental caries. The patient also had difficulties in chewing. The lesion had approximately 4 cm in diameter and had a granuloma and haemangioma-like appearance. However, prior to biopsy it was released from the alveoli spontaneously making the diagnosis of mature clot possible. The management of bleeding in first hours after the surgical trauma is the best way to prevent postoperative complications. This case highlights the importance of considering the formation of a fibrous mature clot even if the lesion has the appearance of a tumour.

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Le Fort I osteotomy with midpalatal split improving access to the craniovertebral junction in a patient with Chiari malformation

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Chiari malformation is a group of congenital malformations involving the brain steam, cerebellum, upper spinal cord and surrounding bone structures and may lead to symptoms such as weakness, dysphagia, sleep apnoea and signs that include sensory and motor deficits and weakness in the extremities. Surgical treatment is widely accepted as the treatment option for symptomatic patients. Surgery may be performed trough a surgical approach in the posterior cervical region; however, depending on the malformation, a transoral approach may be required for better visualisation of the anterior craniovertebral junction.

We report a case of 45-year-old female patient with Chiari malformation and increasing neurologic symptoms such as headaches and neck pain and also showing a motor deficit in the lower limbs. A Le Fort I osteotomy with midpalatal split was performed, as it is reported to improve access to the retropharyngeal structures such as the anterior craniovertebral junction. The neurosurgical team used a neuronavigation software as a tool to facilitate cervicomedullary decompression with less risk to cause complications by damaging some noble structure. Maxilla was then stabilised following the principles of rigid internal fixation using an occlusal splint to guide correct occlusion.

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A familial case of cleidocranial dysplasia with a frameshift mutation in the Runt-related transcription factor 2 gene

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Background and Objectives: Cleidocranial dysplasia is an autosomal dominant disorder presenting with delayed ossification of the skeletal system, characterised by clavicle hypoplasia, delayed ossification of the cranial sutures, supernumerary teeth, and delayed eruption of teeth. It is caused by a Runt-related transcription factor 2 (RUNX2) mutation. However, few studies have described familial mutations or clinical conditions of patients with RUNX2 mutations. We conducted a RUNX2 mutation analysis targeting a mother and child with cleidocranial dysplasia. We identified a frameshift mutation caused by a single base-pair deletion and described the clinical presentations of the patients.
Methods: DNA was extracted from blood samples obtained from a 9-year-old girl and her mother, both suffering from cleidocranial dysplasia. The eight exons of RUNX2 were directly sequenced for both patients, and the sequences were compared with those of healthy control subjects and sequences obtained from GenBank to identify mutations.
Findings: The child presented with bilateral clavicle hypoplasia, delayed closure of the anterior fontanelle, short stature,

supernumerary teeth, and delayed eruption of permanent teeth; the mother had a similar clinical history. The RUNX2 mutation analysis revealed a frameshift mutation caused by a cytosine deletion at nucleotide 1205 in exon 8 (c.1205delC) in both subjects.
Conclusion: We found one case of a c.1205delC mutation in an extensive literature search, but the clinical condition of the patient was not described. Therefore, we were unable to compare the clinical presentations associated with this mutation. However, we believe this report provides a useful basis for genotypic and phenotypic analyses in cleidocranial dysplasia.

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Management of severely atrophic cleft maxilla in ectodermal dysplasia

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Background: Ectrodactyly ectodermal dysplasia-cleft syndrome is characterised by cleft lip and palate, severely hypoplastic maxilla and hypodontia.
Objectives: To present the management, and relapse rates following maxillary distraction osteogenesis among ectrodactyly ectodermal dysplasia-cleft patients.
Methods: This is a retrospective study of five patients diagnosed with ectrodactyly ectodermal dysplasia-cleft, where maxillary advancement was achieved by distraction osteogenesis. All patients included had been operated according to the well-established protocol of cleft lip and palate reconstruction prior to maxillary distraction osteogenesis. Hard and soft tissue changes were evaluated by cone beam computed tomography and lateral cephalograms prior to distraction osteogenesis (T1) at post-distraction point (T2) and after one year of follow-up (T3).
Findings: Examination revealed marked maxillary advancement in all of our patients with a significant mean difference in hard tissue parameters (Co-A = 15.8 mm; SNA = 11.1°) and a notable improvement in facial convexity (13.5°). One year follow-up measurements demonstrated mild relapse rates of 17% in the horizontal plane.
Conclusions: We conclude that despite the challenging anatomic and physiological features of ectrodactyly ectodermal dysplasia-cleft patients, maxillary advancement is safe and stable and by enhancing current surgical techniques there is promising potential for improved patient outcomes, achieving normognathic facial appearance with implant based rehabilitation.

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Craniomaxillofacial Trauma

Clinical and experimental evaluation of bone marrow aspirate on the outcome of mandibular fractures

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Mandibular fractures are among the most common injuries in facial trauma. Numerous methods are available to treat fractures of the mandible. Careful evaluation of the type and location of fracture, the condition of the patient's teeth and occlusion, the patient's age, the general condition of the patient, and the facilities and material available will affect the surgeries selection of specific method for treatment of this type of fracture.

The objectives of this study were to evaluate the effect of bone marrow aspirate as a source of stem cells and growth factors to enhance the healing of mandibular fractures. The study was done in 30 patients who suffered mandibular fractures at different sites of mandible; the patients were classified into two groups as control and study group that received bone marrow aspirate. Panoramic and clinical follow-up of the patients was done at three, six and nine months.

The experimental study was on 24 male rabbits classified into same classification to receive mandibular trauma followed by application of bone marrow aspirate and histological assessment was done. The results of this study explain the benefits of bone marrow aspirate both clinically and experimentally.

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The epidemiology, incidence and patterns of maxillofacial fractures in Jeddah city, Saudi Arabia

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Background: The maxillofacial trauma increased worldwide and these injuries vary between the countries. The differences in patterns and aetiology of maxillofacial fractures among studies showed that aetiology depend on cultural, social and economical backgrounds. Developed countries especially in Europe showed interpersonal violence were the main causes of maxillofacial fractures, followed by motor vehicle accident (MVA).
Objectives: The aim of the present study was to illustrate the causes, incidence and the pattern of maxillofacial fractures in Jeddah city, Saudi Arabia.
Methods: Between 1998 and 2015, a retrospective study of 616 patients treated at the Department of Maxillofacial Surgery, King Fahad General Hospital were reviewed. Data regarding the patient age, sex, pattern of facial fracture and causes of injury were recorded. Data were analysed using SPSS Pc+ 21.0 version statistical software.
Results: Of 616 patients, 86.4% ($n = 532$) were males and 13% ($n = 80$) were females. Within this group, males were most prevalent (38%; $n = 234$) in peak incidence during the age group of 11–20 years. A significant percentage of the fractures were caused by MVA 73.1% ($n = 450$) patients. The mandibular fractures were the most common fracture types 60.4% ($n = 372$ out of 616), followed by zygomaticomaxillary complex (37.2%). There is statistically significant association between causes of accidents and the types of injury ($P < 0.01$).
Conclusions: This study has brought out the pattern of multiple maxillofacial injuries and the causes of accidents. The data obtained provide important information for develop global preventive measures, appropriate health education programs and application of stricter traffic rules to reduce such injuries.

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Retrospective review of orbital fractures in the Auckland region from 2010 to 2015

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Objective: The objective of this study was to review the orbital fractures managed by our department, especially epidemiological aspects, treatment options and postoperative sequelae.
Method: A retrospective review of the orbital fractures treated by the Department of Oral and Maxillofacial Surgery at Middlemore Hospital (Auckland, New Zealand) from 2010 to 2015 was undertaken. Patients were evaluated by age, gender, aetiology, time to surgery, type of reconstructive material used and complications.
Results: The most common cause of orbital fracture was interpersonal violence (46%), followed by sporting injuries (25%). Males accounted for 80% of the fractures, with 50% of these being aged between 18 and 30 years old. The most significant complications were ongoing pain and restriction in movement requiring further intervention (6%), infection (3%) and retrobulbar haemorrhage (<1%).
Conclusions: In the catchment area for our Hospital, which has a population of approximately 1.5 million, interpersonal violence is the leading cause of orbital fractures. Postoperative complications cannot be evaluated definitively until a few months after surgery.

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Two-dimensional lambda versus three-dimensional delta plates in subcondylar fracture using modified mini retromandibular subparotid approach

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Background: Condyle fractures are one of the most controversial maxillofacial injuries. In open reduction and internal rigid fixation of such fractures, to keep in mind are the functional loads which result in compressive stress patterns along the posterior border and tensile stress patterns along the anterior border of ramus and in the zone situated below the sigmoid notch. This study compares the efficacy of two-dimensional (2D) lambda plate and three-dimensional (3D) delta plates fixed in condylar fracture management.
Methods: 30 adult patients with subcondylar fractures, 15 in each group using modified mini retromandibular subparotid approach. The indications were:
- Adult patients
- Occlusal disturbance
- Ramal height decrease of over 4 mm
- Fracture dislocation of TMJ

Both plates were compared in terms of time taken to plate segments, functional restoration with amount of mouth opening, status of occlusion, condylar range of motion, deviation on mouth opening and postoperative complications.
Results: There were no significant differences in terms of evaluation parameters between the two groups. But modified mini retromandibular subparotid approach can definitely be considered more conservative, tissue sparing and with the least complications in terms of facial nerve injury.
Conclusions: The effectiveness of these plates proves that fixation along an ideal osteosynthesis line enables effective resistance to the bone tension forces acting on condylar process during mandibular movements.

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Emergency management for orbital compartment syndrome — how important is decompression? A case report

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The management of acute orbital compartment syndrome includes immediate lateral canthotomy and cantholysis, followed by open surgical decompression. Medical treatment is controversial, but is advocated in an attempt to reduce intraorbital pressures prior to surgical intervention. This consists of high dose steroids, mannitol and acetozolamide. Studies suggest that optic ischaemia for more than 90 min can result in permanent damage and therefore initial treatment needs to be commenced promptly.

Treatment for late presenting cases is debatable, however, if not treated clinicians may be scrutinised and be accused of medical negligence. We present a case of delayed presentation of retrobulbar haemorrhage and loss of vision that improved with no intervention.

A 76-year-old man blind in one eye, presented having sustained trauma to the other eye in which he had vision. He was referred to the maxillofacial team 5 h after the injury and a computed tomography confirmed a retrobulbar bleed with oedema. On examination he was noted to have proptosis, a fixed dilated pupil, loss of vision and ophthalmoplegia. The patient had a complex medical history that included chronic renal failure and peptic ulceration which were contraindications to diuretics and high dose steroids. Lateral canthotomy/cantholysis and decompression was refused by the patient in view of his comorbidities.

This patient surprisingly made a full recovery after 48 h with no intervention. In contrast to the current literature, this case would appear to cast some doubt over the understanding of the role of orbital compartment syndrome/retrobulbar haemorrhage in the aetiology of blindness.

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Intermaxillary fixation screws for conservative condylar fracture treatment: a torsion strength comparison and screw pattern recommendation

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Background: Material breakage, especially screws, can occur during intermaxillary fixation (IMF) for the treatment of condylar fractures. Further there is no consensus about the amount of screws required during these treatment procedures.
Objectives: The present study was conducted to investigate the breakage moments of different screwing systems. The material properties of the best screwing system were used to develop a

computer simulation system to investigate the force distribution on the screw and to determine the minimal amount of screws required for IMF in the treatment of condylar fractures.
Methods: Instructed for hand-tight insertion, three maxillofacial surgeons applied eight screws each of every screwing system (KLS Martin, Synthes, Jeilmed) into porcine mandibles. These hand-tight torque values were compared with breaking torque values, for which eight screws per screwing system were inserted till breakage. To determine the minimal amount of screws needed for IMF, a digital biomechanical model of the human masticatory system was constructed, with all masticatory muscle attachments.
Findings: All screws had significant safety margins between hand-tight and breaking torque values. No difference in safety margins existed between screwing systems. After simulating a condylar fracture on the model, a digital analysis calculated the forces needed per screw to remain in IMF following different activations of the masticatory muscles.
Conclusion: Screw selection should not be based on torsion strength but on other clinical factors, such as ease of usage and patient comfort. The digital model for calculating the minimal amount of screws seems valid, but still has to be evaluated clinically.

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Rare fractures of the maxilla: the isolated fracture of the anterior nasal spine and of the posterior wall of the maxillary sinus

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There are exceptional fractures of the maxilla that have not been described in the literature. They are characterised by their proper mechanism and particular circumstances related to the anatomic conditions. These fractures ought to be described to define novel clinical features.

Fracture of the nasal spine needs to happen a direct choc on the nasal base with an anatomically long spine. Clinical presentation showed important oedema of the upper lip, ecchymosis and a swelling of the superior vestibular sulcus. The diagnosis is confirmed by means of an X-ray revealing the fracture on the profile incidence. Isolated fracture of the posterior wall of the maxillary sinus is another rare entity created by a direct choc on the maxillary tuberosity.

We advocate as a possible hypothesis that direct trauma of this region causes intrasinus high pressure leading to the fracture of the posterior wall. The authors tend to describe these rare fractures and to establish their anatomic and clinical aspects.

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Direct impairment of the optic nerve in case of orbitocranial trauma

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Posttraumatic optic neuropathy is a dread and rare complication of facial trauma. The authors describe two clinical cases dealing with this pathology, clinical features; mechanisms of the lesions and evolution are discussed.

A 17-year-old male patient referred for left ocular motor palsy and exophthalmos after craniofacial trauma. Computed tomography (CT) scan showed orbitonasal dislocation and a bone fragment in contact with the optic nerve. Postoperative restricted vision to a distance of four meters and persistence of ocular motor palsy were the outcome of long-term follow up. The second observation is of a 40-year-old male patient referred to us after a traffic accident, complaining about loss of his right vision and light perception. On examination we noted a limitation in the upper gaze. Ophthalmoscopy revealed a papillary oedema and paleness of the retina of ischaemic nature. CT imaging showed a displaced fracture of the lateral wall of the right orbit and elongation of the right optic nerve. Despite early corticotherapy the blindness was the definitive result.

Posttraumatic neuropathy is a rare cause of blindness due to direct and indirect injury of the optic nerve. The diagnosis becomes difficult when the patient has lost conscious. Ophthalmoscopy shows only nonspecific signs and imaging views confirm direct lesion of the optic nerve nailed by a bony fragment but they are less contributive in analysing intrinsic injury. The visual evolution in most cases is of poor prognosis.

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Optimising the field surgical equipment used by maxillofacial surgeons deploying on future military operations

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Background: The 2015 Ministry of Defence Strategic Defence Strategy Review identified the need for highly mobile medical facilities for future conflicts. Field hospitals will include military maxillofacial surgeons capable of providing damage control surgery for injuries to the head and neck. The requirement for speed and mobility necessitates optimisation of the maxillofacial specific equipment.
Objectives: The aim of this study was to identify field surgical equipment that can be utilised by maxillofacial surgeons to manage acute head and neck trauma in the current deployed military environment.
Methods: A systematic review of the medical and commercial literature was undertaken with Preferred Reporting Items for Systematic Reviews and Meta-Analyses methodology to identify surgical procedures necessary to identify portable surgical equipment capable of treating head and neck trauma in the deployed military environment.
Findings: A maxillofacial specific field module will be required to supplement the existing orthopaedic module to manage hard tissue craniofacial trauma. This should enable facial fracture intermaxillary and external fixation as well as craniotomy within 72 h.

Equipment for internal fixation will be required for 5–7 days post injury.
Conclusions: A lightweight, modular and compact trauma module for future conflicts based upon these recommendations is currently being built. All drills and craniotomes are should be battery operated, but the use of compression units are recommended to improve torque. Rapid resupply modules should be available for commonly used components. A cadaver based training programme utilising this equipment is planned for all deployable military maxillofacial surgeons.

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Primary repair of traumatic rupture of the lacrimal canaliculus

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Background: The rupture of the lacrimal canaliculus is the important part of trauma to the eyelids. A torn lacrimal canaliculus, especially the lower eyelid, if not treated properly, can result in not only cosmetic problems but also functional impairment of the lacrimal drainage system (epiphora).
Objectives: Diagnosis is not difficult, careful examination of the wound at medial side of the lower punctum will clearly reveal the rupture.
Methods: In our oral and maxillofacial department, from July 1995 to December 2015, we treated 1467 facial trauma admissions. Of these 24 patients, five also had midfacial bone fractures. By using loupe or microscope magnification, the distal and proximal parts of the torn lacrimal canaliculus were located under general anaesthesia. A pig-tail probe was utilised in conjunction with dilator. After dilation of the canaliculus, a special probe with a silicon tube was used to pass through the bony part of the nasolacrimal duct into the inferior nasal cavity. The tube was knotted together from lower end of the nose. The lower eyelid wound was sutured layer by layer with 6-o monofilaments. The average tube indwelling was about eight weeks.
Findings and Conclusion: The incidence rate of lacrimal canaliculus injury of facial trauma admissions was 1.6%. Only two patients needed secondary correction. In conclusion, trauma to the lower eyelid should alert the maxillofacial surgeon to the possibility of lacrimal canaliculus injury. Once diagnosis, proper and immediate repair will deliver good cosmetic and functional results.

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Assessment of the oral and maxillofacial surgery trauma patients journey from the Accident and Emergency Department to consultant clinic

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Background: Consultant clinics have long been very busy and demanding, worsened by acute maxillofacial injury referrals from the Accident and Emergency department. This has lead to complaints to the Leeds Teaching Hospital Trust with regards to prolonged clinic waiting times and poorly organised appointments.
Method: Retrospective analysis of all patients attending the oral and maxillofacial consultant clinics over a six-month period in 2014. The computer and hand written appointment ledgers were analysed and the number of patients, appointment type and number of failure to attends were recorded.
Results: 30% of patients attending consultant lead clinics were trauma cases with no appointments on the system and no patient documentation available. This equated to six patients per clinic, a total of 18 per week.
Conclusion: As a result of the high number of trauma patients attending clinics without an appropriate appointment, the trust agreed to the review the data and allocated funding for a separate oral and maxillofacial trauma clinic with an improved accident and emergency referral system.

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Associated fracture of the zygomatic bone and mandibular coronoid process

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Background: Fractures of the coronoid process of the mandible are an extremely rare event because of the protection offered by the zygomatic complex. In high velocity trauma it is exactly the severe inward displacement of the fractured zygoma that impinges on the coronoid and even fractures it.
Objectives: To present our experience in the occurrence of associated zygomatic bone and coronoid fractures and the subsequent management of the cases.
Methods: Nine patients with both coronoid and zygomatic bone fractures were reviewed. The diagnosis was established by computed tomography (CT)/cone-beam CT assessment (six cases) or by plain X-rays (three cases). The zygomatic bone fractures underwent reduction and internal fixation. The minimally displaced coronoid fractures were treated conservatively in all cases.
Results: Good results were obtained postoperatively in the aspect of function and symmetry. There was no occurrence of postoperative ankylosis.
Conclusions: Fractures of the coronoid process in the presence of associated fractures of the lateral face are usually an incidental finding on CT scans. Limited mouth opening is not apparent at presentation due to the detached coronoid process separated from the mobile mandible. Following surgery, because of active kinesiotherapy, there was no case of mandibular constriction, although the coronoid process had not been removed in any of the patients. Additionally there was no noticeable temporal region asymmetry due to the decreasing volume of the temporal muscle related to the disappearance of its coronoid insertion and decreased function.

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Emergency paediatric admissions to a maxillofacial unit in London

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Background: Emergency admissions represent 65% of hospital bed days in England. Paediatric emergency admissions are costly to the health service as well as the patient and their families. Emergency paediatric admissions to a maxillofacial unit are usually due to either trauma or infection.
Objectives: The authors' aimed to review reasons for paediatric admissions to engineer methods to reduce avoidable admissions where possible.
Methods: Data was collected prospectively over one year of all children presenting to the emergency department and those that were admitted. Data collected included age, aetiology and management.
Findings: Over a one-year period, 636 children presented to the emergency department requiring input by the oral and maxillofacial team. The large majority of patients were seen and discharged from the emergency department. Only 91 patients (14%) required admission. The commonest reason for admission was facial lacerations requiring closure under general anaesthetic (50%). Dental abscesses (20%), non-odontogenic infections (15%), facial fractures (5%) and dentoalveolar injuries (4%) accounted for the remainder.
Conclusions: Emergency paediatric admissions make up only a small part of the workload for a maxillofacial team. However, we must endeavour to find methods to reduce the number of these admissions. Our department is pursuing avenues in paediatric sedation and day-surgery lists, which may help reduce admissions for facial lacerations and dentoalveolar injuries. In addition, early access to primary care dentists and general practitioners may help reduce the number of children requiring intravenous antibiotics for head and neck infections.

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Parental opinion of topical local anaesthetics used for paediatric facial lacerations

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Background: Closure of facial lacerations in children under local anaesthetic can be traumatic for both patient and parent. Our hospital introduced topical local anaesthetic gel (LAT) to improve patients' experience and reduce admissions.
Objectives: To ascertain parents' thoughts on their child's experience of LAT.
Methods: Data was collected prospectively of all children presenting to accident and emergency department for suturing using LAT. Parents were asked to voluntarily complete a short questionnaire. They were asked whether they would want LAT used again on their child and allowed comments. Clinicians were also able to comment on their experiences with that patient.
Findings: 30 parents completed the questionnaire. The majority (27/30) wanted LAT used again on their child. Comments included they appreciated the 'needle-free technique', children 'were at ease' and parents felt 'happy to watch as it didn't look they were in pain'. Comments from clinicians reflected on a straightforward procedure and not needing supplemental local anaesthetic. The minority of parents who were not completely happy reported the procedure had not worked effectively as local anaesthetic was still needed. The clinician's responses also noted that cooperation was poor or they were unable to complete the procedure.
Conclusion: LAT is an effective adjunct to management of paediatric facial lacerations. The parental experience of a child's procedure can govern the behaviour of that child, and future events for the patient and their siblings. As the patient is awake, other patient management skills must also be used to improve patient and parent experience.

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Understanding craniofacial dermoids: 10-year experience at the Liverpool Craniofacial Centre

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Method: We reviewed imaging, surgical findings and complications of craniofacial dermoids from our supraregional craniofacial centre within the United Kingdom Protocols, approaches, morbidity and mortality, analytic discussion and correlations are revealed. This is a retrospective review of 137 consecutive paediatric patients who underwent craniofacial dermoid excision between March 2004 and May 2014. Those in the midline ($n = 44$) and non-midline ($n = 76$) with complete case notes were included.
Results: The non-midline frontozygomatic dermoids ($n = 66$) had no tendency to intracranial extension (ICE) in contrast to pterional ($n = 3/10$). The midline cohort ($n = 44$) included occipital dermoids, or over the bregma and 38 nasal dermoid sinus cysts (NDSC), of these 14 (37%) had ICE. Statistics revealed the midline position of a dermoid suggests significantly more likely ICE. Dermoids on the bregma, occiput or frontozygomatic had no tendency to ICE. The rate of ICE regarding glabellar and nasal dermoids is similar however the rate of infection is significantly higher in nasal than glabellar dermoids. The predictive value of infection indicating ICE is 16 times increased with frontal dermoids. Sensitivity and specificity analysis of the scans performed helped to refine our protocol as over the age of 15 months for nasal or glabellar dermoids the optimally investigation seems to be computed tomography while magnetic resonance imaging is better for others. Two NDSC developed cerebrospinal fluid leak following anterior dural dissection, both of which settled following insertion of a lumbar drain. A single mortality from a brain abscess following excision of an extracranial NDSC was noted.
Conclusion: The presentation gives guide and promote understanding handing craniofacial dermoids.

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The incidence and pattern of mandibular fractures in a United Kingdom Regional Trauma Unit

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Background: Since the introduction of Regional Trauma Networks in 2012, designated Major Trauma Centres have received the majority of severely injured patients with multiple injuries; this in turn has reduced some of the trauma load on district general hospitals. Mandibular fractures are some of the most common maxillofacial injuries comprising a large part of the trauma workload. We undertook a retrospective study to look at how this change in trauma service organisation has changed the pattern and incidence of mandibular fractures.
Methods: A retrospective cross-sectional study was conducted of patients that presented with mandibular fractures to Worcestershire Acute NHS Trust over an 18-month period. Patient demographics, mechanism of injury, fracture location and use of alcohol at the time of the incident were recorded.
Results: The vast majority of patients were male (84%). 65% fell into the 18–30 years age group, 21% were aged 31–50 years, whilst 8% were older than 50 years and only 6% were aged <18 years. 72% patients reported the injury was a result of assault and 52% of these had consumed alcohol at the time of the injury. Other mechanisms of injury included mechanical fall (13%), accident while playing sport (12%) and road traffic accidents (3%).
Conclusions: Mandible fractures most commonly affect young males, as a result of interpersonal violence whereas road traffic accidents alcohol continues to be a common factor where reported assaults are the mechanism of injury.

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Clinical evaluation and comparison of the different types of surgical reduction in patients with mandibular condyle fracture in the period 2010–2015. Retrospective study

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Background: The fractures of mandibular condyle are one of the most often fractures of mandible. There are many types of the reduction for mandibular condyle fractures and the problem of using concrete type has been still discussed.
Objective: This study is focused on retrospective clinical evaluation of types of used titanium plates (single straight plate, couple of straight plates, TCP, lambda) for surgical reduction to find out occurrence of complications, duration of operation and the stability of osteosynthesis.
Method: Authors evaluated the records of patients who were hospitalised in Department of Oral and Maxillofacial Surgery, University Hospital Bratislava, Comenius University Bratislava, Slovakia between 2007 and 2015. Only the patients with surgical reduction for subcondylar fracture were included. The records were divided into the groups by type of used osteosynthesis — single straight plate, couple of straight plates, TCP, lambda. A statistical analysis was performed and the groups were compared.
Finding: Trauma to mandible occurs in 483 patients consist also from 133 (27.53%) patients in whom open reduction on condyle was indicated. We assume the type of reduction, stability of proper occlusion, occurs of complications, the necessary reoperation respectively due to inadequate position of condyle, inflammatory process, etc.

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Fractures of the zygomatic maxillary complex: is the displacement a predictor of sensitive alterations?

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Background: The fractures of the zygomatic maxillary complex (ZMC) are very common in facial trauma and frequently associated with post-management alterations and sequelae like visual disorders, asymmetry, aesthetical problems and sensitive alterations (SA). The last are frequently associated with infraorbital nerve injuries.
Objectives: The aim of this study is review, analyse and relate the type of orbitozygomatic (OZM) fracture treated with open reduction and internal fixation (ORIF), using the Knight and North Classification (1961), with the incidence of SA in a group of patients with unilateral OZM fractures.
Methods: We made a revision of clinical history of each patient between January of 2014 and December of 2015, following the inclusion criteria (unilateral OZM fracture treated surgically, without major facial compromise or bilateral sensitive disturbances). Using clinical information and computed tomography scan images of patients with clinical control after six months, we make a statically relation between the type of OZM fracture and the presence of SA with Fishers exact test, making two groups based in Knight and North classification: Group A (mild or without rotational and displace component) and Group B (with rotation and displacement).
Findings and Conclusion: In our study we found a high incidence of SA and a statically significant relation between rotated and displaced OZM fractures with SA after six months of ORIF intervention.

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Postoperative nausea and vomiting in facial fracture patients: a randomised and controlled trial on the effect of dexamethasone

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Background: Postoperative nausea and vomiting (PONV) is the most frequent side effect of general anaesthesia and a major cause of significant morbidity.[1] Among other anti-emetics, dexamethasone has shown to be effective for preventing PONV.[2]
Objectives: The aims of the study were to determine the rate of PONV after surgical treatment of facial fractures, investigate the effect of preoperatively administered dexamethasone on PONV and indicate any possible causes for the results.

Methods: 119 adult patients with facial fractures were randomised to receive perioperatively either a total dose of 30 mg of dexamethasone, or no glucocorticoid (control). PONV was evaluated every sixth hour during the first postoperative 24 h.
Findings and Conclusion: PONV occurred in 20 out of 119 patients (16.8%). The only significant ($P = 0.016$) association with PONV was postoperative administration of opioids. Slightly more cases of PONV occurred for patients who had not received dexamethasone (20% versus 13.6%). PONV was also non-significantly more common in patients after orbital floor reconstruction (28.0%) compared to mandibular (11.6%) and zygomatic (15.6%) fractures surgeries, and after anaesthesia duration of less than 97 min (21.7% versus 11.3%). The routine use of dexamethasone for reducing nausea is not recommended for facial fracture patients and alternative medications are better options for patients with postsurgery nausea.

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Paediatric mandibular fractures: report of a case in a five-month-old child

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Mandibular fractures in young children are rare presentations. They pose certain questions regarding the optimum surgical management plan and outcome. A developing facial skeleton and the presence of unerupted tooth buds give cause for consideration. Paediatric mandibular fractures require different surgical strategies to be employed, in comparison with adult mandibular fractures. A conservative approach has generally been accepted.

This case report describes a 5-month-old girl who sustained a left-sided mandibular body fracture following a fall from her walker. Treatment options and rationale for surgery versus conservative management in this rare case are presented. Additional factors, such as child abuse are considered. A literature review focused on the management of the young paediatric mandible fracture was performed to offer a more comprehensive overview of this unique subset of paediatric maxillofacial injury.

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Evaluation of the condyle remodeling after costochondral graft in growing children with temporomandibular joint ankylosis and jaw deformity

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Background: Children with temporomandibular joint (TMJ) ankylosis and jaw deformity can be treated by costochondral graft (CCG) for simultaneously release ankylosis and correct jaw bone deformity. But the long-term results have not been reported yet.
Objectives: This study is to evaluate its long-term result in growing children who had TMJ ankylosis and jaw bone deformity.
Methods: Patients from 2010 to 2014 with unilateral TMJ ankylosis and jaw deformity treated by CCG were evaluated. Their computed tomography data within one week after surgery and during at least one-year follow-up were measured by ProPlan CMF 1.4 software. Condyle-ramus, chin deviation and the length of CCG were measured and compared after operation and during follow-up. SPSS 17.0 software was used for statistical analysis.
Findings: Eight patients with a mean age of 5.4 years (range, 3–8 years) were included in the study. The mean follow-up period was 2.2 years. The mean condyle-ramus elongation by CCG was 6.25 mm and chin deviation correction was 5.62 mm after surgery. The mean growth of CCG was 4.78 mm. The mean mandibular ramus growth was 3.71 mm in the healthy side and 2.03 mm in the affected side ($P = 0.089$).
Conclusion: CCG is a reliable method to treat TMJ ankylosis with jaw bone deformity in growing children. It has growing ability but the long-term results still need observation.

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Conservative management of isolated orbital floor fractures: a retrospective review in a single institution

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Background: The orbital floor has the largest area of the four orbital walls and is commonly fractured following maxillofacial trauma sustained in road traffic accidents, assault and falls. Surgical management of orbital floor fractures seeks to restore the anatomy of the orbit and prevent ophthalmic sequelae such as diplopia, limitation of extraocular muscles and enophthalmos. However, surgery is not without risk and recent studies have demonstrated the persistence of symptoms despite surgical management. In this study, we determine if surgical management is always required to minimise ophthalmic symptoms.
Methods: We identified all patients with orbital fractures which were conservatively managed in the National University Health System, Singapore between 2012 and 2014. Patients with bilateral orbital injuries, a history of orbital trauma or ophthalmological conditions were excluded from this study. Patients with orbital fractures involving the roof, medial wall or lateral wall were also excluded. 39 consecutive patients were identified and we reviewed their medical records to identify the presence of diplopia, extraocular muscle limitation and enophthalmos at 12 months after the injury.
Results: At presentation, five patients had diplopia, 11 had limitation of extraocular muscles and two had enophthalmos. None of these complications were noted during follow-up at 12 months after the injury.
Conclusion: Orbital floor fractures can be managed surgically or conservatively. In this series, we have demonstrated that conservative management may be sufficient in some cases and surgical intervention may not be necessary.

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Intraoperative use of three-dimensional C-arm for facial fractures

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Background: Intraoperative C-arm technology has improved to include three-dimensional (3D) imaging with coronal, axial and sagittal views. This has the advantage of intraoperative analysis of fracture reduction and fixation in facial fractures.
Objectives: The study examines the utility and cost effectiveness of intraoperative 3D C-arm technology.
Methods: We utilised a retrospective chart analysis of 20 consecutive facial fracture patients from March 2015 until July 2016 at University Hospital that underwent operative repair of facial fractures with the use of intraoperative C-arm. Operative reports were analysed for post-imaging fracture/plate manipulation. Any intervention was further characterised as avoidance of major or minor complications. Hospital billing was evaluated to approximate overall cost of intraoperative c-arm use and compare this to traditional postoperative non-contrast maxillofacial computed tomography (CT) scan.
Findings: Evaluation of the 20 patient charts revealed use in 10 orbital fractures, 8 zygoma fractures and 2 mandible fractures. Use of intraoperative imaging led to further changes in 7 (35%) of cases, while no changes were made in 13 (65%) of cases. Major changes were made in four cases, while two cases underwent minor changes prior to completion of the procedure. Use of the C-arm led to an approximate increase in OR charges of $1549 ($649 for use of C-arm and $900 in operating room time). Postoperative CT scan for a maxillofacial scan without contrast were $1884.
Conclusion: Intraoperative use of 3D C-arm imaging to ensure proper fracture reduction is cost-effective and warranted to avoid suboptimal surgical results.

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Trigeminocardiac reflex — a phenomenon neglected in maxillofacial surgery?

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Background: Trigeminocardiac reflex is a physiologic response of the body to pressure effects in the region of distribution of the trigeminal nerve. Oral and maxillofacial surgical procedures can induce the development of this reflex, which leads to significant changes in the heart rate and sinus rhythms. This study intends to evaluate the effects of this reflex in patients with facial fractures and its subsequent management.
Methods: A total of 37 patients with facial fractures who presented to the Department of Oral and Maxillofacial Surgery at Basaveswar Teaching and General Hospital, Gulbarga between July 2015 and March 2016 were considered for the study.
Results: A male preponderance is observed with the most susceptible age group being 21–30 years. 23 patients sustained midfacial fractures alone, nine patients had isolated mandible fractures and five patients had fractures of both the midface and mandible. A relative bradycardia was observed in the patients with midfacial trauma, both at the time of presentation and also during the surgical reduction of midfacial fractures, which improved after completion of procedure in most of the patients. However, in two patients, the bradycardia progressed to a cardiac asystole during midface manipulation necessitating immediate halt of the procedure and intravenous administration of atropine.
Conclusion: Trigeminocardiac reflex though physiologic, which usually tends to subside without complications is not to be neglected in the surgeries of the maxillofacial skeleton. A propensity for unforeseen complications due to this reflex has to be avoided by meticulous electrocardiography monitoring.

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Genioglossus advancement surgery — a modified technique using virtual surgical planning and a custom cutting guide

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Background: Genioglossus advancement (GGA) is a surgical option for the management of obstructive sleep apnoea. While the ideal candidate for GGA continues to be elucidated, previous studies have identified significant variability in terms of the anatomical position of the genial tubercles (GT) and the genioglossus muscle (GGM) relative to the apices of the mandibular incisors and to the inferior border.
Objectives: To determine if the use of three-dimensional (3D) imaging, virtual planning, and custom cutting guides would ensure accurate osteotomy placement to completely capture the GT/GGM, decrease risk to adjacent teeth, and identify unfavourable anatomy that precludes the use of GGA.
Methods: We compared patients who had GGA advancement using traditional method based on the average anatomic location of the genial tubercles with patients who underwent the GGA with computer assisted surgical simulation and a custom cutting guide. The primary outcome variable was positive identification of GT capture based on postoperative imaging or GGM capture noted intraoperatively. The secondary outcome variable was as assessment of the genial tubercle location relative to the apices of the mandibular incisors on CBCT.
Results: Incomplete capture of the GT was noted in five patients treated via the traditional technique as compared to complete GGM/GT capture noted in four patients treated with the modified technique.
Conclusion: The use of a personalised approach with 3D imaging, virtual planning, and custom cutting guides was associated with significantly higher rate of GT/GGM capture.

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Maxillofacial injuries in hospital of Cali, Colombia

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Background: Oral and maxillofacial surgeons play an important role in the treatment of patients with injuries in the facial area, maxillofacial surgeons represent a vital part of the trauma team.
Objectives: The purpose of this study is to review the epidemiology data concerning the maxillofacial trauma care of patients in low-complexity hospital in Cali, Colombia.

Methods: The sample was composed of all patients who sustained maxillofacial fractures from January to December of 2015. The data were collected and analysed to determine the pattern of maxillofacial injuries, including sex and fracture patterns. Data analysis included the Fisher's exact test, and the *t* test.
Findings and Conclusion: All patients had a motor vehicle accident. There were 250 patients (194 males and 56 females) who sustained maxillofacial fractures. There were 357 fractures: nose, 90; orbital, 82; alveolar, 62; maxilla, 54; jaw, 40; zygomatic arc, 26; and frontal, 3. The kinetic energy present in a moving object is a function of the mass multiplied by the square of its velocity. The dispersion of this kinetic energy during deceleration produces the force that results in injury. Trauma from traffic accidents is a problem of public health in some countries.

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Minimally invasive endoscopically-assisted middle cranial fossa reconstruction following traumatic intrusion of mandibular condyle

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Background: Traumatic intracranial intrusion of the mandibular condyle into the middle cranial fossa is a rare injury pattern following facial trauma. Such injuries carry potential for multiple comorbid outcomes regarding both neurological and temporomandibular joint function. Various treatment modalities have been described in the literature, including closed reduction, condylectomy, or open reduction and middle cranial fossa reconstruction.[1]
Objectives: We detail a case report of a traumatic condylar intrusion into the middle cranial fossa, managed via a minimally invasive open approach with endoscopic assistance. This paper highlights the utility of endoscopic surgery in minimising operative morbidity at a critical site.
Findings and Conclusion: A 23-year-old female presented to a tertiary level trauma centre following a skateboarding injury involving a chin-strike. Radiological examination demonstrated traumatic intrusion of the mandibular condyle into the middle cranial fossa with associated base of skull fracture. Open reduction of the mandibular condyle was performed via a preauricular approach. Endoscopic assistance was utilised to intraoperatively confirm dural integrity and perform reconstruction of the skull base with autogenous bone. The patient made an unremarkable recovery with no postoperative neurological deficit and satisfactory temporomandibular joint function.

Use of an endoscope allowed accurate reduction and skull base reconstruction, whilst minimising operative morbidity. This case demonstrates an additional treatment modality that can be employed in the management of a complex injury pattern.

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Current trends in the surgical treatment of patients with posttraumatic defects and deformations of the zygoma-orbital complex

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37 reconstructive surgeries have been performed at the A. I. Evdokimov Moscow State University of Medicine and Dentistry and N.V. Sklifosovsky Research Institute for Emergency Medicine of Moscow Healthcare Department.

All patients had multislice spiral computed tomography (MSCT) in the axial plane of the skull with the construction of three-dimensional reformations in the preoperative period. MSCT data were uploaded to the neuronavigational installation database and layering a virtual model of the missing fragments of bone wall of the orbit was performed in axial, frontal and sagittal sections. Thus, we have created a virtual model of the implant, the shape, volume and localisation of which is fully in line with the corresponding posttraumatic defect of the orbital walls.

Intraoperative monitoring of the form of the established implant, control of the reduced bone fragments and the eyeball was performed using the Pointer neuronavigation setup.

According to the data of MSCT performed in the postoperative period, recovery of the correct anatomy of the facial bones of the skull, the shape and position of the installed implants, reduced bone fragments were satisfactory and consistent with the configuration intact bone structures. All patients with diplopia noted the positive functional effect after the operation and the disappearance of doubling in the central position of gaze.

The applying of frameless navigation when you need to eliminate the defects and deformities of the orbit allows to reproduce the shape, size and position of the bone fragments, implants and autografts most precisely, intraoperatively to assess the position of the eyeball.

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A systematic review of patient-reported outcome measures use in oral and maxillofacial trauma surgery

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Background: With approximately one facial injury per 100 people per year in the United Kingdom, trauma surgery is a considerable part of oral and maxillofacial surgical caseload. Patient reported outcome measures (PROMs) allow for patient-centred assessment of postoperative outcomes. However, most oral and maxillofacial surgery (OMFS) trauma research does not currently include such measures.
Objective: To assess and appraise the use of PROMs in the OMFS trauma literature.
Methods: A Medline search was performed to find relevant titles on treatment outcomes in OMFS trauma from inception to August 2016. Non-English texts and studies not reporting any surgical intervention were excluded.

Results: 27 studies met the inclusion criteria. The most frequently reported PROMs were the University of Washington Quality of Life (UW-QoL) assessment (6 studies) and the Geriatric Oral Health Assessment Index (GOHAI) [3 studies]. Cohort studies were the most common study design; with the UW-QoL the most frequently reported PROM in these studies. Amongst the four randomised controlled trials in the review the most frequently reported PROMs were author devised visual analogue scale.
Conclusion: There is a great heterogeneity in the use of PROMs in the OMFS trauma literature. In view of the increasing importance of these measures compared to simpler objective measures, which may bear no relevance to the patients' perception of their outcome, more research is needed to establish what QoL and PROM measures may be suitable in OMFS trauma.

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The financial case for using orthodontic brackets as a method of intermaxillary fixation in suitable mandible fractures

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Background: Although open reduction and internal fixation is a common method for treating mandibular fractures, certain cases are still suitable for intermaxillary fixation (IMF) alone. Arch bars, Leonard buttons and IMF screws are commonly used methods at this regional trauma centre in London. However, these methods of IMF usually require admission of a patient and a general anaesthetic (GA). Orthodontic brackets with elastics are a simpler method of IMF, which can be placed in the emergency department without the need for admission, and GA.
Objectives: The purpose of this study was to identify all mandibular fractures requiring IMF placement under GA that may have been suitable for treatment using orthodontic brackets and elastics instead. Using this data we then performed a cost analysis to see how much money the hospital could have saved.
Methods: All mandibular fractures treated solely with IMF in the past 12 months were identified. The length of admission, time to theatre and time in theatre was identified. Costing for this was performed and the amount that potentially could have been saved were calculated.
Findings: 11 patients were identified. They spent a total of 19 days in hospital and 15.8 h in the operating theatre at a total cost of £26,600.
Conclusion: In suitable cases orthodontic brackets and elastics can be used as an effective method of IMF. This can reduce the hospital admission rate and need for GA. This will not only reduce costs for the hospital but also intangible costs for the patient.

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Evaluation of patients submitted to conservative treatment of jaw fracture in fire weapon projectile

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Background: The treatment of gunshot injuries in the face somehow led to the development of modern maxillofacial surgery, and remains one of the main challenges of the specialty. Conservative treatment of this fracture has been cited by many scholars of the subject as the form of procedure in obtaining greater success with less morbidity for the patient. This study aims to evaluate patients who underwent conservative treatment of mandibular fracture by projectile from a firearm through maxillomandibular block.
Methods: The sample consisted of six patients, where a descriptive analysis was performed with obtaining and measuring mandibular movements, obtaining computed tomography scans to assess bone morphology and a subjective evaluation with the application of the Oral Health Impact Profile-14 questionnaire to assess quality of life.
Results: Patients had a maximum aperture of mouth mean 45.42 mm, 3.38 mm with an average protrusion, and right and left laterality were averaging 9.49 and 7.39, respectively. In imaging evaluation, three patients had unchanged morphological, two patients with mild alteration and one patient with moderate alteration. Given the quality of life was observed that patients one, two and four got a great quality of life, patient five a good quality of life and patients three and six showed a moderate quality of life.
Conclusion: It was observed that with the proposed treatment patients showed maintenance of mandibular movements, bone repair without major morphological changes and the patients reported a good quality of life.

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Impaled wooden foreign body traversing inferior orbital fissure — report of an interesting case

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Penetrating orbital injuries with or without retained intraorbital foreign bodies (IOrbFBs) are uncommon but often dramatic injuries.

Orbital penetration by a wooden foreign body is relatively rare, especially in impalement injuries where the head can be impaled on a stationary object.

Although orbital injuries are most commonly examined by the ophthalmologist or oculoplastic department, the maxillofacial surgeon may be more adept at management of retained foreign body when the bony structures of the orbit are involved.

We encountered such a case of a 7-month-old orbital impalement injury by a wooden twig from a shrub, which was successfully retrieved in a short operation.

Though uncommon these injuries have been reported in ophthalmology literature, but are still a rare presentation to the maxillofacial surgeon who may actually be just as adept or more at management of these when bony structures are involved.

The purpose of reporting this case is to highlight the rare nature of disease, and importance of meticulous planning in managing

such cases with rare presentations and sound anatomical knowledge. Also to emphasise that these injuries may fall well within the forte of the maxillofacial surgeon.

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Temporomandibular joint ankylosis secondary to panfacial fracture

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Panfacial fractures (PF) involve upper, middle and lower third of the face. Condylar fractures may be present. They can be intracapsular, which is more associated with ankylosis of the temporomandibular joint (TMJ), or extracapsular. TMJ ankylosis appears de novo or after primary treatment.

We report a case of panfacial fracture associated with bilateral condylar fracture. We proceeded in a "top-down and outside-in" sequence to restore facial skeleton. Both condylar fractures were treated with semi-rigid fixation. While miniplate fixation was used for right condyle, wire fixation was chosen for the left one. No immediate postoperative complications arose. After 18-month follow-up, control mandible computer-assisted tomography showed left TMJ bony ankylosis. The patient underwent second surgery to remove the ankylotic block. Both coronectomy and partial temporalis muscle transposition flap were also performed. After 11-month follow-up, no signs of reankylosis has been found, the patient is asymptomatic and has a normal jaw function.

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Antibiotic prescription in mandibular fractures

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Background: Antibiotics are prescribed prophylactically during open reduction and internal fixation (ORIF) of mandible fractures to reduce the incidence of surgical site infection. An audit was performed to determine adherence to the Scottish Intercollegiate Guidelines Network (SIGN) on antibiotic prophylaxis in surgery which provided evidence-based recommendations that suggest not giving more than 24 h of antibiotic prophylaxis in ORIF of mandible fractures.
Objective: Antibiotic prescribing needs to be done in an appropriate manner to minimise the adverse effects of antibiotics and also to reduce the incidence of resistant organisms.
Methods: Data of cases admitted with mandible fractures were collected between January 2014 and August 2016 in a major United Kingdom district general hospital. The data recorded included mandible fractures, patients' demographic, length of stay in the hospital and antibiotic prescribing pattern.
Findings: While 90% of them were males the rest 10% were females. In the control group 95% patients were given antibiotics on discharge from the hospital. We have compared this control group with patients who were prescribed antibiotics as per SIGN guidelines. We found no significant difference in the rate of postoperative infection rates among them.
Conclusion: There seems to be a tendency of over-prescribing of prophylactic antibiotics in our unit in the treatment of mandibular fractures. We have therefore changed the practice of prophylactic antibiotic prescribing in our unit and collected evidence whether this has increased the incidence of surgical site infection from this protocol.

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Maxillofacial trauma: preliminary results of a multicentre study at emergency units in Chile (FONIS SA1520196 Project)

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Background: Trauma represents 50% of emergency consultations in developing countries, and is the third cause of death worldwide. Specifically, those injuries involving soft or hard tissues of the facial area or maxillofacial trauma reported incidents in Latin America are in the order of 20 cases/100,000 with variations in its aetiology and mechanisms. In Chile, it still has information that prevents biased estimate their real magnitude and behaviour.

This project is a national multicentre study developed in three high complexity medical centres involved in Chile and has been approved by the respective ethics committees.
Objectives: Characterise maxillofacial injuries in adult patients treated at emergency units.
Methods: Observational, cross-sectional study, based on the diagnosis of maxillofacial injuries in patients over 18 years consulting in emergency units of three hospitals of high complexity in Chile. An exploratory data analysis and recoding of diagnoses and trauma mechanisms according to suggested by World Health Organization was performed. Summary measures and differences were estimated by sex and age group with Chi squared test using Stata 11.0 © software.
Findings: Preliminary results of the study are presented. During the observation period maxillofacial trauma was presented mainly in active age males (20–40 years); the most common cause of trauma was assaults followed by traffic accidents.
Conclusion: Maxillofacial trauma is currently a clinical entity that represents a challenge to surgical teams, however, also they are considered aspects such as the impact on public health and prevention measures.

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Delayed open reduction and single screw internal fixation as a treatment option in case of failed nonsurgical treatment of bilateral condylar head fractures with fragmentation

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Background: The open treatment of condylar head fractures has been approved by more surgeons with the superiority of the open treatment. However, there are rare experiences on the open treatment of the condylar head fracture with fragmentation.

Objectives: To share our experience on the open reduction and single screw internal fixation of delayed bilateral condylar head fractures with fragmentation and evaluate its feasibility and outcomes.
Methods: The study involved six males and one female. All patients have multiple injuries on different sites of body and failed nonsurgical treatment of bilateral condylar head fractures. The mean period between the injury and the operation was 5.7 (4–8) weeks. According to the preoperative computer-aided design, and the clinical manifestations, the fracture fragments were reduced and fixed with a single screw. A helical computed tomography scan was requested postoperatively to check the reduction of the fragments and the location of the screws. And the mean follow-up duration was 9.7 (8–14) months.
Findings and Conclusion: The malocclusion was corrected after operation. The intraoperative passive mouth opening was 3.93 ± 0.19 cm. The mouth opening was 3.43 ± 0.35 cm in three months follow up, and more than three transverse fingers at the last follow up. No one has a progressive limitation of the mouth opening in 8–14 months follow up. The strategy of open reduction and single screw internal fixation of bilateral condylar head fracture with fragmentation of mandible is feasible and effective. It is a treatment option in the rare delayed cases of failed nonsurgical treatment.

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Dental Implantology, Preimplant Surgery and Grafting

Miniplate temporary orthodontic bone anchorage devices for maxillary molar intrusion — the challenges

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Background: Miniplate orthodontic bone anchorage (OBA) devices are being increasingly utilised for management of certain malocclusions. Anterior open bites are renowned for being the most challenging to correct, along with the most likely to relapse. Literature shows good outcomes when utilised for closure of small anterior open bites and the opportunity to minimise osteotomy movements or even avoid bimaxillary surgery.
Findings: The author presents a personal series of cases in which the anterior open bite was greater than 6 mm, and discusses the challenges faced mid treatment with the miniplate OBA and how we overcame them

- Flaring of first permanent molars on applying traction.
- Gauging appropriate tightness of powerchain — balance between traction forces and risk of breakage.
- Interference of occlusion due to wisdom teeth.
- Mucosa overgrown to cover the OBA before treatment commences.
- Difficulty in correction of skeletal asymmetries.

Conclusion: The use of miniplates is an effective management strategy for partial or complete correction of open anterior bites. They can reduce size of osteotomy movements or limit the surgery to a single jaw, reducing morbidity and reducing postoperative recovery periods. It does come with some inherent problems and challenges.

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Prospective randomised clinical trial using autogenous bone or beta-tricalcium phosphate in maxillary sinus lifting: histological and tomographic results

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Objectives: The aim of this study was to analyse the use of the beta-tricalcium phosphate (β-TCP) ChronOs® and autogenous bone (AB) in maxillary sinus floor augmentation by comparing computed tomography (CT), histological, histometric and immunohistochemical analysis.
Methods: 12 consecutive patients underwent bilateral maxillary sinus grafting. One side of each patient was augmented with pure β-TCP and the other sinus was augmented with pure autogenous bone. Patients had their sinus scanned for computed tomography (CT) seven and 180 days after surgery for quantitative comparative analysis of residual volume after graft resorption and remodeling. Prior to implant placement, grafted material was collected from each sinus using a drilling mill for histological and histochemical analysis.
Findings: CT volumetric analysis revealed no statistically significant difference between groups. Histological analysis revealed absorbing granules of β-TCP being substituted by mature bone. Histomorphometric analysis showed the presence of 51.58% of newly formed bone in the β-TCP group and 40.97% in the AB group. There was no statistical difference between the groups. Immunohistochemical evaluated the presence of osteocalcin, Runt-related transcription factor 2 (RUNX2), tartrate-resistant acidic phosphatase (TRAP) and vascular endothelial growth factor (VEGF). Osteocalcin and VEGF were expressed in both groups with similar intensity. TRAP showed a low expression in both groups. RUNX2 was observed only in AB group.
Conclusions: Autogenous bone has superior osteoinductive properties. Chronos® is a biocompatible and osteoconductive material with similar clinical results to the autogenous bone in this proposed model, even without osteoinductive properties.

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Evaluation of graft resorption following anterior iliac crest bone grafting for the reconstruction of deficient alveolar ridges via general and combined spinal epidural anaesthesia

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Objectives: The main purpose of the study is to evaluate the graft of iliac block bone grafting performed under general anaesthesia (GA) or combined spinal epidural anaesthesia (CSEA) and assess three-dimensional volumetric changes in the grafted bone.
Methods: The investigators implemented a retrospective study including patients who underwent anterior iliac block bone grafting for maxillary augmentation. The primary predictor variable was GA or CSEA. The outcome variable was volumetric changes at the augmented sites from baseline (V-0) to 3 weeks (V-I) and 4 months (V-II) after surgery by using 3D volumetric analysis technique.

Aim and Hypothesis: The null hypothesis was that iliac crest bone grafting under GA and that under CSEA have different resorption rates with statistically insignificant differences.
Results: The sample comprised 22 patients grouped as follows: GA ($n = 10$) and CSEA ($n = 12$). No significant differences were observed between groups with regard to graft resorption. The total average resorption at the grafted site from V-I to V-II was 34% in both groups ($P < 0.001$).
Conclusion: Iliac block bone grafting for deficient maxillary ridges can be successful under both GA and CSEA. Although there is no statistically significant differences were observed between groups, CSEA may increase patient comfort.

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Rehabilitation of the patient using the tunnelling bone grafting method and "XiVE" dental implants

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Objectives: The purpose of this work is a complete rehabilitation of chewing function in partially edentulous patients with jaw bone atrophy using tunnelling bone augmentation method and "XiVE" dental implants.
Methods: A 62-year-old female patient sought treatment for her radicular cyst in the upper jaw and partial edentia. The cyst and the teeth were extracted. The sinus was sanitised endoscopically. Eight months after the surgery tunnelling bone augmentation with simultaneous sinus floor lifting was carried out. Six months later dental implants were installed.
Results: No postoperative complications were reported, there was a slight swelling of the soft tissues. The patient noted a comfortable postoperative period and did not take painkillers. All the installed implants integrated successfully and had a full prosthodontic rehabilitation.
Conclusions: This minimally invasive technique allows a full rehabilitation of patients. Subject to the treatment protocol them minimally invasive methods are becoming more widely used in the treatment of complex patients.

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Immediate post-extraction dental implantation with fixation of implant to buccal and palatal bone wall of tooth socket using miniplates (case report of 10 years of success)

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Background: Immediate post-extraction dental implantation may be impossible at difficulties of primary intraosseous stabilisation of implant. In these cases we can wait for a period of two to eight 8 weeks. However, in this period, atrophy of alveolar bone may occur. Delayed implantation is second and additional surgical procedure. Reduce the numbers of surgical procedures and increase the effectiveness of immediate dental implantation where a primary fixation of implant is impossible.
Methods: This study describes the case of immediate implantation in fresh socket where the primary intraosseous fixation of the implant is impossible. Patients had excessive destroyed left upper second molar. Tooth was removed under local anaesthesia. Buccal and palatal mucoperiosteal trapezoidal flaps were raised. Titanium mini plate for jaw osteosynthesis with length of 30 mm was fixed to the implant (Imtec Endure CL 4, 3/15 mm) by cover screw. Barrier resorbable membrane was also fixed between the plate and the implant. Mini plate was curved by design of buccal, occlusal and palatal socket walls. Socket was grafted by tricalcium phosphate. Implant with membrane and mini plate was inserted into socket and fixed to buccal and palatal bone by two titanium screws for osteosynthesis. Buccal flap was extended and socket was closed by sutures.
Results: There was complete healing. After 6 months an osseointegration was observed radiographically, and crown was fabricated. After 10 years patient was examined radiographically and periimplant bone resorption was not found. The stabilisation of the implant was good.
Conclusion: This method can be successfully used at immediate dental implantation.

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Segmental implant bone-block repositioning: a retrospective clinical evaluation

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Background: Vertical alveolar bone atrophy represents a challenge for reconstruction, especially when involving the aesthetic zone of maxilla, and when reconstruction is not achieved, a good aesthetic outcome is hardly obtained.
Objective: To assess the outcome of implant-bone block movement, after segmental osteotomy and osteodistraction in the maxillary aesthetic region in patients with vertical alveolar bone atrophy.
Methods: Consecutive patients with vertical alveolar bone atrophy that underwent relocation of implant-bone block segment in the maxillary aesthetic region with a minimum of six-month follow-up were selected. Outcome measures were implant failure, complications after initial loading, vertical bone augmentation, papilla index, width of keratinised mucosa and patient satisfaction.
Results: Nine patients were enrolled in the study, all with multiple implant, with a total of 25 implants. Mean vertical bone augmentation was 4.9 mm (from 3.0 to 8.4 mm), and only one implant failure occurred. A statistical significant improvement in papilla index was seen after surgery, leading to a good aesthetics outcome. More than 2 mm of keratinised mucosa width was presented in six patients. A high satisfaction and acceptance to treatment was observed in present study.
Conclusion: The technique can successfully reconstruct vertical alveolar bone atrophy, with a high overall implant survival rate in a short-time period, increasingly the aesthetics outcome with a good acceptance from patients.

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Anterior mandibular bone grafts by submental approach

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Background: Some cases of totally edentulous mandibles are associated with extreme osseous resorption, which do not allow the placement of dental implants, even in the symphysis area. In these cases, bone reconstruction techniques are limited by the risk of gingival tear and graft exposure.
Technical Note: The bone graft technique with a submental approach avoids an intraoral break and the risk of graft exposure or infection. The reconstruction was done with calvarian bone apposition in the mandibular interforaminal region. The graft was generally placed on the upper surface of the symphysis and occasionally on the underside. The scar was hidden in the submental fold.
Discussion: We believe this surgical technique is mainly indicated for cases with extreme bone resorption. It allows the reconstruction of the mandibular symphysis, without an intraoral approach. The postoperative courses are uneventful thanks to the cranial bone harvesting technique. This approach can also be indicated for elderly patients who complain about ill-fitting dentures.

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No periimplantitis case ever seen!

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Background: For the time being, we have never observed inflammatory or similar effects within the structure of titanium implants.
Objectives: We would like to question the validity of the terms implantitis/periimplantitis as we believe that inflammatory process cannot exist within the structure of the implant device. Should the term refer to processes around the implant, other terms would potentially need to be used.
Methods: Our clinical practice with implants started in 1961–1962. At that time, the concept of osseointegration was not observed and the work involved implant types different from titanium. When both (osseointegration and titanium) came together, the current era appeared. Evolution brought us to periimplantitis and also to everything surrounding the referred term. Large material for study exists, both clinical and bibliographic, and therefore many studies could be performed. We wonder though, whether it would be possible to speak about a physiopathology of the osseo de-integration and try to understand even better the aspects of periimplantary illness. Researchers have the environment needed for their practice and that allows the comparison among implantary phenomena and the one derived from the dental physiopathology: perception of mucosa inflammation related to gum inflammation related to implants, leading to mucositis. Same rational made that periimplantary inflammation led to implantitis/periimplantitis.
Findings and Conclusion: Our practice with official devices could not prove inflammatory signs within the device; this triggers our concern about the terminology used.

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Biomechanical analysis of immediately loaded implants according to the all-on-four concept

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Background: The All-on-Four concept offers a less invasive option because it requires fewer implants, with bilateral distal implants inserted at an inclination of 30° to decrease the cantilever length. However, there has been little biomechanical evidence for immediately loaded implants according to the All-on-Four concept.
Objectives: The purpose of this study was to investigate the biomechanical behaviour of immediately loaded implants in an edentulous mandible according to the All-on-Four concept.
Methods: A three-dimensional finite-element model of an edentulous mandible was constructed. Four implants were placed between the bilateral mental foramen according to All-on-Four concept. A framework made of titanium or acrylic resin between the bilateral first molars was modelled. Immediate loading and a delayed loading protocol were simulated. A vertical load of 200 N was applied at the cantilever or on the abutments region of the distal implants, simulating the absence of a cantilever.
Findings and Conclusion: The loading position greatly affected the principal compressive and tensile strain values. The peak principal compressive strains in non-cantilever loading resulted in a 45.3–52.6% reduction compared with those in cantilever loading. Mandibular fixed full-arch prostheses without cantilevers may result in a favourable reduction of the periimplant bone strain during the healing period, compared with cantilevers. The maximum micromotion was within the acceptable limits for uneventful implant osseointegration in the immediate loading models. Framework material did not play an important role in reducing the periimplant bone strain and micromotion at the bone-implant interface.

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Treatment with short zirconium-oxide implants

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Zirconium-oxide implants in maxillofacial surgery are a growing market. Regarding titanium implants, there is a tendency to short implants to avoid augmentation. Regarding zirconium implants, the manufacturers and the users are still more conservative regarding diameter and length of the implants.

In this case-report, a patient is presented, receiving an implant with a length of 6 mm.

No problems regarding osseointegration and healing occurred. The implant presented stable after 3 months, therefore the dentist could continue with prosthetic reconstruction.

Studies with a bigger number of patients are required to prove the potential of short zirconium oxide implants in comparison to titanium.

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Preparation of large maxillary sinus membrane perforation using a collagen membrane: retrospective clinical study

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Objectives: To evaluate the clinical outcomes of repairing maxillary sinus using a collagen membrane, when a large perforation occurs in the course of a sinus lift.
Methods: This study included 18 patients who occurred a large perforation in the course of a sinus lift at the Seoul National University Bundang Hospital, South Korea, between September 2011 and March 2014 (11 males, 7 females; mean age, 55.1 ± 12.3 years; 19 implants). The perforations were repaired by using tissue additives and collagen membranes, and then sinus bone graft and implant placement were performed. The resorption of sinus bone graft, marginal bone loss around the implants, and complications were assessed.
Findings: The average resorption of bone graft materials to evaluate possible case after one year was 2.99 ± 1.06 mm (19 cases), after two years was 5.28 ± 2.43 mm (8 cases) and after three years was 6.39 ± 2.88 mm (8 cases). The total average observation period of the patients was 27.5 ± 17.67 months and the final average absorption was 4.76 ± 2.96 mm. The number of postoperative complications was 8 of 18 patients. Screw loosening, periimplantitis, pain, prosthesis dislodgement, haematoma, sinusitis, and bleeding were observed. Implant survival rate was 100% until the final follow-up period. The final alveolar bone resorption was 1.67 ± 1.36 mm around the implant.
Conclusion: The reparation of large maxillary sinus perforation using collagen membrane is effective and successful treatment.

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Affinity of octacalcium phosphate collagen composite for titanium dental implants

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Background and Objective: Octacalcium phosphate (OCP) and its collagen composite (OCP/collagen) are good bone substitute materials. We previously showed that OCP/collagen can be used to repair human jaw bone defects without any associated abnormalities. The present study investigated whether OCP/collagen could be applied to dental implant treatment using a dog tooth extraction socket model.
Methods: OCP/collagen was prepared as previously described. The second and third premolars were extracted from bilateral mandibles of dogs; each extraction socket was extended, and titanium dental implants were placed in each socket. OCP/collagen was inserted in the space around a titanium dental implant. Autologous bone and beta-tricalcium phosphate (β-TCP) were used to fill two of the other sockets, while the untreated socket (i.e. no bone substitute material) served as a control. Three months after the operation, we examined the osseointegration of each bone substitute material with the surface of the titanium dental implant.
Results: Radiographic and histological evaluation revealed bone formation around implants in sockets containing OCP/collagen, autologous bone or β-TCP. In histomorphometric analyses, the periimplant bone areas (BA) percentage and bone-implant contact (BIC) percentage were measured. There was no difference in BA percentage between OCP/collagen, autologous bone, and β-TCP; however, BIC percentage differed significantly between the three materials, although not between OCP/collagen and autologous bone.
Conclusion: These results demonstrate that OCP/collagen is a good alternative to autologous bone as a bone substitute material in dental implant treatment.

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Elimination of deformities of alveolar processes and dentition with the use of mini implants

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Background: In many clinical cases it is difficult, and sometimes impossible, to eliminate deformations of dentition and alveolar processes only by means of orthodontic or surgical treatment. Therefore, in order to implement an effective movement of the teeth and surrounding tissues, it is often necessary to use miniscrews for better, and often the only possible, support.
Objectives: To analyse methods of eliminating deformations of the alveolar processes and dentition in patients using miniscrews.
Methods: Treatment of patients with deformities of alveolar processes of upper and lower jaws included orthodontic treatment with brackets and additional anchorage on miniscrews, sometimes the movement was carried out only by miniscrews and elastics. In some cases the procedure was supplemented by compact-osteotomy. Tapered miniscrews were used and loaded immediately after installation. In cases with implant loosening, they were reinstalled at a new location.
Findings: Duration of treatment depended on the severity of deformation. The best effect was achieved when installing implants on both sides of the alveolar process. Use of miniscrews provides faster and more effective result in eliminating deformations.
Conclusion: Elimination of deformations of dentition and alveolar processes with the use of orthodontic miniimplants goes on faster and without unwanted movement of adjacent teeth.

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Experimental studies of the effect of low frequency ultrasound on the wettability of the surface of titanium dental implants

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Background: It is known that wettability of dental implant surface is one of the key factors influencing quality of osseointegration.
Objectives: To study the effect of low-intensity pulsed ultrasound on the wettability of the surface of titanium dental implants in experimental medical-technical model.

Methods: The medical–technical model included ultrasonic generator, fixtures for implant samples, camcorder and Petri dish with sterile 0.9% physiological solution, and allowed simultaneous immersion of apical part of test and control implants into wetting solution. Empirically the base resonant frequency for given size of implants was found. Ultrasonication of implants with found frequency allowed "forced wetting" of implant surface.
Findings: Results of experiment showed that application of ultrasound with resonant frequency to dental implants caused "forced wetting" of the surface of all the test samples (32 dental implants with SLA surface) within 5–7 s. Surface wetting of control samples (32 dental implant with SLA surface) was not observed. We assume, that effect of "forced wetting" of dental implant surface is possible due to increase of surface energy caused by ultrasound application, which destroys surface tension of wetting agent.
Conclusion: Based on the performed experimental studies it can be concluded, that ultrasonic application to dental implants could increase their surface wettability, especially in porous and complex surfaces with micro- and nanotopography.

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Histomorphometric results of low-intensity pulsed ultrasound application in dental implantation

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Background: Studies show that osteoreparation processes proceed more intensively at sites with low-intensity pulsed ultrasound (LIPUS) application to 47.2–66.8% ($P < 0.001$) compared to the ones without.
Objectives: To evaluate histomorphometric changes around dental implants after ultrasound application in the early healing stages.
Methods: Histomorphometric evaluation of periimplant bone tissue with and without LIPUS was performed.
Findings: In animal models without LIPUS at all stages of the experiment trabecular bone area with high density of osteogenic cells was significantly lower (Mann-Whitney U Test, $P < 0.05$) than in group with LIPUS application to implants and periimplant tissues. The area of newly formed bone around the implant bed was significantly higher (up to 25.6–36.5% ($P < 0.001$)) in animal models with LIPUS exposure comparing to the ones without. The combined effect of LIPUS on implants and periimplant tissues has expressed a linear relationship ($R = 0.96$)–and resulted in marked increase of the area of active osteoblastic surface ($P = 0.0332$). Newly formed coarse fibre and lamellar bone tissue formation was observed around implant bed in LIPUS group. In the control group there was a delay of bone maturation and the predominance of coarse-fibered bone tissue at a later terms of osteosynthesis compared to LIPUS group.
Conclusion: We assume that the combined effect of LIPUS on dental implants and periimplant tissues improves osteoreparation and osseointegration processes.

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Results of morphological studies on the effectiveness of dental implantation using low-intensity pulsed ultrasound

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Background: Ultrasound application to bone fractures in early stages has shown acceleration of callus formation and ossification in several studies.
Objectives: To study the morphological changes around installed dental implants after ultrasound application in the early healing stages.
Methods: In all experimental groups osseointegration processes took place without breaking the sequence of reparation stages. However, the timing and extent of the repair and osseointegration in the control and experimental groups differed depending on the therapeutic effects of the methods.
Findings: Delay of bone maturation, presence of necrotic zones, immature granulation tissue in the early stages, and the predominance of coarse-fibered bone tissue at a later stage of osteosynthesis were found in the first group. In the second group application of low-intensity pulsed ultrasound (LIPUS) to dental implants and periimplant tissues of the operated area contributed to the formation of bone tissue similar in histostructure to the parent bone. The area of the newly formed periimplant bone tissue in the group with LIPUS was significantly higher than that in the first group at all stages of the experiment.
Conclusion: The use of LIPUS during dental implantation induces osteoreparation processes by stimulating angiogenesis in the granulation and the newly formed bone.

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Clinical outcome of implants and sinus bone grafts in the case of maxillary sinusitis: retrospective clinical study

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Objectives: To evaluate clinical outcome of implants and sinus bone grafts in maxillary sinusitis patients.
Methods: This study included 29 patients (59 implants) who contracted maxillary sinusitis before or after sinus bone graft or implantation. Treatment cases were categorised into three groups according to the time of sinusitis treatment, bone graft and implantation; Group I ($n = 18$): maxillary sinusitis treated before bone graft and implantation, Group II ($n = 22$): maxillary sinusitis treated after bone graft, but before implantation, and Group III ($n = 19$): maxillary sinusitis treated after bone graft and implantation. Among the groups, mean marginal bone loss (MBL), survival rate, sinus membrane perforation at bone graft, relationship with smoke, primary and secondary stabilities of implant were evaluated.
Findings: During average observation period of 70.58 months, Group II showed significantly more MBL than Group I and III ($P < 0.05$). The implant survival rates of Group I ($94.44 \pm 0.24\%$) and Group III ($89.47 \pm 0.32\%$) were significantly higher than that of Group II ($63.16 \pm 0.50\%$; $P < 0.001$). Group II showed dominant frequency in sinus membrane perforation at bone graft

surgery. Group II also showed significantly lower primary stability ($P < 0.001$), but no statistical difference in secondary stability when compared with the other groups. More smokers were in Group III ($P < 0.001$), but no relations with MBL, survival rate and primary/secondary stabilities were found.
Conclusion: MBL and frequency of sinus membrane perforation were highest in the Group II, and its survival rate was significantly lower than the other groups. Early diagnosis and treatment of maxillary sinusitis before or after the graft and implantation showed better clinical outcome of dental implants.

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Evaluation of efficacy of demineralised dentin matrix fixed with recombinant human bone morphogenetic protein-2

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Objectives: To evaluate the efficacy of demineralised dentin matrix (DDM) fixed with recombinant human bone morphogenetic protein-2 (rhBMP-2) through experimental and clinical study.
Methods: Experimental study: unilateral upper second and third premolars of eight beagles were extracted. The mucoperiosteal flap was elevated around extraction socket and bone defect was formed by surgical drill. Each DDM fixed with rhBMP-2 and autogenous bone were grafted at bone defect area with collagenous membrane. Beagles were sacrificed at 2, 4, 8, 12 weeks after bone graft. Block specimens involving grafted bone and surrounding nature bone were extracted.
Clinical Study: A total of 23 patients who received bone graft using human DDM fixed with rhBMP-2 (AutoBT BMP) with implant placements (36 implants; maxilla: 14, mandible: 22) were selected. The implant stability, marginal bone loss and clinical outcome were evaluated.
Findings: In the histological evaluation, four weeks after bone graft, autogenous bone showed 41% of new bone formation and DDM fixed with rhBMP-2 showed 5% of new bone formation. Eight weeks after bone graft, autogenous bone showed 46% of new bone formation and DDM fixed with rhBMP-2 showed 13% of new bone formation. At periapical radiograph, both groups showed newly formed bone which was continuously connected with the original bone. Favourable osseointegration was obtained in 35 out of 36 implant sites (one osseointegration failure). In all cases, severe complications were not observed.
Conclusion: DDM fixed with rhBMP-2 (AutoBT BMP) provided good osteoinductive and osteoconductive potentials and clinical efficacy.

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Facial pain after dental implant installation on maxilla

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Background: There are many reports about traumatic neuralgia and paraesthesia after injury of inferior alveolar nerve in mandible due to implants. However, in case of maxilla, although there are not obstacles for implant installation such as nerve, patients sometimes complained of facial pain and paraesthesia after surgery.
Objectives: In this research, we analysed data and observed progress about facial pain after implant installation on maxilla.
Methods: This study includes 30 patients who came to the hospital due to facial pain after maxilla implant from 2001 to 2015. Age, sex, location of implant, symptoms, onset of pain, progression, and prescribed drug were scrutinized retrospectively. We classified specific diagnosis by clinical data.
Findings: The average age was 57 years (range, 40–70 years). Nine patients were male, and 21 patients were female. Seven patients complained right side facial pain and 23 patients complained other side. Five cases occurred after implant installation of anterior teeth. There were several trigger factors: first surgery ($n = 19$), second surgery ($n = 1$), prosthesis fabrication ($n = 4$), infection such as maxillary sinusitis ($n = 1$) and cryptogenic ($n = 5$). Patients were observed during 536 ± 831 days (range, 0–2906 days). Medicine such as anticonvulsant, antidepressant, vitamin B12, non-steroidal anti-inflammatory drug was prescribed. Eight patients had constant pain and others had paroxysmal pain. Fifteen patients were improved their symptom during follow up periods.
Conclusion: We diagnosed 21 cases of posttraumatic trigeminal neuropathy, eight cases of persistent idiopathic facial pain, and one case of headache attributed to disorder of the paranasal sinus by International Classification of Headache Disorders criteria. Fixture was removed in 13 patients. Six patients were improved their symptom after fixture removal.

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Zygomatic implants in traumatic loss of maxilla

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Background: Maxillary defects that occur after trauma are highly challenging for the maxillofacial surgeon to reconstruct and rehabilitate. The aim of rehabilitation is not only to provide a cosmetically acceptable appearance, but also to restore oral functions. Zygomatic implants are not only an alternative to complex free or vascularised bone grafting but are also used when these techniques have failed. However, implant placement in the zygoma is difficult due to the variable anatomy following trauma in the maxillofacial region.
Case Report: A 29-year-old male has a history of alleged road traffic accident in 2014 with maxillofacial fractures. He underwent reconstructive surgery with multiple complex microvascular flaps for the maxillofacial defect. He presented to our department with a failed fibula graft on the maxilla. After comprehensive planning, it was decided to place zygomatic implants for the maxillary defect.
Conclusion: Due to both the anatomical complexities of the zygomatic bone and the implant length, the placement of zygoma implants still represents a challenge. To minimise the risks of surgery, three-dimensional reconstruction, preoperative planning, registration and surgical implant guidance should be used.

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A retrospective clinical study of subgingival suture or double-layered suture technique for guided bone regeneration

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Background: An exposure of guided bone regeneration (GBR) site is one of the main reasons that may cause the failure of GBR. Therefore, it is necessary to suture a wound with reduced tension by sufficient flap releasing or effective tension resistant closure.
Objectives: The aim of the study is to introduce a double-layered suture technique named subgingival suture.
Methods: Basically the subgingival suture is similar to that of subcutaneous skin suture technique. An absorbable suture was used to make buried stitches in a region of the sub-epithelial connective tissue and simple interrupted or vertical matrix suture was carried out to complete the flap closure. The patients who underwent GBR surgery from June 2007 to June 2015 were reviewed by clinical record.
Findings and Conclusion: In total, 403 GBR sites were evaluated. Compared to the previous published literatures, the failure rate of the primary closure for the technique is remarkably lower. Only five out of 30 cases have experienced the failure of the surgery that required additional GBR. Furthermore, the suture technique is not technically difficult. Thus the double layered suture or subgingival suture is can be worthwhile aid for successful GBR.

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Retrospective evaluation of bone graft and dental implants survival after combined one step double-team endoscopic sinus surgery and sinus floor elevation procedure

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Background: In common practice, the presence of maxillary sinusitis, or maxillary sinus pathologies, may impede or postpone the sinus floor elevation procedure (SFE), until the resolution of the condition. Our surgical approach in these cases is to combine both SFE and endoscopic sinus surgery (ESS) in one-step double-team procedure.
Objectives: We present our experience and long-term outcome, including dental implant survival and prosthetic rehabilitation.
Methods: Clinical records of 24 patients that underwent maxillary SFE + ESS between 2011 and 2015 were retrospectively reviewed. All included patients had sinonasal-related pathology.
Findings: 24 combined SFE + ESS surgeries were performed using various bone graft mixtures. Three patients were excluded from the final study due to lack of follow-up. The study group included 11 males and 13 females; median age was 60 years (range, 44–80 years). 13 patients underwent a unilateral SFE, and eight patients underwent bilateral SFEs. There were no intraoperative complications, and combined procedures were successful. 85 dental implants were installed after a period of bone formation. On follow up cone-beam computed tomography the median vertical dimension of the grafted bone available for implant insertion was 14.4 mm. The median of the residual bone after implantation was 3.1 mm; periimplant bone loss was acceptable as in literature. Clinically none of the patients suffered from periimplant disease, majority of implants were clinically stable and only one failed to integrate. Nasal antrum was open in all patients.
Conclusion: We report the long-term promising outcomes of the double-team one-stage SFE + ESS, late dental implant survival and prosthetic dental rehabilitation.

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Treatment of the atrophic upper and lower jaws using dental implants: rehabilitation of two complex cases

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Management of the atrophic maxilla and mandible requires special considerations because of the unfavourable biomechanics, surgical, prosthetics and aesthetics factors. Therefore, autogenous bone grafts represent the treatment of choice prior to any implant restorations of such cases.

This report presents two cases treated in this manner, where the vertical and sagittal dimensions of the jaws were restored using iliac crest bone graft, sinus lift, sulcus deepening and nerve repositioning for the lower arch for the first case. These complex cases required healing times of nine months for graft integration, afterwards dental implants placed in the grafted sites are allowed to heal for six months. During this period, it was possible to functionalise the implants with temporary restorations, and at the end of the healing period final fixed implant restoration is performed. Eighteen months after prosthetic rehabilitation and oral hygiene follow up there has been no complications.

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Osteoinductive potential of bone scaffolds developed from FYR Bioceramic (a material of emitting high performance far-infrared ray irradiation)

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Background: Autogenous bone has been considered the golden standard for bone replacement procedures in maxillofacial surgery. Synthetic inert bioceramics are currently used as an alternative to autogenous bone graft. New developed type of so called FYR type of Bioceramic (FYRTOB) is a material that emits high performance far-infrared rays (4–20 μm), and possess physical, chemical and biological characteristics on irradiation of water: reducing the size of water clusters and weakening of the hydrogen bonds of water molecules and other effects on physical and chemical properties of water). The use of FYRTOB bone substitutes is not noted in the literature.
Objectives: The present study examined the osteoinductive potential of effects of FYRTOB using *in vivo* animal models.
Methods: In this study, autogenous milled bone grafts harvested with a trephine from Wistar rats and a novel alloplastic FYRTOB were implanted into bilateral muscle pouches (25 mg per pouch) of

30 Wistar rats and analysed histologically (at three and six weeks postoperatively) for their ability to induce new ectopic bone formation around grafted material. A semi-quantitative osteoinductive score was used to quantify the osteoinductive ability of both bone grafts.
Results: The results reveal that the FYRTOB bone graft possessed 2.1 times higher osteoinductive potential in comparison with autogenous bone.
Conclusion: These findings suggest that FYRTOB bone grafts have potential for inducing ectopic bone formation. Future clinical testing is necessary to reveal their bone-inducing properties in different clinical scenarios.

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Effects of bone density and inclination of implant on micromotion at the bone-implant interface

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Background: Primary stability is one of the most important variables affecting the success of immediately loaded implants. There have been no studies evaluating the correlation between the bone types and the primary stability of immediately loaded implants according to the "All-on-Four" concept (Ao4 model).
Objectives: The purpose of this study was to investigate the effects of bone density and crestal cortical bone thickness as well as inclination of implant on micromotion of immediately loaded implants.
Methods: A three-dimensional finite element model of an edentulous mandible was constructed. Four parallel implants were equally spaced between the bilateral mental foramen (4PI model) or four implants were placed according to Ao4 model. A framework made of acrylic resin between the bilateral first molars was modelled. The contact interface between the implant and bone was simulated. A vertical load of 200 N was applied at the cantilever or on the abutments region of the distal implants, simulating the absence of a cantilever. Micromotion (relative displacement between the implant and bone) was calculated.
Findings and Conclusion: The maximum micromotions with low-density cancellous bone were approximately five-fold higher than those with high-density cancellous bone. Maximum micromotion in the Ao4 models resulted in 28–68% decrease compared with 4PI models. Cancellous bone density and loading position may be a critical factor for avoiding excessive micromotion in immediately loaded implants. Ao4 configuration can significantly decrease the maximum micromotion compared with parallel implant configuration because of reduced cantilever length.

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Acute infection and numbness following dental implant placement using the flapless technique

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Background: Acute onset of infection and numbness arising after dental implant placement are rare but not uncommon complications. Studies have reported that 4–10% of patients receiving dental implants develop postoperative infections which hamper osteointegration and leads to implant failure.
Objective: The aim of this article is to report the incidence of a postoperative right submandibular swelling and right mental region numbness occurring 48 h post implant placement using a flapless technique. The patient noticed swelling of the right submandibular region 2 days after implant placement, which was associated with excruciating pain and fever. The swelling gradually increased in size despite the administration of oral antibiotic with pus seen discharging around the vicinity of implant when palpated. Pus swab revealed the isolation of *Streptococcus parasanguinis*, *Neisseria* spp. and *Klebsiella* spp. The sensation of pain at the implant site and submandibular region overwhelmed the numbness felt at the right mental region, which was caused by the implant impinging onto the inferior alveolar nerve. However, numbness became prominent and persisted after controlling the infection and removing the offending implant.
Conclusion: A rare case of acute infection that presented as a submandibular swelling coupled with the sensation of numbness at the right mental region after implant placement is presented. These symptoms lead to detrimental quality of life for the patient at one-month post-explantation.

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Correlation between nasal decongestant use and maxillary sinus perforation: a retrospective study

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Background: Perforation of the Schneiderian membrane is a common complication during external sinus augmentation procedure, which may be at a higher risk in patients using steroidal nasal spray. Research has shown a statistically significant decrease in the thickness in the inferior turbinate of nasal epithelium after 6 months.[1] Similarly, steroidal nasal spray would make the membrane thin and brittle, which may increase risk for perforation; however, there is no published data yet.
Objective: The objective is to explore whether history of steroid nasal spray increases the risk of perforation of the Schneiderian membrane. The outcomes of this study will allow practitioners to be cautious or alter the procedure method and/or treatment plan.
Methods: This retrospective study was conducted at the Tufts University School of Dental Medicine. Following the institutional review board approval, clinical records of the patients who underwent external sinus lifts at the Oral and Maxillofacial Surgery Resident Clinic in the past five years were reviewed.
Results: A total of 76 patients underwent this procedure. Only 11 (14.5%) patients had documented history of steroid nasal decongestant spray. There were a total of 29 (36.8%) perforations documented and among them only five (45.5%) patients were using nasal spray.
Conclusions: This is an ongoing study and results from this preliminary analysis show that there is no correlation between steroid nasal decongestant spray and the risk of perforation of the Schneiderian membrane.

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Autologous bone block graft in combination with platelet-rich fibrin for posterior mandible and maxillar rehabilitation

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Background: When there is inadequate bone volume there are different surgical techniques in order to reconstruct the bony ridge to allow later implant placement. The autologous block bone graft is one of the alternatives most used and it has demonstrated satisfactory results in the increase bony rim.
Objectives: Show two cases of rim bone augmentation with autologous bone block graft in for the subsequent rehabilitation.
Methods: The report of two cases of bone graft used in maxilla and mandibular posterior zone. In these two patients the graft was realised in a first surgery, and the chosen donor was the retromolar site. The waiting period for the second surgery, in which the implant was placed, was of four months and afterwards the dental rehabilitation with the coming follow up of their treatment. Patient 1 maxilla: bone graft bone augmentation in combination of platelet-rich fibrin (PRF) and with sinus floor lift, and patient 2 mandibular: bone graft bone augmentation in combination of PRF.
Findings and Conclusions: The use an autologous bone graft in combination with PRF, was a good choice for the rehabilitation of these two patients.

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Maxillary sinusitis following sinus bone augmentation:

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Background: Maxillary sinusitis (MS) is a relatively rare complication following sinus bone augmentation (SBA); however, the majority of the complications may require additional surgical intervention which may delay or even prevent future implant placement.[1]
Objectives: The purpose of this study was to describe patients with MS which developed following SBA and to emphasise the importance of thorough evaluation of the patients preoperatively.
Methods: The study included 17 patients presenting MS and treated due to failed lateral-approach SBA from 2010 to 2015. Eleven of the SBA operations were performed by one of the three authors and six were performed by different practitioners, with or without simultaneous implant placement. All relevant clinical, radiological and surgical data were recorded.
Findings: The study group consisted of 7 female and 10 male patients aged 43–69 years. All patients were classified as Group I and Class 1a (1). Examination of both available preoperative radiographs and patient history indicated that 11 patients already had chronic MS before the procedures. All patients were given systemic antibiotic and nasal treatment. Five patients responded treatment without need for further surgery. In 12 patients infected graft material and seven implants (out of 11) were removed by Caldwell-Luc operation. Four patients required further endoscopic sinus surgery. SBA was reattempted in three cases.
Conclusion: Detailed clinical and radiographical evaluation as well as close cooperation with an ear, nose and throat surgeon is prerequisite before SBA in order to minimise complications.

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Feasibility of implant treatment provided by public health insurance in our hospital

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Background: The common causes of lost teeth and alveolar bone deficiency are osteomyelitis, trauma, tumour disease, and congenital deformity. In order to improve oral functioning of such patients, the use of dental implants is considered useful in the reconstruction of occlusion and functional recovery. Public health insurance coverage for bone-anchored devices and prostheses for wide edentulous area was introduced in Japan 2012. The aim of this study was reported the feasibility of implant treatment provided by Japanese health insurance at Nippon Dental University hospital between the years 2012 and 2014.
Methods: Eight patients (four males and four females, aged between 30 and 82 years) who underwent implant treatment provided by Japanese health insurance after surgical resection of osteomyelitis or tumour disease were included in this study.
Results: Two were edentulous in the maxilla, and six were edentulous in the mandible. Of the eight patients, bone-anchored bridge-type implant prosthesis was performed in six and an implant-retained overdenture was in 2. 5 implants were placed in the native bone, and 23 implants was placed in the bone grafts. Implant treatment was successful with no complications in 7 patients. One patient had lost two implants due to periimplantitis, because of the flap for bulky.
Conclusion: Based on our results, it suggests that implant prosthesis is useful for oral rehabilitation and improves quality of life of patient after surgical resection of jaw bone.

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Dentoalveolar Surgery and Nerve Injuries

Palatal injection for the removal of maxillary teeth: current practice amongst oral and maxillofacial surgeons

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A number of clinical trials have recently been published which examine whether palatal injection is necessary for the extraction of maxillary teeth. It has been suggested that contemporary local anaesthetics might diffuse sufficiently across the buccal-palatal cortical bone distance, which increases anterior to posteriorly in the maxilla. However, recent clinical trials present very little information on the necessity of palatal injection according to region of the maxilla.

The purpose of this study was to conduct a survey of consultant Oral and Maxillofacial Surgeons regarding their use of palatal injection for maxillary tooth extractions, and to obtain data on use according to region of the maxilla.

The Canadian Association of Oral and Maxillofacial Surgery (CAOMS) sent an online survey to 276 consultant surgeons in Canada. Respondents were asked to answer eight simple questions regarding their use of palatal injection.

92 replies were received. 2.3% never used palatal injection for extraction of either some or all groups of maxillary teeth (grouped as incisors, canine, premolars, first and second molars, third molars); 5.7% occasionally used palatal injection, and 13.5% used palatal injection most of the time, for extraction of some or all groups of maxillary teeth. The number of practitioners who did not 'always' administer a palatal injection for the removal of maxillary teeth (i.e. they give it most of the time, occasionally or never) decreased in a broadly linear fashion anteriorly to posteriorly in the maxilla (incisors: 17/89; canines: 16/88; premolars: 13/88; first and second molars: 10/89; third molars: 10/88).

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Accidental displacement of teeth: a systematic literature review

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Background: Removal of teeth is one of the most common surgical procedures performed in oral and maxillofacial surgery. This procedure may result in a number of major and minor complications. Accidental displacement is a complication that occasionally occurs during these operations.
Objectives: The aim of this paper was to review the literature associated with displaced teeth and to recommend rational guidelines for management.
Methods: A systematic review of the literature was performed using the MEDLINE database to record the types of displacements, patient's personal data and the surgical approaches with complications.
Findings: 27 reports were identified and reviewed. In the 35 reviewed cases, men are more affected than women and the second and third decades of life were the most common time for this complication to occur. The factors that usually contribute to such problems are numerous. Fragments were displaced into seven different tissues spaces. The size of the fragments varied, but fragments roots are more displaced then whole teeth. The three-dimensional exploration was the most requested radiological examination. The timing of the retrieval attempt has been the subject of some debate.
Conclusion: The accidental displacement of teeth during attempted extraction is a rare but potentially serious complication. Retrieval should be effected as soon as possible. Because of differences in the direction of displacement, the size of fragment, delay in retrieval, and tissue reactions, different techniques can be used.

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Trigeminal neuralgia for cerebral surgery, treatment and case report

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Background: The first complete description of trigeminal neuralgia (NT) was given by the English philosopher John Locke. NT is a disorder presenting as sudden electric shock, throbbing pain on one side of face following the distribution of the fifth nerve.
Case Report: A 41-year-old female with a history of right cerebellar pilocytic astrocytoma managed surgically, in medical control (NT) with anticomisiales patient (NT) branch 2Y3 right side secondary to brain surgery evolution of 10 years. Magnetic resonance imaging AN area of right cerebellar encephalomalacia without mass effect or cancer recurrence is observed subsequently underwent surgery branch 2Y3 right trigeminal under general anaesthesia balanced by a peripheral neurectomy of alveolar nerve and infraorbital nerve intraoral so doing neurectomy scalpel and placing oxytocin in both segments of neurectomy.
Conclusion: Anticonvulsants are effective in the treatment of (NT) but few studies with high levels of evidence found. It is difficult to compare or combine their scientific results and significantly due to insufficient research data, there is a high need for randomised controlled trials in this medical area. The long-term prognosis for pain relief is of interest and is not widely known. The use of oxytocin in neurectomies is insipiente since there are no long-term studies or large number of cases, the patient is asymptomatic one year after the procedure.

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Does cone-beam computed tomography imaging have an impact on treatment planning for ectopic maxillary canines?

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Background: There is a poor evidence base relating to the impact of cone-beam computed tomography (CBCT) imaging on treatment planning for ectopic maxillary canines. Therefore, an evaluation into the impact of these scans is of valuable importance due to the relatively high radiation exposure.
Objectives: To investigate the impact of CBCT imaging data on the existing treatment plan of ectopic maxillary canines follow-

ing an initial diagnosis obtained from clinical examination and conventional radiographic imaging.
Method: This service evaluation was carried out in the Departments of Oral Surgery, Maxillofacial Radiology and Orthodontics. Patients attending between 2011 and 2016 who were (1) under the age of 30 years, (2) attending the Trust for orthodontic treatment and (3) presented with ectopic maxillary canines were included. A total of 30 patients met these criteria.
Findings: The most common reasons for requesting a CBCT scan were to assess the extent of root resorption (23 cases) and confirm the position of the canine (20 cases). A further two cases showed resorption on the CBCT scan that was undetectable on conventional radiographs; however resorption was minimal and had no effect on the treatment plan. Only one case out of 30 had a change in treatment plan following the CBCT scan, where surgical removal of the canine was opted instead of exposure and bonding of an orthodontic attachment.
Conclusion: Justifications for CBCT scans, simply on the basis of treatment planning have to be challenged if this can be clearly determined with conventional radiography.

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The acute reaction of neurons of facial nerve is an early event after facial nerve axotomy

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Background: Injury to facial nerve causes neuronal damage to varying degrees; from acute reaction of cells to apoptosis depend on the severity, position and time of injury.
Objectives: To explore the morphologic change of cells and survival rate of facial nerve neurons in different times after facial nerve axotomy.
Methods: The facial nerve of rats was cut off, and in 1, 3, 7, 14, 28 day after injury, the brainstem was dissected and the slices containing facial nerve nuclei were made to observe the cellular morphology. The survival rate and apoptosis index of facial neurons were also assessed.
Findings and Conclusion: (1) About 21.21% and 19.63% facial neurons showed acute reaction on day 1 and 3 after injury, respectively; on day 7 to the top of 33.61%, on day 14 down to 24.80%, on day 28 to 18.75%. (2) The facial neurons survival rate were 95.28% and 94.50%, respectively on day 1 and 3 after injury, on day 7 to 80.71%, on day 14 to the minimum 72.64%, on day 28 to 74.33%. (3) The apoptosis index of facial neurons were 2.78% and 2.23% on day 1 and 3 after injury, respectively; on day 7 to 11.31%, on day 14 to the top of 20.87%, on day 28 down to 18.92%. Acute reaction in neuronal cells is obvious early after injury, then the amount of survival neurons reduced and the amount of apoptosis neurons increased. After day 14, the amount of neurons tended to be stable.

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Globulomaxillary cyst fact or fiction — a case report

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Background: The globulomaxillary cyst is believed to represent a proliferation of epithelial remnants entrapped within the bone structure of the maxilla and premaxilla. We present a case highlighting the diagnostic dilemma encountered with regard to the aforementioned entity.
Case Report: A 45-year-old male presented having noticed the position of his upper left anterior teeth had changed over the preceding months. Clinical examination revealed a painless 3 cm × 3 cm labial bony expansion with 'eggshell crackling' in the left anterior maxillary alveolus. Vitality of all teeth in the anterior sextant was confirmed. Radiographical examination confirmed the presence of a unilocular radiolucent area causing displacement of roots 22 and 23.
Discussion: The frequent occurrence of radiolucent areas in the dental bearing hard tissues gives rise to discussion of appropriate diagnosis, classification and subsequent management. Histopathological examination provides the definitive conclusion, however, in the case of the globulomaxillary cyst, ambiguity still remains.

Recent studies have called into question the validity of this entity and have ascribed it to other pathologies including keratocystic odontogenic tumours, primordial cysts and lateral periodontal cysts. Despite the doubt thrown over this cyst's existence, it presents with specific features that are uncommon in the other potential diagnoses. We examine our finding in the management of a patient who presented with findings analogous to those ascribed to a globulomaxillary cyst.
Conclusion: It is advantageous to differentially diagnose a radiolucency in the mandible and maxilla in order to facilitate appropriate and timely management.

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Assessment of clinical effectiveness of inferior alveolar nerve repair with nerve sliding technique

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Background: In case of inferior alveolar nerve (IAN) injury, surgical interventions often include resection of nerve defect making it difficult to anastomose primarily because of increased tension between nerve stumps. So additional nerve graft should be done bringing several problems. We introduced a new IAN repairing method called nerve sliding technique enabling direct closure of nerve segments with minimal tension without performing a nerve graft. An incisive nerve is intentionally severed and a mental foramen is moved to posteriorly so that nerve stumps can be sutured directly.
Objectives: The purpose of this study was to evaluate the long-term clinical effectiveness of the technique.
Methods: Among 13 patients who underwent surgery using the technique from April 2012 to March 2016, 11 patients with more than 1 year of periodic follow up were included. Neurosensory mapping results, length of resected nerve and others were studied retrospectively. Pre-and postoperative changes in the degree of

pain and discomfort (visual analogue scale) were recorded via telephone survey interviews. Neurosensory mapping results were statistically analysed. Sensory recovery evaluation was done using the Medical Research Council Scale.
Findings and Conclusion: Subjective improvement in the symptoms was seen in eight patients. Nine patients reached functional neurosensory recovery with average 144.33 (±89.20) postoperative day. Neurosensory mapping results (CT, DD, PP, TT) showed significant improvement after surgery. The average length of excised nerve was 9.18 (±3.82) mm, with its maximum length was 15 mm. None of the patients complained discomfort associated with lower anterior teeth where incisive nerve innervates. So sequelae caused by incisal nerve cutting seems insignificant.

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A clinical comparison of efficiency of laser surgery and electrosurgery on intraoral soft tissue pathologies

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In this study, the difference of laser surgery and electrosurgery and their superiority against each other is intended to be clarified. In our study, epulis fissuratum excision was carried out which is a reactive lesion of oral soft tissues. 17 patients were treated with laser surgery and 17 patients were treated with electrosurgery. 34 patients in total were included in the study. Mann–Whitney *U* test and the Chi squared test were used for the statistical analysis.

Most complaints that discomfort the patients was determined as the parameters of our study; pain, contraction, analgesic requirements and reepithelisation time.

An evaluation form on postoperative pain, contraction, analgesic requirement and total amount of analgesic used was filled by patients with the help of visual and verbal scales. Patients were monitored on the reepithelisation day by inviting them to clinical controls on postoperative days 3, 7, 14, 21 and 30.

No significant difference was found between laser surgery and electrosurgery. After both surgical procedures, there was an approximately equal level of pain and both within acceptable limits.

During the postoperative period, both groups reported that they have no feeling of contraction. Since the reepithelisation model develops from basal layer to upper layer in both methods, there has been no shoaling in the vestibular sulcus. No scarring was observed.

No significant difference was found between laser surgery and electrosurgery in terms of needed and used total amount of analgesic in the postoperative period.

Reepithelisation duration of clinically monitored patients was observed to be completed in 21 days on average for both groups.

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Postoperative pain after bilateral third molar extraction under local anaesthesia with sedation is less severe than that after unilateral third molar extraction under local anaesthesia

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Background: In Japan, unilateral tooth extraction is performed under standard local anaesthesia, while bilateral extraction is performed under local anaesthesia with sedation because postoperative pain seems to be more severe after bilateral than unilateral extraction. However, there is little evidence regarding the postoperative pain level after these two extraction methods.
Objective: The aim of this study was to investigate the possibility of intravenous sedation as a useful pain-relieving option for impacted third molar extraction.
Methods: A prospective cohort study was conducted among patients who underwent bilateral mandibular third molar extraction under local anaesthesia with intravenous sedation (sedation group) and patients who underwent unilateral mandibular third molar extraction under local anaesthesia alone (local anaesthesia group). The frequency of use of postoperative oral analgesia and the intensity of pain assessed using the full cup test were compared between the two groups.
Findings: The maximum pain intensity (0–100) on postoperative day one in the sedation and local anaesthesia groups was 72.80 ± 16.98 and 84.80 ± 15.84, respectively, and the mean pain intensity was 42.20 ± 16.00 and 49.60 ± 18.94, respectively. The maximum and mean pain intensities in the sedation group were significantly milder than those in the local anaesthesia group. The number of oral analgesic doses in the sedation group was significantly lower on both the day of surgery and postoperative day one than in the local anaesthesia group.
Conclusion: The results of this study suggest that bilateral impacted mandibular third molar extraction under local anaesthesia with intravenous sedation could be a recommended treatment option.

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Antimicrobial effect of a single dose of amoxicillin on the oral microbiota

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Background: Antimicrobial resistance is a severe global threat and it is crucial to prevent overuse of antibiotics. After surgery, during the postoperative follow-up period, the prevention of postoperative complications and the risk of compromising surgical efforts may drive the decision to administer prophylactic antibiotics to healthy patients.
Objectives: The aim of this study was to determine whether amoxicillin reaches the break-point concentrations in saliva and has any effect on the salivary microbiota, colonising bacteria on mucosal

membranes and on the gingival crevice after a single dose of amoxicillin.
Methods: Twenty subjects received 2 g of amoxicillin, per os. The facultative and strictly anaerobic microflora, as well as the streptococcal microflora specifically, were followed from baseline and after 1, 4 and 24 h. Samples were taken from saliva, the dorsum of the tongue and the gingival crevice and were inoculated and cultured. Plasma samples and saliva samples were analysed for amoxicillin concentrations (free and protein bound) using liquid chromatography and mass-spectrometry.
Findings and Conclusions: Amoxicillin was detected in concentrations over the breakpoint (>2 μg/mL) of amoxicillin in plasma after 1 and 4 h but not after 24 h. In saliva, amoxicillin levels were undetectable at all time points in all subjects. The dose had a significant effect on the streptococci in the gingival crevice and may be recommended for dentoalveolar surgery for patients requiring antibiotic prophylaxis.

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Atypical facial neuralgia after placing dental implants on posterior maxilla

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Background: After placing implant on posterior maxilla, some patients complained about atypical facial pain. The cause of this symptom is not yet understood and reliable consensus among the clinicians on the treatment protocol is yet to be established.
Objectives: The object of this study was to examine specific patient characteristics of the atypical facial neuralgia (AFN) patients and to assess the effectiveness of conservative and surgical treatment.
Methods: Patients who experienced AFN symptoms after implant placement on posterior maxilla were examined from 2008 to 2016 at Seoul National University Dental Hospital. Through chart-review and patient-interview with questionnaires, demographic and clinical data were retrieved. For the evaluation of the treatment effectiveness, visual analogue scale of the patients before and after the treatment course was compared.
Findings and Conclusions: Patient age ranged from 41 to 71 years (mean age, 56.2 years; 7 males and 9 females). Placement site of the concerned implants was mostly in the maxillary molar region (77.78%). In majority of cases symptom of AFN started within one week after implant fixture installation (62.5%). Eleven patients reported continuous dull pain and five patients reported continuous sharp pain. In surgically treated group, four patients reported complete alleviation of pain, four considerable alleviation of pain, one slight alleviation of pain and two reported no change. In conservatively treated group, none reported complete alleviation of pain, four considerable alleviation of pain, and one reported no change. Considering the results of treatment, surgical intervention can be a trial solution.

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Analgesic effect of submucosal dexamethasone and methylprednisolone in third molar surgery

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Background: Beneficial effect of corticosteroids in reducing postoperative swelling and trismus is well established by previous studies. However, their effect on postoperative pain is still controversial.
Objectives: To compare the analgesic effect of submucosal injection of dexamethasone and methylprednisolone in controlling postoperative pain following mandibular third molar surgery.
Methods: 60 recruited patients were randomly assigned to three different groups, namely the saline control group, the (4 mg) dexamethasone group and the (40 mg) methylprednisolone group where the agents were administered as a preemptive submucosal injection. Postoperatively, patients were prescribed with standard analgesic and antibiotic. Pain was assessed on postoperative day one, two, five and seven based on visual analogue scale and the amount of analgesic consumed.
Findings: The methylprednisolone group experienced significantly less pain and consumed less analgesic on postoperative day one and two when compared to control group (analysis of variance, P 0.05).
Conclusion: The use of methylprednisolone reduced pain in the early postoperative period while the use of dexamethasone did not render any beneficial analgesic effect.

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Patient's perception of lingual and inferior dental nerve paraesthesia following mandibular third molar extraction–a telephonic survey

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Background: The surgical removal of mandibular third molar is associated with risk of damage to inferior dental and lingual nerve sensory deficit. The damage to lingual and inferior dental nerve depends on the position of the tooth in proximity to the nerves, surgical techniques and it is operator dependent. Postoperatively these patients are only followed up when there are complications. Unless patients perceive the sensory deficiency and make an attempt to report to the surgeon these cases will not come in to light.
Objectives: To assess the incidence of inferior dental nerve and lingual nerve damage among patients who had removal of mandibular third molars with close proximity to the inferior dental canal. To discuss the need of considering coronectomy in selected patients.
Methods: Data was collected from theatre list including both general anaesthesia and local anaesthesia. A telephonic survey was done to assess patients perception of sensory deficit following mandibular third molar extraction at our unit. Radiographs, operator notes and patients feedback were analysed. The patients who were operated by surgeons with minimum of three years surgical experience were included to minimise the error from inexperienced surgeons.
Findings and Conclusion: The incidence of inferior dental nerve paraesthesia was significantly low compared in the literature. It

was found that there is a need of discussing coronectomy only in selected cases.

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Compliance to national guidelines for wisdom teeth extractions

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Background: The removal of wisdom teeth is a common surgical procedure within dentoalveolar surgery. The reason for extraction can be associated with a number of pathological changes such as pericoronitis, caries or cysts. As with all procedures, there are potential risks and benefits associated with intervention.
Objectives: The aim of the retrospective study is to improve care for patients who are referred into the hospitals for wisdom tooth removal, by complying with best evidence based practice:
1. The National Institute for Health and Clinical Excellence (NICE) – Guidance on the extraction of Wisdom Teeth March 2000.
2. Scottish Intercollegiate Guidelines Network (SIGN) Management of Unerupted and Impacted Third Molar Teeth September 1999.

Methods: There were 673 removal procedures carried out at Pinderfields General Hospital in 2015; a retrospective case note review was conducted for the last 67 (10%) patients who had a total of 100 wisdom teeth removed. Comparison was made with previous results.
Findings: From the 98% documented, 90% complied with the NICE guidelines and 90% with SIGN, a clear increase from the previous years, 75% and 80% respectively. 7% of extractions listed did not comply with either guideline. 2% failed to document a reason for removal of wisdom teeth.
Conclusion: Although there is an overall improvement in the compliance with either guidance, it does not meet the 100% recommended local standard. SIGN has been discontinued. If this is taken in to context, a local agreement needs to be made whether patients should only be listed according to NICE guidelines.

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Tooth extraction in the area of an arteriovenous malformation: a case report

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Vascular malformations and vascular tumours represent two distinct entities according to the classification of vascular anomalies. Unlike vascular tumours (except rare congenital haemangiomas), vascular malformations are present at birth and grow with the development of the child. Vascular malformations with arterial component are considered as high-flow lesions and could be life-threatening due to uncontrolled haemorrhage after tooth extraction.

This paper reports a safe tooth extraction in a 58-year-old female with arteriovenous malformation (AVM) [Cho type IIIb] of the left floor of the mouth, tongue, inferior lip, buccal, chin, anterior cervical and submandibular region (Schobinger class 3). The patient had metabolic syndrome. Her main complaint was pain in the left mandibular region. Unusual bleeding from the periodontal sulcus of the teeth 36 developed after attempt of division of Sharpey's fibres. The extraction procedure was interrupted immediately. Haemostasis was achieved with compression manoeuvre.

Diagnosis of AVM with mandibular bone involvement was established by cone-beam computed tomography, magnetic resonance imaging, digital supraselective and computer tomography angiography. The patient refused treatment of the vascular malformation prior the extraction of the tooth. Preoperative embolisation of the AVM (biosphere 40–120 μm, BeadBlock 100–300 μm, PVA contour 45–150 μm) and consecutive tooth extraction were performed. The postoperative course and six months follow-up were uneventful.

To summarise, adequate knowledge about AVM of all dental practitioners is mandatory in order to avoid a possible life-threatening complications.

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Preventing never events in oral surgery

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Background: Dental extractions are the most common surgical procedure. Extraction of the wrong tooth is considered 'wrong site surgery' and is considered a never event. In 2014 there were 126 'wrong site surgery' never events reported, with the wrong tooth or teeth being removed as the most common. It is clear that the sequence of events leading to patient harm is multifactorial and that wrong site surgery continues to be an issue even with the safeguards already in place.
Objectives: Development of a new marking system to be performed using a sterile pen onto the drape just before the procedure begins adding an extra check to the procedure.
Methods: The varied process leading to wrong site surgery was analysed using three separate methods:
- Root cause analysis
- Process mapping
- Literature review of current best practice and formulation of a standard and audit

Following the above the authors created a proforma to ascertain current practices and to investigate any improvements that can be made to patient safety.
Results: The results of the proforma show practices vary in different units in how the World Health Organization checklist and marking systems are implemented.
Conclusions: This new system is now being used when carrying out oral surgery under general anaesthesia in our trusts. Usually marking the patient is performed at the time of consent or marking the board when the patient enters theatre. There are usually a few minutes between this and actually starting the procedure (sign in, scrubbing and prepping).

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The use of vancomycin-impregnated calcium sulphate in the treatment of osteomyelitis of the jaw

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Objectives: The aim of this study was to describe the effect of vancomycin-impregnated calcium sulphate in the treatment of osteomyelitis of the jaw.
Methods: Twelve patients who were diagnosed with osteomyelitis of the jaw have been treated with vancomycin-impregnated calcium sulphate since July 2014 at the Department of Oral and Maxillofacial Surgery, School of Stomatology, China Medical University (Shenyang, China). All patients underwent debridement of nonviable bone and implantation of vancomycin-impregnated calcium sulphate. The wounds were covered with acellular dermal matrix (ADM) and tightly sutured.
Findings: Ten patients had satisfactory wound healing. However, two cases of maxillary central osteomyelitis had delayed wound healing. The wounds healed after the surgical site was tightly sutured again under local anaesthesia. At three months, the panoramic radiograph showed that most of the implants had been reabsorbed and replaced by new bone formation. All the patients in this study had no recurrence of infection at six to 18 months (mean 10.8 months) of follow-up.
Conclusion: The use of vancomycin-impregnated calcium sulphate in the surgical debridement site for chronic osteomyelitis of the jaw has shown encouraging results. In addition, calcium sulphate can promote the formation of new bone to a certain extent.

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A longitudinal study of coronectomy over five to nine years postoperation

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Background: Coronectomy is a surgical procedure performed to remove the crown of the tooth, but leaving the root in place to prevent nerve damage during wisdom tooth extraction. Our department performed coronectomy on 383 cases between 2005 and 2016. The authors have previously reported the effectiveness of coronectomy to prevent nerve damage.
Objective: To prove the long-term safeness of coronectomy, regarding root migration, we evaluated the effectiveness of the procedure over five years to nine years among the postoperation cases.
Method: We evaluated 99 follow-up cases five to nine years after the coronectomy procedure. We evaluated the clinical course over 97 cases (98.0%) with constant to follow-up, and image evaluation over 80 cases (80.8%) with panoramic X-rays. According to the clinical observations and image findings we stated examination items as follows: (1) acute inflammation symptoms, (2) nerve damage, (3) root exposure, (4) number and reason of root extraction cases, (5) root migration after procedure, (6) bone formation over the root, (7) contact with the anterior tooth, and (8) development of pathology.
Results: Of the 97 cases with constant follow-up, we observed (1) none with acute inflammation, (2) none with nerve damage, (3) two cases (2.0%) with root exposure, (4) two cases (2.0%) with root extraction; among 80 cases with image findings, there were (5) 80 cases (100%) with root migration, (6) 79 cases (98.8%) with bone formation over the root, (7) 21 cases (26.3%) contacted with the anterior tooth, and (8) none with development of pathology.
Conclusion: Our results have shown long-term stability and safeness of coronectomy over five to nine years postoperation cases.

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Is the application of high temperature normal saline solution a widely used for the treatment of vascular lesions technique? Literature review

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Background: Haemangiomas are principally referred as congenital lesions characterised for appearance after two to four weeks after birth, with a fast development from six to eight months and slowly involute by adolescence old. The most prevalent site for skin and lambing is more than 60% occur in the head and neck. The diagnosis is usually based on history and clinical assessment of injury and does not necessarily require an imaging conformation (magnetic resonance imaging, computed tomography, ultrasound Doppler) and histological, but in some cases requires these tools to plan treatment. Proposed treatments for these injuries include a wide range of possibilities from the expectantly and periodic checks; surgical excision; interferon α therapy, laser therapy; nitrous oxide or cryotherapy with liquid carbon dioxide; embolisation; systemic corticosteroids; and radiation therapy sclerosing agents. Sclerotherapy decrease the lesion size and change its nature to more fibrous consistency, and could be used as the only treatment or as complement to subsequent surgery. There are different types the sclerosing solution in alcohol, salicylates, hypertonic saline and polidocanol. The use of high temperature normal saline solution (HTNSS) has no chemical reaction to the body, with low cost and easy to find.
Objective: Determine whether there is scientific evidence to support the application of HTNSS as an alternative nonsurgical treatment of vascular lesions.
Findings and Conclusions: Although the use of this sclerosing agent for oral haemangioma is safe treatment and with acceptable results there is insufficient evidence to support its use and more research is required.

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The application of a modified mandibular block technique to relieve acute trismus in odontogenic infections

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Background: Inferior alveolar nerve block techniques are commonly administered to achieve local anaesthesia in the dental patient. A modified approach can, however, be utilised to effectively manage patients presenting with acute trismus, caused by an odontogenic infection. Reduced clinical mouth opening can prevent the execution of urgent treatment by inhibiting access to

the desired site. A well-performed variation of the conventional technique, the Akinosi Block, can assist in temporarily relieving muscle spasms to allow clinician access to the surgical site and perform the required treatment.
Case Report: A healthy, young, male patient presented to the Acute Dental Care Department at Kings College Hospital complaining of severe pain and limited mouth opening. Extraoral examination revealed a maximal incisal opening of 11 mm. Access for intraoral examination was severely restricted; there was evidence of inflamed pericoronal tissue, pain and pus discharge related to the lower left wisdom tooth. Radiographic examination showed bone loss distal to the lower left wisdom tooth. A diagnosis of pericoronitis was established.

The patient was managed with the administration of an Akinosi mandibular nerve block to achieve both anaesthesia and relieve muscular spasm. Following manual manipulation of the patient's mandible the patient was able to produce a maximum incisal opening of 27 mm. This significant increase facilitated the removal of the offending tooth.
Conclusion: This E poster aims to present a case report that demonstrates the successful application of a modified mandibular block technique to assist urgent treatment of patients who present with reduced oral opening.

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Autotransplantation of teeth: a case report

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Background: For nearly the entirety of modern dentistry, we have been pursuing reliable methods to replace missing teeth. Autotransplantation is gaining more recognition with solid evidence of clinical success yet remains far less frequently employed in comparison. The biggest obstacle is that selection criteria are highly specific which limits the suitable cases for autotransplantation.
Objectives: This case report highlights the factors that contributed to a successful autotransplantation and demonstrates a clinical situation where it can be a preferable treatment. It illustrates the potential to utilise autotransplantation to treat congenital missing or prematurely loss teeth in young adolescents.
Methods: Patient received orthodontic treatment due to multiple congenital missing teeth including the lower left premolars, which lead to the retained deciduous molar. Extraction of #45 was required to align the dentition and #45 was autotransplanted into the extraction socket of #7E with subsequent root canal treatment one-year post transplantation.
Findings and Conclusion: The subject was 13 years old and systemically healthy. Root canal treatment was required post autotransplantation and this is in line with previous findings where vitality of pulp is more favourable when apex opening is more than 1 mm (Andreasen J et al., 1990). This case is considered clinically successful at 2 years postoperation as there are no compromises in functional and aesthetic component. Favourable factors shown from this case leading to successful autotransplantation includes young patient age, comparable morphology between recipient and donor sites, atraumatic extraction to preserve Hertwig's root sheathe, semi-rigid splinting and immediate extraction socket as recipient site.

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Head and Neck Oncology

A three-long non-coding RNA signature derived from the Cancer Genome Atlas database predicts the survival of patients with head and neck squamous cell carcinoma

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Background: Long non-coding RNAs (lncRNAs) have important biological functions and can be used as prognostic biomarkers in cancer.
Objectives: To identify a prognostic signature of lncRNAs for head and neck squamous cell carcinoma (HNSCC).
Methods: We analysed the RNA-seq data derived from The Cancer Genome Atlas database to identify a prognostic lncRNA signature model by using the orthogonal partial least square discrimination analysis (OPLS-DA) and 1.5-fold expression change criterion methods. The prognosis prediction model constructed on the lncRNA signatures and clinical parameters were evaluated by using five-fold cross validation method.
Findings: 84 out of 3199 lncRNAs were significantly associated with survival of patients with HNSCC (log-rank test $22 < 0.01$). By using OPLS-DA and 1.5-fold change selection criterion, five lncRNAs (KTN1-AS1, LINC00460, GUSBP11, LINC00923 and RP3-894A10.6) were further selected. The prediction power of each combination of the five lncRNAs was evaluated through receiver operating characteristic (ROC) curve and a three-lncRNA panel (KTN1-AS1, LINC00460 and RP3-894A10.6) has achieved the highest prognostic prediction power (area under the curve, 0.68; 95% CI 0.60–0.76; $P < 0.0001$) in the cohort. Patients were categorised into high- and low-risk groups based on their three-lncRNA profiles. Patients with high-risk score had worse overall survival than those with low risk scores in the cohort (log-rank test, $P = 0.0003$). Univariable and multivariable Cox regression analysis showed that the lncRNAs signature and tumour grade were independent prognostic factors for patients with HNSCC.
Conclusion: Our findings showed that the three-lncRNA signature might be a novel biomarker for accurate prediction prognosis of patients with HNSCC.

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A rare case of a parapharyngeal schwannoma – an incidental finding

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Background: Schwannomas are rare tumours of the Schwann cells which surround nerve axons. Up to 45% of all extracranial schwannomas occur in the head and neck region, however tumours of the parapharyngeal space (PPS) itself, account for only 0.5% of all head and neck tumours. Due to their slow growing and painless nature, they are often not detected until they are large enough to palpate or visualise.

In this report, we aim to discuss a rare case of a parapharyngeal schwannoma in a 31-year-old male, which was an incidental find-

ing during wisdom teeth removal. A large, encapsulated posterior oropharyngeal mass was noted, which biopsy, magnetic resonance imaging and computed tomography confirmed as a schwannoma. Subsequently, the patient underwent a complete excision of this lesion, with preservation of the vagus nerve, via a transcervical approach.
Discussion: Of PPS tumours, 80% are said to be benign and 20% malignant. Most are of salivary or neurogenic origin. Schwannomas of the head and neck usually arise from the sensory divisions of cranial nerves, most commonly the vestibular or vagus nerve. Preoperative transoral biopsy is contraindicated as there is a risk of tumour rupture and haemorrhage. This can cause adherence of the mucosa to tumour, making later removal difficult. Recurrence is rare after complete and successful excision.
Conclusion: Complete excision is the favoured treatment for schwannomas, with periodic review. The patient has been reviewed regularly and has experienced minimal postoperative morbidity with no neurological deficit.

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Clinicopathological and prognostic significance of preoperative serum level of epidermal growth factor in patients with oral squamous cell carcinoma

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Background: Epidermal growth factor (EGF) promotes tumourigenesis and tissue repair of epithelial and mesenchymal cells, and may therefore have a role in initiating or promoting oral carcinogenesis.
Objectives: We aim to study the clinicopathologic and prognostic significance of preoperative serum level of EGF in patients with oral squamous cell carcinoma.
Methods: We retrospectively analysed 152 patients underwent surgery whose preoperative serum EGF level was determined by an enzyme-linked immunosorbent assay and 44 age- and sex-matched controls.
Findings: Patients with higher serum levels of EGF were more likely to have neck lymph node metastasis ($P = 0.013$), worse survival ($P = 0.014$), a tendency for more advanced stage cancer ($P = 0.07$), and poorer cancer-specific survival ($P = 0.011$). After tumour ablation surgery, the serum level of EGF decreased in 81% of patients (36/44). Multivariate analysis using the Cox proportional hazards model indicated that EGF level was an independent predictor of poor survival (HR = 1.07; 95% CI = 1.01–1.03; $P = 0.027$).
Conclusion: In patients with oral squamous cell carcinoma, higher preoperative serum level of EGF was associated with neck lymph node metastasis, more advanced stage, and poor survival. EGF should be considered as a potential prognostic biomarker and a therapeutic target for patients with this cancer.

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Pseudoaneurysm of the lingual artery – a case series

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Background: Pseudoaneurysm of the lingual artery is extremely rare, and is most commonly iatrogenic or traumatic in nature.[1] It is difficult to diagnose and manage, and can cause severe distress to patients when haemorrhage occurs. We report a series of cases of lingual arterial pseudoaneurysm, detailing the presentation and management of these cases.
Case Report 1: A 53-year-old man, previously treated with chemoradiotherapy for inoperable squamous cell carcinoma of the posterior tongue, experienced severe intermittent haemorrhage from residual tumour, and was admitted to the intensive care unit. An awake, surgical tracheostomy was performed to secure the airway. Computed tomography (CT) and ultrasound scans showed lingual artery pseudoaneurysm. He underwent superselective embolisation of the right lingual artery with histoacryl/lipiodol.
Case Report 2: A seventy three year old male with a history of surgically treated squamous cell carcinoma of the mandibular alveolus presented to the emergency department complaining of recurrent episodes of prolonged oral bleeding. This patient was admitted to hospital and received ultrasound scanning of the neck, which showed evidence of a pseudoaneurysm of the lingual artery. This required superselective embolisation of both lingual arteries and also the submental/sublingual anastomoses from both facial arteries using histocryl/lipiodol and coils. A repeat Doppler ultrasound the following day showed thrombosis of the pseudoaneurysm.
Conclusion: Both cases were successfully treated by the interventional radiology team and no further bleeding occurred.

Reference

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Is prophylactic neck dissection for early tongue squamous cell carcinoma (cT1-2, cN0 neck) an evidence-based choice? A systematic review and meta-analysis

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Background: The mortality rate of squamous cell carcinoma (SCC) of the tongue was reported as high as 50% once there is neck metastasis. Currently, there is no consensus regarding early neck management of small oral tongue SCC. Disagreement of survival benefit of elective neck dissection (END) is the core of the debate. A systematic literature review and meta-analysis is presented to solve this dilemma.
Methods: A systematic literature search, with predefined inclusion and exclusion criteria from relevant computer databases and journals were performed. The articles were evaluated and critically appraised by two independent reviewers. Extracted data was compiled for descriptive and meta-analysis.
Results: Only three papers with moderate to low evidence level were included in this review. END did not show superior sur-

vival benefit when compared to 'watch and wait' (WW) [$R = 0.50$, $P = 0.18$, 95% CI = 0.19–1.36, $I^2 = 48\%$]. There was strong evidence favouring END at an earlier disease stage with the weighted odds of regional recurrence 9 times lower than the WW group [OR = 0.09, $P < 0.0001$, 95% CI = 0.05–0.16, $I^2 = 0\%$].
Conclusions: END is the gold standard treatment for small tongue SCC without clinically detectable nodes. Although there appeared to be no superior survival benefit subjecting patients to END, subsequent management can be guided by the histological finding from the neck specimen.

Observation remains a conservative alternative to early neck intervention provided a stringent follow up scheme is strictly adhered to. Immediate surgical intervention when lymph node remains small is the key to high salvage rate and overall survival outcome.

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Nasogastric feeding tube placement in head and neck oncology patients

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Background: Nasogastric (NG) feeding is important for a successful recovery in many postoperative head and neck cancer patients. There have been 21 deaths in England since 2005 as a result of misplaced feeding tubes. Misplaced NG feeding tubes are a 'never event' in the Leeds Teaching Hospital Trust.
Method: Retrospective analysis of the notes of 80 head and neck oncology patients who underwent surgery between 2014 and 2015 and required NG feeding tube (NGFT) postoperative placement. Completed over four three-monthly cycles.
Results: For the first six months, 50% of patients had no record of NGFT postoperative placement and in 70% of cases the length of insertion was not recorded. After the introduction of a new oncology clerking proforma and further staff training, placement was correctly recorded in 100% of patients.
Conclusion: Repeat audit cycles and analysis of the data localised the failures in documentation completion to placement of the NGFT in theatres. With a new oncology clerking proforma and further training to the entire oral and maxillofacial surgery team, I successfully improved the completion rate of the NGFT placement documentation.

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The immunological impact of chemotherapy on the tumour microenvironment of oral squamous cell carcinoma

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Background: The immune system plays an important role in the development and progression of cancers, including oral squamous cell carcinoma (OSCC). However, little is known about the immune response in the tumour microenvironment after neoadjuvant chemotherapy.
Objective: To investigate the immunological impact of chemotherapy in the tumour microenvironment of OSCC.
Methods: We retrospectively analysed a degree of immune cell infiltration and relevance of the programmed death ligand-1 (PD-L1) expression in surgically resected eighteen OSCC specimens from patients with or without pretreatment of certain chemotherapy.
Results: No distinct difference was observed on the degree of immune-cell infiltration between two groups. A decreased number of programmed death-1 (PD-1) positive cells were found in the specimens of cancer nest of the neoadjuvant chemotherapy group. In the without neoadjuvant chemotherapy group, 80% specimens showed intermediate to strong expression of PD-L1 protein. Whereas most of the specimens of the neoadjuvant chemotherapy group (75%) showed weak expression.
Conclusion: Neoadjuvant chemotherapy in OSCC is useful to induce the number of tumour-infiltrating lymphocytes in the tumour microenvironment. And it was revealed that the expression of PD-L1 changed by the chemotherapeutic agents.

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The rate of phrenic nerve injury following neck dissection for head and neck cancer and its impact on length of hospital stay

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Background: The published rate of phrenic nerve injury following head and neck cancer surgery is highly variable and there is a paucity of data regarding its impact on postoperative recovery. Our aim was to investigate the prevalence of phrenic nerve damage following neck dissection for oral cavity malignancy and to explore its association with postoperative length of hospital stay.
Method: We reviewed the clinical records of 100 consecutive patients who underwent a neck dissection for oral cancer. We assessed both the pre and postoperative chest radiographs for evidence of phrenic nerve injury. Data pertaining to stage of disease, type of neck dissection, pre-existing respiratory disorders, patients' performance status and postoperative length of hospital stay were collected from the medical treatment records.
Findings: 93 patients met our inclusion criteria. 9% had a radiological evidence of postoperative unilateral phrenic nerve injury. Only 1 patient underwent a radical neck dissection and in most patients ($n = 7$) the nerve injury was noted incidentally on chest radiographs after a selective neck dissection. The median length of stay was compared and patients with phrenic nerve injury stayed for median of 16 days versus a median of 15 days for the overall cohort (Mann–Whitney U, $P = 0.86$).
Conclusion: Unilateral phrenic nerve injury is a common incidental finding following neck dissection. Most of these are usually transient or found to have no clinical significance. Our study demonstrates a rate of unilateral phrenic nerve injury to be 9% with no statistically significant association with increased length of hospital stay.

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Improvement measures for complete excision of the malignant tongue tumour: retrospective factor analysis of 101 consecutive cases

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Background: Complete local excision of tongue squamous cell carcinoma (SCC) is the primary surgical aim in disease control.
Method: A retrospective analysis was performed among those who underwent resection of tongue cancer between 1 September 2010 and 8 July 2015.
Results: The population mean age is 63.9 (SD, 14.5) years, 53 were female. SCC was localised on the ventral aspect in 18 cases, 5 on the dorsum, 40 and 37 on the left and right lateral tongue. Postoperative staging were 54 T1, 30 T2, 8 T3 and 9 T4. Neck dissection was performed in 63 instances and found 9 N1, 12 N2b and 4 N2c with 38 N0 disease negative necks. Two investigated ordinal type primary outcome measures were used: closest radial and closest deep margin. Over 30 pre-, intra- or postoperative factors impact was analysed.
Conclusion: At least four factors for each outcome measures were identified which can predict close not sufficient excision margins. Using the coefficient and confidence intervals to be provided correction of techniques is possible. Independently the publication would also suggest some baselines for certain measures as to avoid incomplete excisions. Control over the identified statistically significant predictors can eliminate incomplete excisions potentially. Incomplete or narrow margin excision of tongue tumour is still rare possible. Control over the margins however mostly possible for good outcomes this is a must criteria. All possible steps should be followed to prevent incomplete excisions.

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Comorbidity scoring in head and neck cancer patients

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Background: Comorbidities in head and neck cancer patients can prohibit the use of preferred therapy and have a negative influence on the effectiveness of treatment, as well as impact on cancer survival statistics. The Adult Comorbidity Evaulation-27 (ACE-27) is specifically designed for assessing comorbidities in patients with cancer. The National Cancer Intelligence Network (NCIN) recommends the collection of ACE-27 scores for all adult cancer patients. All patients discussed in the head and neck cancer multidisciplinary team (MDT) should have a correct ACE-27 score documented.
Methods: The audit was a retrospective review of case notes and letters. 56 patients were identified from the DAHNO report as discussed in the MDT February to August 2015. Two investigators independently assessed the notes to complete scores. These were later compared with scores given during the MDT meeting. Data were recorded on an Excel spreadsheet and quantitative analysis performed.
Results: 40 of the 56 (71%) patients had a co morbidity score recorded in the DAHNO report. 2 patients were excluded. 60.5% ($n = 23/38$) had scores which were correct on recalculation. Out of the total eligible patients, 42.6% ($n = 23/54$) had correct score recorded.
Conclusion: Assessing comorbidities in newly-diagnosed cancer cases is important for informed patient treatment decisions, quality of life considerations, and to ensure high-quality cancer statistics. This audit has highlighted poor calculation and recording of comorbidity scores. We discuss some important steps we have undertaken to ensure correct score calculation. We encourage all head and neck cancer units in the United Kingdom to undertake this audit to ensure accurate scoring and management.

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Synchronous unilateral histologically different three parotid tumours

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Background: Multiple tumours of unilateral parotid gland with different histology are rare. Although studies and case reports have presented this phenomenon no studies were found with more than two histologically confirmed tumours
Methods: We present a case report of a 42-year-old gentleman who presented with an exophytic; rapidly growing left parotid lesion where the initial diagnosis of sarcomatous lesion was superseded by the final diagnosis of three histologically confirmed tumours.
Results: Patient's medical history, initial clinical, radiological and histological diagnosis and the final histological diagnosis are presented. The surgical management of this patient is also discussed.
Conclusion: Synchronous multiple unilateral, histologically different parotid tumours usually include two. We present a patient with three histologically confirmed tumours within a unilateral parotid and how best to manage such cases. The importance of preoperative radiological and histological investigations together with a multidisciplinary approach in managing such patients is highlighted.

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Surgical management of deep lobe parotid tumours, presentation of three clinical cases and a review of the literature

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Background: Tumours of the parapharyngeal space occur infrequently, accounting for 0.5% of head and neck neoplasms. A majority of these are benign and approximately 50% of these arise from salivary glands as pleomorphic adenomas. These tumours although benign can prove to be a challenge to remove surgically due to the complex surrounding anatomy. The literature describes several approaches including the transcervical approach with or without lip split and mandibulotomy, transparotid combined with trans-cervical, transoral or transpalatal approaches

Objectives: We describe our experience of using the transcervical transparotid approach in our case series of three deep lobe parotid tumours.
Findings: The transparotid, transcervical approach is an effective means of accessing deep lobe tumours and successfully excising them. In our small case series of three patients, all were discharged without any significant complications and no facial nerve weakness.
Conclusion: Our small case series of patients with deep lobe tumours demonstrates how effective the use of a transcervical; transparotid approach is in surgically removing parotid tumours of moderate size. The literature describes several approaches to excising deep lobe tumours invading the pterygoid space with various levels of success. The authors concur that in order to successfully remove these tumours, adequate exposure and protection of structures is vital. With newer techniques available including minimally invasive surgery and robotics, there are more options for selection based on tumour size and pathology.

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Diagnostic accuracy of fine-needle aspiration and core biopsy in parotid lesions

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Background: Fine-needle aspiration (FNA) and core biopsy (CB) is safe and cost effective technique and introduces high accuracy in identifying nature of salivary gland lesions. Differentiating between inflammatory and neoplastic disease; benign and malignant pathology is paramount to instigate an appropriate management plan to achieve a successful outcome.
Methods: Retrospective study was carried out to examine diagnostic accuracy of parotid FNA/CB. Total of 31 patients who underwent FNA/CB under ultrasound (US) guidance for a parotid lesion at University College London Hospital was randomly selected. Initial and final histological diagnosis was compared.
Results: Average age of patients was 52 years and 9 months (16âŁ“79 years) and male to female ratio was 1:1. Most of the lesions were on the right side (right:left, 3:2) and were benign (benign:malignant, 2:1). More patients underwent FNA (FNA:CB, 3:2) and no difference was noted between the two modalities in relation to the initial versus final histological diagnosis. FNA/CB with an initial diagnosis of a benign or malignant pathology did correlate well with the final diagnosis. However, two patients with benign pathology had a histologically different (benign) pathology whilst a similar number was noted for the malignant group.
Conclusion: US-guided FNA and CB remains gold standard investigation for parotid lumps. Results of this study confirms; in the presence of experienced head and neck radiologist and pathologist, US guided FNA and CB of parotid gland is equally reliable and has a good sensitivity and specificity in diagnosis.

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Spotlight on oral cancer in the United Arab Emirates: the presentation and treatment

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Background: Oral cancer associated with significant morbidity and mortality. Worldwide, the estimated deaths are more than 700,000 over a period of five years.
Objectives: To present the outcome of retrospective study designed to determine the prevalence of various malignant oral lesions in the United Arab Emirates (UAE) and correlate cases of squamous cell carcinomas with age, gender, site, grade, clinical presentations at the time of diagnosis, and the prevalence of neck metastasis.
Methods: The study was based on histopathology reports and hospital records from the major cancer treatment centres in the UAE.
Findings and Conclusion: Of the 992 oral biopsies reported over years, 147 cases of cancer found, which accounted for 14.9% of the total oral biopsies. 15 types of malignant lesions were diagnosed. Oral squamous cell carcinoma (OSCC) accounted for 77% of all malignancies reported. The commonest presentation of cancer was ulceration (31.17%), followed by lumps and white lesions. The most common site where the lesions were diagnosed was the tongue (51.9%), followed by the cheeks and lips. Neck dissections performed in only 20.8% of all OSCC cases, of which 43.75% showed evidence of neck metastasis. In conclusion, oral cancer is not an uncommon disease in the UAE. This may mandate more awareness campaigns, including screening procedures for early detection of cancerous lesions and other potentially malignant oral diseases. Neck dissections to remove/detect lymph node metastasis should be more routinely performed, in particular for tongue carcinomas because of the early neck involvement potential.

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Competency of dental students in report of oral mucosal lesions: a potential role of dentists in early cancer detection

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Background: Worldwide, dentists examine millions of mouths everyday, and even though oral cavity is accessible for direct examination, cancer is often detected in a late stage. Discovering early lesions showed a better of cure and survival rate as compared to late or metastatic cancer.
Objectives: To assess the ability of dental students to identify, describe and report various oral mucosal lesions, including potentially malignant diseases.
Methods: Analysis of the lesions reported by students; including classification, accuracy of description, an accuracy of diagnosis score, different locations in the oral cavity, ability of the students to suspect potential for malignancy.
Findings and Conclusion: 850 lesions, reported by 350 students over a period of nine months in total, approximately one-fifth of the reported lesions ($n = 181$) had a potential for malignancy, the risk of malignant changes was suspected by the reporting students

in 76% of cases. The most reported lesions were changes of colour (almost 54%). Students could reach an optimal diagnosis in more than half of the cases (59%). However, students failed to provide an adequate description of different types of lesions (57% had poor description).

Dental students, show a significant ability to identify and report various changes in the oral mucosa, strikingly changes in colour followed by tongue lesions. They were able to suspect potential of malignancy. However, most of the participants failed to meet the criteria of the standard description of lesions. This exercise may serve as a model for student training towards competency in early detection of oral lesions and cancer.

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Schwannoma of the neck: a report of four cases and literature review

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Background: Schwannoma was first described as a pathological entity by Verocay in 1908, and are slow growing benign tumours of the tissue that covers nerves (nerve sheath) with a well-developed capsule. Typically, symptoms of schwannomas are based on the affected nerve, and may arise from any cranial or spinal nerve that has a sheath.
Objectives: Here we discuss four cases of schwannomas of the neck along with review of literature.
Methods: We present four cases of schwannomas of the head and neck.
Findings: In our series of four cases, site of the lesion, clinical history and features were important in arriving at a provisional diagnosis. Computed tomography and magnetic resonance imaging played an important role in demonstrating the spread of schwannomas preoperatively. Histologically, there are two main patterns: Antoni A pattern, with palisading nuclei surrounding pink areas (Verocay bodies), and Antoni B pattern, with loosely arranged stroma and fewer cells.
Conclusion: Masses in the neck are common and it is often difficult to establish the nature of these lesions on clinical examination. Differential diagnosis of nodules in this area must include schwannomas that may mimic other conditions such as metastasis or infection. Fine-needle aspiration of these masses is useful, but not always diagnostic. Complete surgical excision is the treatment of choice, and the possibility of nerve injury should be kept in mind. Schwannomas are benign tumours, and their prognosis is excellent because local recurrence is rare.

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Predicting outcome following oral potentially malignant disorder surgery – a 590 patient cohort study

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Background: Clinically recognisable potentially malignant disorders (PMD) precede lethally invasive oral squamous cell carcinoma (OSCC), but the natural history of PMD is poorly understood and the ability to predict clinical behaviour and malignant transformation (MT) risk remain elusive.
Objective: To determine reliable clinicopathological predictors of clinical outcome for PMD patients.
Methods: A cohort of 590 patients presenting for CO_2 laser surgery (excision or ablation) in Oral and Maxillofacial Surgery in North-East England between 1996 and 2014 were studied. Inclusion criteria required new, untreated PMD lesions confirmed on incision biopsy as dysplastic, with post-laser follow-up and defined clinical outcome data documented to a census date of 31 December 2014.
Findings: PMD patients were followed for a mean of 7.3 years postsurgery. Laser rendered 75% disease free, primarily younger patients with 'low-grade' dysplasia, whilst 9% exhibited persistent disease and were older with features of proliferative verrucous leukoplakia. In 12%, unexpected SCC was both identified and treated on laser excision, whilst a further 4.8% underwent MT during follow-up. Factors predictive of persistent PMD included clinical appearance.
Conclusions: CO_2 laser surgery provides definitive PMD diagnosis and management. Long-term patient cohort studies facilitate analysis and stratification of clinical outcome data. The usefulness of observable clinicopathological features in predicting PMD outcome require further validation in future prospective, multicentre randomised controlled trials.

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Dentinogenic ghost cell tumour: a retrospective study of eight cases with long-term follow-up

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Background: A dentinogenic ghost cell tumour (DGCT) is a locally invasive neoplasm that characterised by ameloblastoma-like islands of epithelial cells in a mature connective tissue stroma.
Objectives: The aim of this study is to assess the diagnosis, treatment and prognosis of the dentinogenic ghost cell tumour.
Methods: Cases listed in the Wuhan University Hospital of Stomatology files as DGCT were reviewed. They were included in the study if the diagnosis was confirmed and if there was adequate histologic material and clinical information with at least two years of follow-up.
Results: Eight patients who underwent surgical treatment during the 10-year period from 2004 to 2014 were included in this study. The patients were 12–52 years old at the time of diagnosis (median, 36 years). The lesions were located in the maxilla in five patients and in the mandible in three patients. The treatment for five patients was conservative surgery consisting of enucleation or curettage. And the treatment for three patients was radical surgery consisting of marginal or segmental resection. After 27–150 months' follow-up, no recurrences were found in any of the patients.
Conclusion: The optimal treatment modalities for DGCT were hard to define. And a long-term follow-up for patients with DGCT was recommended.

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Effect of survivin gene silencing on apoptosis in head and neck squamous cancer cells by the flow cytometry

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Objective: To study the effect of survivin gene silencing on human head and neck squamous cell carcinoma activity.
Methods: Survivin-SiRNA into PCI-37B cells, cell apoptosis were examined by the flow cytometry.
Results: The apoptosis rate of head and neck squamous cell carcinoma cells were significantly increased ($P < 0.05$), after survivin gene silencing. Meanwhile, the inhibition of survivin gene can interfere with cell cycle, so that the proportion of cells in S phase decline significantly ($P < 0.05$).
Conclusion: Survivin gene silencing can inhibit the growth of head and neck squamous cell carcinoma.

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Unusual marginal gingiva squamous cell carcinoma presenting as localised periodontitis — a case report

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Background: Gingival squamous cell carcinoma (SCC) is a malignant neoplasm, which presents 10% of diagnosed intraoral carcinoma. Due to proximity to dentition, it can be misdiagnosed as tooth-related inflammatory conditions, like periodontitis or endodontic-related diseases. In this study we report a case of marginal gingival SCC that mimicked a periodontal diseases in its early presentation.
Objectives: A 64-year-old male complained about the toothache over lower left posterior area for one month. Clinical examination revealed deep pockets over tooth 46 47 lingual area with teeth mobility grade I but without gingiva swelling or pus discharge. After three months of periodontal therapy, tooth 47 was extracted but found the wound was unhealed. An incisional biopsy was obtained from the lesion.
Methods: The diagnosis of SCC was made and we arrange the examination for the tumour staging. After discussed with the patient, the operation was done with supraomohyoid neck dissection of the regional lymph nodes, tumour wide excision with segmental mandibulectomy and fibula flap reconstruction. Postoperative concurrent chemoradiotherapy was also done. There was no sign of recurrence or metastasis six months postoperatively.
Conclusion: Marginal gingival SCC easily mimics localised periodontal disease and can be misdiagnosed. In this instance dentists play an important role in early detection of the disease and should aware that lesions that do not respond normally to routine therapy should be biopsied.

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Notch3 is frequently downregulated in oral cancer

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Background: Members of the Notch family are frequently dysregulated in various types of cancers, and these alterations can lead to oncogenesis or tumour suppression depending on the context.
Objective: The aim of this study was to elucidate the relationship between members of the Notch family and oral squamous cell carcinoma (OSCC) tumourigenesis, with a focus on epigenetic alteration, especially DNA methylation.
Methods: We analysed the mRNA expression and DNA methylation of members of the Notch family in six OSCC cell lines. We also evaluated the DNA methylation level and the frequency of Notch3 methylation in clinical samples and compared the results between tumour and normal tissues using The Cancer Genome Atlas dataset. Further, we comprehensively evaluated DNA methylation and gene mutation of Notch3 in tumour tissues.
Results: Notch1, Notch2, and Notch4 were substantially expressed in all the OSCC cells, whereas Notch3 expression was not detected; moreover, Notch3 was highly methylated at the promoter region in one of the six cell lines. In the OSCC clinical samples, Notch3 methylation was significantly higher in the tumour samples compared to that in the normal tissues ($P = 0.04$). Intriguingly, DNA methylation and loss of function mutation of Notch3 tended to be mutually exclusive.
Conclusion: Our data indicate that Notch3 is downregulated by multiple mechanisms during OSCC tumourigenesis, mainly due to DNA methylation. Our findings provide evidence that Notch3 functions as a tumour suppressor in OSCC.

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Dental extraction prior to carbon-ion radiotherapy for head and neck cancer

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Background: Post radiotherapy (RT) dental extraction is often suggested as the most likely cause of osteoradionecrosis (ORN) of the jaw. Therefore, it is widely recommend that teeth of guarded or worse long-term prognosis should be removed before RT for head and neck tumours. However, there is no report to evaluate the safety and efficacy of pre carbon ion RT (C-ion RT) dental extractions.
Objectives: The aim of this study was to evaluate the safety and efficacy of dental extraction prior to C-ion RT.
Methods: From October 2006 to January 2016, a total of 71 patients with head and neck cancers underwent tooth extraction before C-ion RT at our institution. Of these, the patients with teeth extracted from within the planning target volume (PTV) were included, comprising 23 patients.
Findings: The median follow-up period was 16.5 months (6.3–61.7) for all patients, and the median period between dental extraction and irradiation was 14 days (range 8–20). A total

of 37 teeth were extracted before C-ion RT. There was no hindrance of healing of wound complication in the extraction site for all cases post C-ion RT. In this study, one case (4.3%) developed maxillary osteoradionecrosis of exposed bone with concomitant soft tissue ulceration in the PTV. However, no clinical finding of exposed bone was observed in the pre-C-ion RT dental extraction area.
Conclusions: Pre-C-ion RT dental extraction appears generally safe. The ability to remove teeth with questionable prognosis so as to reduce the risk of osteoradionecrosis still needs to be assessed.

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Computational fluid dynamic simulation of intraarterial chemotherapy for tongue cancer

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Background: Intraarterial chemotherapy (IAC) for oral cancer can deliver a higher concentration of anticancer agent into a tumour-feeding artery. However, distribution of anticancer agent into several branches of the external carotid artery (ECA) in IAC has not demonstrated sufficient treatment efficacy.
Objectives: To investigate flow distribution of anticancer agent into the branches of the ECA in several IAC methods using computational fluid dynamics (CFD).
Methods: Patient-specific three-dimensional vessel models were created from computed tomography images of two patients with tongue cancer. Catheter models were combined with the vessel models. 32 models were generated with varying vertical and horizontal positions of the catheter tip. With the use of a zero-dimensional resistance model of the peripheral vessel network, conventional and superselective IAC were simulated in 30 and 2 models, respectively. The flow distribution of anticancer agent into the branches of the ECA was investigated in 32 models.
Findings and Conclusion: The CFD simulations could be conducted within a reasonable computational time. In several models, the anticancer agent flowed into the target artery only when the catheter tip was located below the bifurcation of the ECA and each target branch. Furthermore, the anticancer agent tended to flow into the target artery when the catheter tip was shifted toward the target artery. This CFD study showed that in IAC, a curved catheter tip should be placed both below and toward the target artery to increase the distribution rate of anticancer agent into the tumour-feeding artery.

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A study on the cases of soft tissue sarcoma in oral and maxillofacial region

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Soft tissue sarcoma arising from the oral and maxillofacial region is very rare. We experienced four cases with soft tissue sarcoma treated from 2006 to 2015 in the region and retrospectively analysed. The patients consisted of three males and a female. The age ranged from 32–71 years. The primary sites of the tumours were buccal mucosa, gingiva, tongue and submandibular. They were classified by TNM classification of UICC as follows: two cases with Stage III, one each of Stage IIA and Stage IV.

We examined resected tissue specimens pathologically. Myogenic markers were stained positively for some cases. An SYT-SSX1 fusion gene was detected for one case. From the result of morphological and immunohistochemical features, we gained the histopathological diagnoses: leiomyosarcoma, fibrosarcoma, low grade myofiblastic sarcoma and synovial sarcoma. Histologic grade by FNCLCC (Fédération Nationale des Centres de Lutte Contre le Cancer) was Grade 1 in each case. All cases were removed by surgical operation. In case of the synovial sarcoma, some margins of the extraction were found positive, we tried to perform the extended resection including Level I neck dissection. Neither chemotherapy nor radiotherapy was performed in each case. The period of observation ranged from one year to nine years and two months. We have no recurrence or metastasis observed after treatment in all cases. Since some cases were not diagnosed accurately in biopsy, to secure an adequate margin with surgical operation was thought to be important.

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Minimally invasive surgical approaches to the management of ameloblastoma

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Background: Ameloblastoma is a rare, slowly growing, locally invasive, epithelial odontogenic tumour with a high recurrence rate, but with virtually no tendency to metastasise. A controversy exists about the most appropriate treatment plan, ranging from minimally invasive approaches to more radical surgeries.
Objectives: The aim of the present study is, through comparison of different surgical approaches to ameloblastoma, to evaluate the effectiveness of minimally invasive procedures to the treatment of this tumour in terms of both recurrence and preservation of contour and function.
Methods: Thirteen patients (eight females, five males) diagnosed with primary ameloblastoma (eight multicystic, four unicystic, one extraosseous) were reviewed. The average age at the time of surgery was 43.5 years. The methods of treatment consisted of radical surgery (resection- both marginal and segmental) and minimally invasive surgery (marsupialisation alone, marsupialisation followed by enucleation with sufficient bone curettage if necessary, and enucleation with bone curettage). The effect of minimally invasive approaches was evaluated after a follow-up period ranging from 2 to 12 years postoperatively.
Results: Minimally invasive procedures were performed in 10 patients. Recurrence was observed in two out of three patients after radical surgery and in one after minimally invasive treatment. All recurrences were treated with radical surgery. No new recurrence was found thereafter. Relatively higher tendency of recurrence was observed in the multicystic type.

Conclusion: Minimally invasive surgical techniques represent a reliable option for the management of ameloblastoma with a low risk of recurrence and excellent results in function and appearance.

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Analysis the expression of MIF, Beclin1 and LC3 in human salivary gland adenoid cystic carcinoma and its prognostic value

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Background: Adenoid cystic carcinoma (ACC) is an uncommon salivary gland malignancy with poor long-term prognosis. Clinical reports show the high rates of local recurrences and distant metastases. This study aimed to investigate the expression of MIF, Beclin1 and LC3 in ACC.
Methods: Tissue specimens were obtained from 41 ACC and 15 squamous cell carcinoma (SCC) patients. Immunohistochemical staining was performed to estimate the level of LC3, Beclin1 and MIF. All patients of ACC were followed up from January 2003 to June 2015. The Kaplan Meier method was performed to compare the patients' prognosis with different treatments.
Results: The patients of 3-, 5- and 10-year survival rates for overall survival were 83.9%, 69.9%, and 46.6% respectively. In this study, we also found that the patients with solid histology or end-grade TNM showed higher level of MIF compared to LC3 and Beclin1.
Conclusions: Our findings suggest the ACC patients' long-term survival is poor. This study also suggests that MIF might be a risk factor for ACC patients, whereas LC3 and Beclin1 might be an effective strategy for treatment of ACC.

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Case report: hepatocellular carcinoma first metastasis to the mandible

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Background: The prognosis of metastatic hepatocellular carcinoma (HCC) is poor with a mean period of 6.1 months survival time after discovering the jaw metastasis.
Objectives and Methods: A male with HCC (BCLC stage C) s/p TACE x6 in 2015. Head and Neck CT in 2016 showed a heterogeneous bone tumour at the left mandibular body involve roots with cortex destruction. Frozen biopsy was a metastatic HCC. Composite tumour wide excision and anterolateral thigh free flap with plate fixation were done on March 2016. Entecavir was prescribed for him and TACE x1 was done after operation.
Findings: Positron emission tomography/computed tomography showed intense fluorodeoxyglucose (FDG) uptake in the left mandibular body (SUVmax: 4.59) and increased FDG uptake in the liver (SUVmax: 3.50), which proved his HCC first metastasis to his left mandibular body. Histopathology reported a metastatic HCC with all surgical margins free from tumour.
Conclusions: This patient survived for seven months after operation so far. Only 42 cases of this kind of cases from 1940 to 2014 in English language literature review so far. It had been proposed that HCC cells first metastasis to mandible through the paravertebral veins bypassing the pulmonary, inferior caval and portal venous circulation without pulmonary metastasis.

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Cervical lymph node density and distribution as prognosis predicting factors of oral squamous cell carcinoma

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Background: Compared to traditional TNM staging system, further factors including lymph node density (LND) and extended levels of lymph node (LN) involvement may play more reliable roles of predicting outcomes. In this study, we analysed patients with oral squamous cell carcinoma (OSCC) to evaluate if LND or LN dissemination were related to prognosis.
Methods: We examined OSCC patients who underwent tumour resection with neck dissection in Mackay Memorial Hospital. Univariate and multivariate analyses of clinicopathological characteristics including LND (the ratio of positive lymph nodes/total lymph nodes) and extension levels of positive LN distribution were performed for all patients and in positive nodes (pN+) patients.
Results: Total 613 OSCC patients were enrolled for this analysis. Several significant factors related to prognosis on multivariate analysis including pathological T and N, DM, histological grade of differentiation and positive of perineural invasion ($P < 0.05$). pN+ patient with LND > 0.04 had significantly related to poor outcome compared to patients with LND $\leq$ 0.04 ($P < 0.05$) on univariate and multivariate Cox PH regression analysis. For evaluation of LN distribution, pN+ patients with LN metastasis involved to lower level of neck were found to have poor prognosis.
Conclusions: The study suggested of the value of LND for predicting survival in patients with OSCC. Patients with lower neck LN metastasis were related to worse outcome. LN density and distribution positive LN may serve as guiding risk factors for further adjuvant treatment planning.

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Down-regulation of long non-coding RNA tissue differentiation-inducing non-protein coding RNA associated with metastasis and serves as a predictor in oral cancer

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Background: Recently long non-coding RNAs (lncRNAs) emerge as new gene regulators involving in tumourigenic processes. However, lncRNAs remain unknown in oral cancers (OCs).
Objectives: This study aimed to determine whether lncRNAs play a role in OCs progression.

Methods: The lncRNAs expression profiles in OC tissues and paired adjacent non-tumour tissues from 10 patients were detected by lncRNA microarrays. OCs-specific gene co-expression networks were constructed by differential expression analysis and weighted gene co-expression network analysis (WGCNA). Differentially expressed lncRNAs were verified in OCs tissues ($n = 45$) using quantitative reverse transcriptase-polymerase chain reaction (qRT-PCR) and further confirmed in another patient cohort ($n = 103$) by *in situ* hybridisation. The effects of lncRNA on cell migration and invasion were assessed by knockdown or knock-in *in vitro*.
Results: A total of 815 lncRNAs and 1783 mRNA were differentially expressed between OC tissues and non-tumour tissues. WGCNA showed that one co-expression network was significantly enriched for epithelial cell differentiation, among which, tissue differentiation-inducing non-protein coding RNA (TINCR) was significantly downregulated. Both PCR and ISH analyses validated down-regulation of TINCR in tumour tissues compared with controls. TINCR expression was associated with tumour size, differentiation, lymph metastasis status, and clinical stage in patients with OCs. TINCR low patients had a poorer survival. COX regression analysis showed that TINCR can be served as an independent prognostic factor for patients with OCs. More, upregulation of TINCR dramatically suppressed cell migration and invasion. Knockdown of TINCR enhanced cell migration contrarily.
Conclusion: Our study suggests that downregulation of TINCR plays a role in OCs progression, at least partially, by regulating epithelial differentiation-associated genes.

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Clinical research for treatment of ossifying fibroma in the jaws of children

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Background: A high recurrence rate of ossifying fibroma (OF) in the jaws of children has been noticed by surgeons. It must be treated properly for children's physical and mental health.
Objectives: To evaluate recurrence rate of different surgical methods of OF in the jaws of children.
Methods: A retrospective study was carried out for patients below the age of 18 years with ossifying fibroma of the jaws treated in Department of Oral and Maxillofacial surgery, Peking University School and Hospital of Stomatology, China between 1991 and 2016. Patients with complete clinical, pathological, radiological and follow-up data were selected. Recurrence rates of different surgical methods were compared.
Findings: 44 patients met the selection criteria comprising of 30 males and 14 females. The age ranged 3–18 years with a medium age of 11 years. 20 cases were located in the mandible and 23 in the maxilla. One was multiple OFs in both jaws. Forty patients were subjected to surgical treatment. Seven cases got curettage, 8 cases got local excision and 25 cases got extended resection. Ten of them relapsed with the recurrence rate of 25%. The recurrence rate of curettage was 71.4% (5/7), and 50% (4/8) for local excision. As for extended resection, it was 4% (1/25). Different jaws were also different, 33.3% (7/21) in maxilla and 15.8% (3/19) in mandible.
Conclusions: The recurrence rate of extended resection for OF in the jaw of children was lower than local excision and curettage. OF occurred in maxilla was easier to relapse than in mandible.

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Chondrosarcoma in the head and neck region: a retrospective analysis of the clinicopathological features and treatment outcomes from a single-institute database

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Objective: Head and neck chondrosarcomas are rare, and their clinical outcomes are not well understood. The aim of this study was to identify the factors that influenced the prognoses of 38 head and neck chondrosarcoma cases from a single institution.
Methods: Data from the patients who were treated for head and neck chondrosarcomas in the Oral and Maxillofacial Department of Head and Neck Oncology from 2005 to 2015 were retrieved for the study. The overall survival (OS) and disease-free survival (DFS) were analysed in terms of demographic, histological and therapeutic factors.
Results: A total of 38 patients were treated in the defined time period, including 11 male and 27 female patients. The median age at presentation was 36.5 years, with a mean of 39.4 ± 17.33. The median follow-up period was 58 months, with a mean of 50.08 ± 32.08 months. The Kaplan–Meier (KM) curves of the OS according to the grades of the conventional tumours revealed borderline significance ($P = 0.056$) with the best survival among the patients with grade I tumours. The patients with mandibular tumours exhibited significantly better survival than did those with maxillary-skull base tumours ($P = 0.046$).
Conclusion: Tumours occurring in the maxilla and skull base region exhibited worse prognoses than did those in the mandibular region. Moreover, the grade I conventional chondrosarcomas were associated with better survival than were the other conventional chondrosarcomas.

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Resection of benign parapharyngeal and deep parotid tumours: do we need to split the mandible for access?

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Background: Most small tumours of the deep parotid lobe can be resected adequately through transcervical/retromandibular approach. However, additional access procedures such as lip-split mandibulotomy or inverted L osteotomy have been recommended for removal of larger deep parotid and parapharyngeal tumours. These access procedures are associated with significantly higher incidence of complications and morbidity.
Methods: We present our initial review of nine patients presenting with large deep parotid, parapharyngeal and skull bases tumours, where the tumour was resected through only a transcervical/retromandibular approach without splitting the mandible.
Results: Complete excision of tumours was achieved in all nine patients.

Conclusions: We demonstrate that resection of large benign tumours of deep parotid, parapharyngeal and some skull base area can be achieved adequately through a transcervical approach alone, avoiding additional access procedures requiring splitting the mandible, thus reducing morbidity and improving postoperative functional outcomes.

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Transoral resection of soft palatal tumours: is there a need for access surgery?

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Background: Small soft palate tumours (T1–T2) can be resected adequately through a transoral approach. However, larger tumours particularly those involving the lateral pharyngeal wall and lingual tonsils often require access procedures such as a lip-split mandibulotomy in order to ensure complete tumour resection and optimal microvascular reconstruction.
Methods: We present an initial review of transoral surgical resection in 11 patients presenting with tumours of the soft palate ranging from T1–T4, some with involvement of the lateral pharyngeal wall and tongue base.
Results: Complete clearance of tumour was achieved in all 11 cases, with two cases exhibiting close margins. With the application of readily available gags such as Boyle-Davies, we were able to achieve complete excision of these tumours and reconstruct the defect adequately with a free flap, thus avoiding access procedures. None of the patients developed postoperative velopharyngeal incompetence and were able to eat and drink postoperatively.
Conclusions: We demonstrate that large tumours of the soft palate, including those involving the adjacent structures such as the lateral pharyngeal wall and tongue base can be surgically resected and reconstructed adequately through a transoral approach with the aid of readily available mouth gags. The technique described here avoids the need for additional access procedures, thus reducing morbidity and improving postoperative functional outcomes.

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The radiographic imaging and management of basal cell type ameloblastoma with hemimandibulectomy: a case report

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Background: Ameloblastoma is one odontogenic tumour invasive and have high recurrence. The radiographic characteristic ameloblastoma in specific cases sometimes go undetected.
Objective: To analyse radiographic imaging and management of the basal cell ameloblastoma type with hemimandibulectomy resection.
Methods: A 45-year-old male patient with complaints of a lump in the lower left jaw since four years; gradually become larger and the present size is 25 cm × 15 cm × 10 cm. The radiography examination shows multilocular radiolucent, soap bubble appearance and damage of the mandible bone. Based on clinical examination, radiographic and histopathologic, patients diagnosed Ameloblastoma Basal Cell types.
Findings: Hemimandibulectomy is the best choice treatment of ameloblastoma involving half of mandible in the operation, found that the tumour mass had invaded locally into facial muscles and mandible bone destruction. Panoramic radiographs in this case do not show a complete picture because large lesions disrupt the process so computed tomography scan radiographic technique is the right choice.
Conclusion: The success of ameloblastoma treatment is removal of the tumour mass is complete and no further recurrences. Radiographs an important role in providing bone destruction information, the extent of the tumour mass and determining the surgical technique. The reconstruction with reconstruction plate is useful to get the shape of the jaw and restore the function of the mandible.

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A case of dedifferentiated parosteal osteosarcoma in the maxilla

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Background: A dedifferentiated parosteal osteosarcoma (DPOS) is a high-grade surface osteosarcoma which rarely occurs as either primary or secondary events of conventional low-grade parosteal osteosarcoma (c-POS).
Objectives: c-POS is known as good prognosis after the local excision, and DPOS has ability to metastasise systemically, which leads to uncontrollable condition. Although some treatment strategy has been attempt, clear evidence-based treatment has not been established due to low incidence rate of DPOS. DPOS mainly arise from long bones such as femur, humerus and tibia. However, arising from head and neck region has not been reported. Here, we present our treatment experience involving a DPOS in the maxilla.
Case Presentation: A 45-year-old female patient with a swelling of the left buccal region was referred to our hospital. The patient underwent biopsy for four times in three years which diagnosed bone related benign tumour. Because the tumour got progressed during the check-up, we performed biopsy and the diagnosis was 'DPOS'. Coexpression of MDM2 and cdk4 stained by immunohistochemistry, we found the DPOS was derived from low-grade sarcoma. Preoperative imaging showed tumour invasion of skull base and temporal fossa. After three courses neoadjuvant chemotherapy (ifosfamide + pirarubicin), we performed subtotal maxillectomy using orbitozygomatic and mandibulectomy approach. Subsequently, immediate raw surface muscular flap reconstruction was carried out, which we have reported before. Because histopathological result did not show the effect of neoadjuvant chemotherapy, we administered additional chemotherapy (cisplatin + pirarubicin).
Findings and Conclusion: The patient had no indication of recurrence a year after surgery.

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A summary of flap cases for head and neck oncology at University College London Hospital between September 2015 and August 2016

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An analysis was conducted of all patients undergoing flap surgery for the treatment of head and neck cancers between September 2015 and August 2016. 57 patients underwent flap surgery, 72% for SCC, 21.0% for sarcoma and 7% for other. Of these, 9/57 had previous head and neck cancer. The median time from first surgical clinic until surgery was 41 days while the median time from first multidisciplinary team (MDT) meeting to surgery was 27 days.

Of the flap cases: 19/57 were radial forearm, 17/57 fibula, seven pectoralis major, three latissimus dorsi, two anterolateral thigh, two facial artery musculomucosal and five other. 66.7% of patients underwent a surgical tracheostomy and 78.9% had at least one dental extraction. The median inpatient stay was 14 days and the median intensive care unit stay was two days. 26.3% had no complications while 31.6% had grade 1, 17.6% a grade 2, 10.5% a grade 3a, 7% grade 3b and 7% grade 4a.[1] There were a total of eight returns to theatre, with a total of three flap failures (5.3%), two flap salvages (3.5%) and three other causes. The final histology diagnosis correlated with the initial MDT diagnosis 93.8% of the time. Initial MDT TNM staging correlated with final TNM staging with 67.6% of patients. Margins were 5 mm or greater in 62.5% of patients.

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Pleomorphic adenoma of the parotid gland: institutional experience and review of the literature

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Background: Pleomorphic adenoma is the commonest salivary gland tumour. It has the tendency to recur and the ability to undergo malignant transformation. The management of pleomorphic adenoma of the parotid gland is surrounded with controversy in terms of surgical approach and long-term outcomes.
Methods: All patients who were operated for pleomorphic adenoma of the parotid gland between the years 2000 and 2016 were reviewed. Patient demographics, clincopathologic variables and operative details were collected retrospectively.
Results: A total of 246 patients were identified. Superficial parotidectomy was found to be the procedure of choice over extracapsular dissection in our institution. Recurrence rate was found to be consistent with those reported in the current literature. Despite the comparatively more invasive nature of superficial parotidectomy, long-term complication rate remains low in experienced hands.
Conclusion: A general consensus in the surgical management of parotid pleomorphic adenoma is yet to be reached. Our institutional experience over the last 16 years favours superficial parotidectomy for most cases, nevertheless we believe there is merit in performing extracapsular dissection on selected cases of small, superficial parotid pleomorphic adenomas.

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Prediction of acute radiation mucositis using an oral mucosal dose surface model in intensity modulated radiation therapy for head and neck tumours

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Background and Objectives: To evaluate the dose-response relationship for development of acute radiation mucositis (ARM) using an oral mucosal dose surface model (OMDS-model) in intensity modulated radiation therapy (IMRT) for head and neck tumours.
Methods: 37 patients receiving IMRT for head and neck cancer were evaluated for ARM (once per week for six weeks) according to the Common Terminology Criteria for Adverse Events (CTCAE), version 4.0, and the Radiation Therapy Oncology Group (RTOG) scoring systems. The irradiation schedule typically used was 40–70 Gy in 20–35 fractions for four to seven weeks. Maximum point doses in the tongue were compared with ARM in each patient.
Findings: The location of the ARM coincided with the high-dose area in the OMDS-model. There was a clear dose-response relationship between maximum point dose and ARM. The threshold doses for grade 1 and 2 ARM in the tongue were 53.9 Gy and 70.3 Gy, respectively.
Conclusions: The OMDS-model was useful for predicting the location and severity of ARM. Maximum point doses in the model correlated well with grade 1–2 ARM.

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A single centre experience of head and neck cutaneous pleomorphic dermal sarcoma

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Background: Pleomorphic neoplasms are understood to have high-grade malignant behaviour. This does not readily apply to primary cutaneous tumours. The behaviour of these tumours is varied, requiring confident diagnosis to reliably predict behaviour and guide treatment. Diagnosis is challenging because of significant clinical and pathological overlap of cutaneous pleomorphic neoplasms.

Pleomorphic dermal sarcoma (PDS) is a tumour with morphologic and immunohistochemical features of atypical fibroxanthoma (AFX) and in the past they were regarded together with AFX. The separation from AFX is important due to low-grade malignant potential of PDS with risk for local recurrence and metastasis. PDS affects sun-damaged skin of the elderly with a strong male predilection with often a preference for the scalp. A short history of rapid growth is characteristic and ulceration and bleeding are common. PDS is best regarded as a tumour of

low-grade malignant behaviour with local recurrence risk and a reported metastatic risk of between 5–10%. Metastatic disease mainly affects the skin and lymph nodes.
Objectives: To delineate the number of head and neck cases of primary cutaneous PDS experienced in a single district general hospital and to appreciate its nature and disease course.
Methods: Four separate databases were searched for all cases of primary cutaneous PDS to allow further analysis of treatment.
Findings and Conclusion: Patients with primary cutaneous PDS had a variety of treatments to include surgery alone with post-operative monitoring to surgery with consideration of adjuvant treatment.

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Neutrophil–lymphocyte ratio and intraoperative blood transfusion: independent prognostic factors of elderly patients with oral account

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Objective: There are many factors that affect the survival of old people aged over 60 years with oral squamous cell carcinoma. The immune state has great impact on suppression of tumour growth. Bad immune state appears to be associated with worse survival in many cases.

To investigate the correlation between immune state, including inflammation and blood transfusion, and survival in old patients (aged over 60) with oral squamous cell carcinoma (OSCC).
Methods: Data of 559 patients from Shanghai Ninth People's Hospital between January 2010 and December 2012 who were diagnosed as OSCC and aged over 60 years old were retrospectively reviewed. Related factors including preoperative platelet–lymphocyte ratio (PLR), neutrophil–lymphocyte ratio (NLR) and perioperative blood transfusion were analysed. The cutoff value of PLR and NLR were determined by receiver operating characteristic curve (ROC).
Results: The cut-off value of NLR and PLR, based on receiver operating characteristic curve analysis, were 2.20 and 102. Age, tumour grade, site, clinical stage, NLR, PLR and blood transfusion were the significant factors by the univariate analysis for OS ($P < 0.05$).
Conclusion: Preoperative high NLR index and intraoperative blood transfusion predicts a poor prognosis in elder patients who undergoing OSCC. Avoiding or minimised blood transfusion will do good to the survival.

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Subcranial middle cranial fossa approach for paranasal sinus tumours extending to middle cranial fossa

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Objective: The objective is to analyse the outcome using the subcranial approach to obtain oncologic clear margins in craniofacial resections for paranasal sinus tumours extending to the middle cranial fossa.
Methods: This was our experience with 4 patients, two with a maxillary sinus squamous cell carcinoma, the others with an adenoid cystic carcinoma of the sinus tracking to the temporal lobe. The craniofacial resection entailed a lip split, cheek flap with a mandible angle osteotomy to obtain access to the skull base and infratemporal fossa. This was combined with a maxillectomy but the pterygoid disjunction being done only after the completion of the pterional craniotomy and resection of the tumour superiorly so as to drop down the tumour en bloc with adequate margins. Reconstruction was done with an anterolateral thigh flap. A titanium mesh was used to support the globe. All patients have also received postoperative adjuvant therapy.
Results: Oncologic clear resection margins were obtained at the skull base and intracranially with this approach. This was documented by the clear margins obtained on final histopathology (R0 resection). There were no neurologic complications associated with this procedure, and the added morbidity of the craniofacial resection was minimised by avoiding a formal craniotomy.
Conclusion: The subcranial middle fossa approach with a pterional craniotomy is a suitable oncologic access method for paranasal sinus tumours extending into the middle cranial fossa.

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A case of cerebral venous sinus thrombosis associated with chemoradiation therapy for oral cancer

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Background: Cerebral venous sinus thrombosis (CVST) is occluded venous sinus that is a blood outflow tract from the brain, severe case is a disease that leads to death for significant oedema and cerebral haemorrhage. The main symptoms are headache nausea and vomiting by increased intracranial pressure. We report experienced a case of the CVST associated with the chemoradiation therapy for oral cancer.
Case: A 25-year-old male visited our department for right tongue cancer. He was enforced right partial glossectomy. Finding the right cervical lymph node metastasis about one and a half years after, he was enforced right neck dissection. Postoperative radiation 60 Gy + chemotherapy (PF: 2 cool) was planned. He complained of a severe headache and nausea after the first cool end. The abnormal findings were not observed on computed tomography, but the symptoms did not improve. A wide range of thrombus formation from the right transverse sinus to S-shaped sinus was observed on magnetic resonance imaging. It has started an antithrombotic therapy with heparin immediately after imaging in the diagnosis of CVST. Symptoms after the start of antithrombotic therapy showed an improvement trend. Antithrombotic therapy was stopped, because deterioration of symptoms and the increase of thrombosis were not observed.
Discussion and Conclusion: The present case showed a severe headache and nausea after chemoradiation therapy. At the time of normal chemotherapy, nausea is frequently observed; it often improves by symptomatic treatment. However, if it finds the nausea and severe headache with no improvement as this case, it is necessary to perform the quick response.

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Malignant melanoma occurred in maxillary sinus: case report with review of literature

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Background: Malignant melanoma occurred in sinonasal mucosa is rare malignancy. It accounts for less than 1% of all malignant melanoma. In most of cases, it occurs primarily in mucosa of nasal cavity. However, in some rare cases, paranasal sinus can be primary place of malignant melanoma.
Objectives: The purpose of this report is to introduce a case of a patient who had malignant melanoma which occurred primarily on maxillary sinus.
Methods: The patient with malignant melanoma on maxillary sinus visited our clinic. Considering age and personal circumstances of patient, we removed tumour without safety margin and fat pad graft was done for covering bony defect. After stitch-out, the patient was referred to haemato-oncology for additional radiation therapy or chemotherapy. For review of literature, PubMed was searched with keywords of maxillary sinus and malignant melanoma. On the result, the literatures about malignant melanoma occurred in nasal cavity primarily were excluded.
Findings and Conclusion: Malignant melanoma occurred in maxillary sinus showed aetiologic, histological features and survival rate that are quite different with skin malignant melanoma.

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Perioperative management of head and neck cancer patients among United States of America maxillofacial units

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Background: Oncologic and microvascular reconstruction in oral/maxillofacial surgery has broadened treatment options and improved aesthetic and functional outcomes. However, evidence-based guidelines for perioperative management of head-and-neck cancer patients are meagre. By delineating contemporary surgical practices, we hope to facilitate consensus among head-and-neck specialists on evidence-based treatments that improve outcomes and reduce length-of-stay and hospital expenses.
Objectives: To assess variation among United States of America (USA) maxillofacial units concerning perioperative management of head-and-neck cancer patients, determine whether current practices conform to published evidence in literature, and present an evidence-based clinical care pathway.
Methods: Maxillofacial units performing oncologic and microvascular reconstructive surgery in the USA were surveyed with nominal/ordinal multiple-choice, matrix, and free response questions. Descriptive analysis was performed.
Findings: 30% response rate is comparable to published studies. 66.1% often/always submit biopsy specimens for second review. 81.1% have no preference regarding order of imaging/biopsy. Intraoperatively, 47.9% often/always avoid vasopressors, and 25% always use aspirin intraoperatively while 41.7% never do. 72.4% rarely/never place implants intraoperatively. Postoperatively, 77.1% often/always provide intensive care unit care and 60.4% position at neutral and/or 30 degrees elevated. 64.6% often/always perform elective tracheostomies. In addition to clinical observation, adjunctive flap monitoring primarily involves surface and invasive Doppler.
Conclusion: Our survey is the only large-scale study of care practices among USA maxillofacial units performing head-and-neck oncologic surgery and demonstrates areas of agreement and non-uniformity. More prospective clinical trials are needed to identify evidence-based clinical practices that improve care and decrease healthcare costs. A clinical care pathway designed by the senior author for head-and-neck cancer patients will be presented.

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Circulating microparticles levels in the patients of lymphatic malformations: possible role in the development of lymphatic malformations

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Background: Microparticles (MPs) are circulating membrane particles of less than a micrometre in diameter shed from endothelial and blood cells. Recent literature suggests that MPs may possess biological functions and mediate the communication between vascular cells. We hypothesised that MPs may have possible role in the development of lymphatic malformations.
Objectives: To study the clinical significance of circulating microparticles levels of the local lesion and peripheral blood in the patients of lymphatic malformations.
Methods: Collecting and separating the circulating microparticles of the local lesion and peripheral blood in the patients of lymphatic malformations and the normals. Flow cytometry was used to test the concentration and the classification of the circulating microparticles. According to the results combined with clinical indicators to analyse the clinical significance.
Findings: Compared with the normals, the total circulating microparticles levels of peripheral blood in the patients of lymphatic malformations were significantly increased. The circulating microparticles levels of cystic fluid in the local lesions were higher than those of the peripheral blood in the patients of lymphatic malformations and the normals, and the classification was also different. In addition, the circulating microparticles levels of cystic fluid in the local lesions and peripheral blood were significantly higher in the larger lesions.
Conclusion: The levels and the classification of the circulating microparticles in the patients of lymphatic malformations were different with those in the normals. The circulating microparticles may contribute to the development of lymphatic malformations.

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Malignant myoepithelioma arising in the soft palate – report of a case

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Background: Malignant myoepithelioma (MM) is a rare salivary gland neoplasm. It was first treated as an independent disease entity in the WHO classification of salivary gland tumours in 1991. It is a rare tumour accounting for less than 1% of salivary gland neoplasm.
Objectives: We present a case of MM in the soft palate and discuss its therapeutic aspect.
Case Report: A 76-year-old man was referred to our hospital for evaluation of a swelling in the left soft palate, which he had been aware of for 15 years. Recently he complained of disturbance of swallowing. Computed tomography and magnetic resonance imaging showed a 40 mm-in-diameter, mixed density mass in the left palate with no obvious lymph node enlargement. Surgical resection of the tumour was performed. Since it was diagnosed as MM, he underwent postoperative chemoradiation. The patient has done well with no sign of recurrence for four years.
Findings and Conclusion: Microscopically, increase of spindle-shaped cells and the plasmacytoid-cells were recognised in the mucinous stroma in haematoxylin and eosin staining. In immunohistochemical staining, keratin 15 was positive in neoplastic cells. In addition, the positive rate of Ki 67 was around 5%. Also, invasion to capsule was observed. So it was diagnosed as MM. As for treatment of MM, there have been a few reports and surgical resection is the mainstay of therapy. Postoperative chemoradiation is highly recommended in the case like ours, where the tumour could not be resected with enough surgical margin not for technical but for anatomical reason.

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Minimising postoperative pain after head and neck surgery – the use of ultrasound guided superficial cervical plexus nerve block immediately prior to surgery

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Background: Controlling operative pain is vital in ensuring a comfortable and successful recovery after head and neck surgery. The superficial cervical plexus block has been used in vascular and thyroid surgery to reduce postoperative pain and minimise analgesic requirement. We present our series of head and neck patients who received this nerve block, and its effect on pain and analgesic needs.
Methods: A retrospective case note review was carried out for all patients who received ultrasound guided cervical plexus blocks prior to their procedure. Basic demographic data, nature of surgery and intraoperative analgesia were recorded. Postoperative visual analogue scores were noted, as was analgesia requirements and complications.
Results: 54 patients received blocks under ultrasound guidance of typically 10 mL of 0.5% levobupivicaine for a range of procedures including thyroid and parathyroid surgery, neck dissections and branchial cyst, lymph nodes and submandibular gland excision. Intraoperative analgesia involved paracetamol, non-steroidal anti-inflammatory drugs (NSAIDS) and stronger opioids in most cases. 96.2% and 72.2% patients used regular paracetamol and NSAIDS postoperatively with 40.7% making use of opioid analgesia as required. The majority of patients report pain scores between 1 and 3 postoperatively although 7.4% reported significant pain. 1.9% suffered a transient inadvertent brachial plexus block, which resolved during the follow-up period.
Conclusion: The ultrasound guided superficial cervical plexus block is a useful tool in a surgeon's armamentarium prior to head and neck surgery. Our series demonstrates that it is well tolerated and can be used effectively in a range of oral, maxillofacial, head and neck surgical procedures.

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Neutron radiation efficacy when treating salivary gland malignancies

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Background: There is limited literature regarding oral complications following neutron radiotherapy (NRT).[1]
Objectives: The aim of this follow up study was to estimate: (1) the rates of locoregional control and (2) the frequency of oral complications in subjects with head and neck salivary gland malignancies treated with NRT.
Methods: This is a retrospective case series of patients with salivary gland malignancies treated with NRT by the Radiation Oncology Department at the UW from 1997 to 2010. Study variables were demographic, surgical, pathological, radiologic, etc. Univariate statistics were computed for each study variable and Kaplan–Meier methods were used to estimate locoregional recurrence.
Findings: The sample was composed of 562 patients with a mean age of 54.1 years (standard deviation, 15.9 years). 48% were male. Adenoid cystic carcinoma (47.1%) and parotid location (55.8%) predominated. Perineural and lymphatic invasion was present in 49% and 26% of subjects, respectively. The six-year locoregional control rate was 70%. Mucositis, xerostomia, and osteoradionecrosis occurred in 81, 83, and 5.1% of subjects.
Conclusion: The locoregional control rate of 70% compares favourably to the rate reported in the literature for photon radiation treatment of the same areas. The frequency of ORN was comparable to photon radiation treatment of the same areas (4–7%). Given the potential benefits of NRT, dental professionals should be educated regarding its indications and oral complications.

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The first case of intraosseous liposarcoma of the mandible involving the condyle

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Background: Liposarcomas of the head and neck are a rare entity. Intraosseous liposarcoma of the mandible has only been reported once in the past in a paper from 1979. No further information regarding the management of that case was supplied. Intraosseous liposarcomas of other bony structures outside the head and neck have been reported before, but remain a very rare entity.
Case: We report the case of a 21-year-old male of Afghan origin who presented to the sarcoma head and neck clinic of the University College London Hospital with a mass based in the left mandibular condyle. Initial diagnosis suggested a form of a bony sarcoma of the mandible favouring osteosarcoma. On his staging scans no distal metastasis was identified.
Management: The patient was treated with neoadjuvant chemotherapy followed up with tracheostomy, left hemimandibulectomy, clearance of the associated base of skull area, left neck dissection for vessel harvesting and fibula free flap reconstruction with condylar implant.
Outcome: Following surgery the patient was treated in the intensive care unit for 48 h as per protocol and was then hospitalised in the head and neck ward for 10 days. The final histology showed complete clearance of the sarcoma and identified the histological type as that of an intraosseous liposarcoma.
Conclusion: This is the first case of intraosseous liposarcoma of the condyle of the mandible ever reported and the second in the mandible as a whole. We detail the diagnostic process, the treatment regime and the outcomes of this case.

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The surveillance of patients in head and neck oncology; an audit on the clinical and radiographic reviews in the postoperative phase

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Background: This is a retrospective audit on the surveillance of all head and neck oncology patients in the last 3 months within the Royal Free Trust.
Objectives: This audit shows whether the Trust is complying with guidelines in the postoperative review stage of patients with oral, pharyngeal and laryngeal cancers, as well as those with cancers of unknown primary.
Methods: This is an audit taken retrospectively of a total of 50 patients seen in the Head and Neck Oncology clinic at Chase Farm Hospital. Patients are placed into groups of oral, pharyngeal, laryngeal or unknown primary cancers. Their clinical reviews as well as radiographical reviews are recorded, and compared against standards from the British Association of Head and Neck Oncologists.
Findings: The Trust as a whole is complying with the clinical review guidelines as addressed above, but not with the radiographical review guidelines, although these are not specified from year 2 postoperatively and thereafter.
Conclusions: Although the Trust is complying with the suggested guidelines, a further audit should be linked to enquire about the recurrence rates for our head and neck oncology patients to show if these guidelines are helping to reduce the late recognition of recurrence amongst these patients.

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Effect of electrochemical treatment on high-flow venous malformations assisted by computer techniques

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Background: Venous malformations are commonly present at birth and grow with the patient, and affect the patient's appearance and functioning, particularly if it is a high-flow venous malformation. Today, the application of electrochemical treatment on venous malformation has been reported. But if the tumour is deep, it is difficult to determine the extent and boundaries. Now we can accurately guide the operation assisted by the computer navigation technology and make the surgery more accurate.
Objectives: To evaluate the efficacy of electrochemotherapy in treating venous malformations assisted by computer techniques.
Methods: Electrochemotherapy assisted by computer techniques was applied to 10 patients with venous malformations in maxillofacial region from August 2014 to 2016. In this study, four male and six female patients were involved. Preoperative virtual planning was performed in the computer assisted. The tumour margins were marked with the software, so that the three-dimensional position of the tumour and its relationship to adjacent structures could be visualised accurately. We inserted platinum needles assisted by computer techniques into the lesion and protected the normal skin by inserting the cannulas into plastic sheaths, and connected the needles to an electrochemical machine. The common voltage, electric current, and amount of electricity were 6–8 V, 80–100 mA, and 10–20 C/cm^2, respectively.
Findings: During a follow up period of two to eighteen months, seven patients had a complete response, and three a partial response.
Conclusions: Electrochemotherapy assisted by computer techniques is a new, efficient, and more accurate way to treat venous malformations.

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Progression level of extracapsular spread and tumour budding for cervical lymph node metastasis of oral squamous cell carcinoma

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Background: The extracapsular spread (ECS) of cervical lymph node metastasis was identified as a strong prognostic factor in oral squamous cell carcinoma (OSCC) patients at a high risk of recurrence. Tumour budding was reported to be correlated with poor prognosis and lymph node metastasis including occult metastasis.
Objectives: The aim of the present study was to investigate the efficacy of tumour budding on the prognosis, and to analyse the association between progression level of ECS and tumour bussing in OSCC patients based on large number of patients with a multicentre retrospective analysis.
Methods: The Kaplan–Meier method was used to examine overall survival (OS) and relapse-free survival (RFS) curves. Prognosis factor for recurrence was analysed with univariate and multivariate analysis.
Findings: ECS was detected in 216 cases and analysed. The five-year overall survival and RFS rates of patients with Type C, which was microscopically defined as tumour invasion to perinodal fat or muscle tissue, were significantly poor at 40.6% and 37.8%, respectively. The results of a univariate analysis suggested that the prognosis of ECS in OSCC patients is associated with its progression level, particularly Type C. The five-year RFS rate of Type C with tumour budding was significantly poor at 31.5%. Type C with tumour budding correlated with local and regional recurrence as well as distant metastasis. In a multivariate analysis, tumour budding was identified as an independent prognostic factor.
Conclusion: These results suggest that the progression level of ECS and tumour budding are useful prognostic factors in OSCC patients.

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Maxillary ameloblastoma: factors associated with risk of recurrence

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Objective: Maxillary ameloblastomas are rare and associated with an aggressive course because of the anatomical composition of the maxilla and adjacent structures. The risk factors associated with recurrence were analysed in this retrospective study.
Subjects and Methods: Cases of maxillary ameloblastoma reported in a tertiary hospital from 2005 to 2015 were analysed to identify clinicopathological and radiological factors associated with recurrence using univariate and multivariate Cox regression analyses.
Results: A total of 890 patients with ameloblastomas were treated in this study, of whom only 51 (5.7%) had maxillary ameloblastomas. The median follow-up period was 56 ± 28.65 months. Of the maxillary ameloblastomas, 29 (56.8%) were primary and 22 (43.1%) were recurrent. Soft tissue or maxillary sinus invasion and primary or recurrent tumour status were risk factors significantly associated with recurrence in the univariate analyses ($P = 0.006$ versus $P = 0.025$, respectively), while the association between recurrence and surgical methods was borderline significant ($P = 0.08$). The multivariate Cox regression analysis showed that soft tissue or maxillary sinus involvement was significantly associated with recurrence ($P = 0.023$).
Conclusion: Recurrent tumours and tumours with soft tissue or maxillary sinus involvement were risk factors for recurrence among maxillary ameloblastoma patients.

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The effect and molecular mechanism of TSP-1 on biological behaviour of mucoepidermoid cancer

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Background: Mucoepidermoid cancer (MEC) is one of the malignant tumours of salivary gland. Some researches have proved that function of TSP-1 on tumour only by inhibition of angiogenesis, but had no effect on tumour cells.
Objectives: This article explores the impact of TSP-1 on biological behaviour of MEC and provides some references on the mechanisms of development and metastasis of MEC.
Methods: Immunofluorescence (IFC) and Western Blot were used to detect expression of TSP-1, CD36 and CD47 of MEC to choose the most suitable experimental object. MTT was used to detect the effect of TSP-1 on proliferation of MEC. Transwell was performed to investigate the ability change of invasion. Cell cycle was evaluated by flow cytometry and IFC experiments.
Findings: Poorly differentiated MEC which reduced expression TSP-1 and the same time express CD36 and CD47 as experimental object. Cell growth rate ability of TSP-1, CD36 and CD47 group is obviously slower then the control. Transwell showed the number of TSP-1 group cells dramatically decreased, there is no significant differences between CD47 blocked and TSP-1 group. Early apoptotic cell number of TSP-1 group was dramatically higher than the CD47 blocked and control group, but no significant differences with CD36 blocked.
Conclusions: TSP-1 dramatically inhibit proliferation of MEC by combining with CD36 not CD47. TSP-1 inhibits invasive ability of MEC, which is closely rated with CD36. TSP-1 is mainly combined with CD47 to induce MEC apoptosis.

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Detection of genome mutations in high risk oral pre-cancer lesions

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Background: The progression of oral cancer includes a period of pre-cancer lesion, or oral potentially malignant disorders (OPMD). The malignant transformation rate of OPMD is about

4–5%. The early detection of high malignant transformation in OPMD patients is very import.
Methods: Paired oral cancer/OPMD surgical specimens were obtained. Gene analysis of exomes was done by next generation sequencing, (NGS).
Results: The gene mutation rate was increased in the progression of OPMD to oral cancer. The chromosome 4 and 17 had more mutations in oral cancer specimens. Positive correlation of gene mutation and malignant transformation of OPMD was found.
Conclusion: Gene mutation was increased in the transformation of OPMD to oral cancer. Our study might be useful to develop chemical prevention agent to prevent malignant transformation in oral pre-cancer lesions.

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Clinicopathological characteristics and outcomes of squamous cell carcinoma of the tongue in different age groups

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Background: The clinicopathological features and outcomes of squamous cell carcinoma (SCC) of the tongue in patients of different age groups remain debatable.
Objectives: To evaluate biological behaviours and outcomes of tongue SCC in different age groups.
Methods: Medical records of 457 patients with tongue SCC were reviewed, grouped by age, and followed up. The clinicopathological features of the tumours and patients' outcomes in different age groups were compared.
Findings and conclusion: Gender, TNM stage, disease-free survival (DFS), and disease-specific survival (DSS) showed no inter-group differences. Patients aged 46–59 years had the most severe smoking and drinking habits (42.9% and 35.3%, respectively). Tongue SCC in patients' $\leq$30 years had the most advanced TNM stage and the greatest proportion of poorly differentiated tumours. The death rate caused by recurrence or metastasis in the youngest group was much higher than the other two groups (91.7% versus 75.4% and 77.4%, respectively). Young patients had higher incidence of distant metastasis and recurrence death rate than middle-aged and oldest patients.

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Brown tumour of the mandible: report of two cases and review of the literature

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Objectives: Brown tumours are non-neoplastic lesions resulting from abnormal bone metabolism in hyperparathyroidism. The mandible involvement is exceptional, we describe such two cases and highlight the importance of taking a comprehensive history and focusing the investigations so that appropriate treatment can be given.
Methods: A retrospective analysis of two cases of mandibular brown tumour patients in our hospital, one case occurred in the anterior portion of the mandible, another case occurred in the maxilla and mandible involved femur, ribs and skull. The clinical features, laboratory investigations, pathological characteristics, imaging findings and treatment were retrospectively analysed.
Findings: Both patients showed weight loss, fatigue, anorexia, nausea, pain and decreased bone density, high levels of serum calcium, alkaline phosphatase, urinary calcium, parathyroid hormone and lower levels of serum phosphorus and urinary calculi history, X-ray showed decreased bone density, extensive fibrosis, cystic degeneration. Histopathological examination showed a lesion with newly formed bone tissue, diffuse giant cells and deposits of haemosiderin in a background of fibrovascular proliferation.
Conclusion: The diagnosis of mandibular brown tumour was suggested by the clinical history and confirmed by laboratory investigations including calcium, phosphorus, alkaline phosphatase, parathormone assays, computed tomography and histopathological determinations. For mandibular cystic lesions associated with urinary tract stones, hypercalcaemia, osteoporosis, brown tumours should be highly suspected. A majority of these lesions may disappear with the removal of the parathyroid pathology.

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Oral and Maxillofacial Pathology

Enucleation with adjuvant therapy as treatment modality for ameloblastoma — a retrospective analysis of 10 years

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Background: Ameloblastoma is a rare odontogenic neoplasm of the mandible and maxilla, with multiple histologic variants, and high recurrence rates if improperly treated. Historically, the extent of resection has been controversial, comprising of two surgical options: 'conservative' versus 'radical'.
Objective: The aim of this presentation is to retrospectively evaluate the patients with ameloblastoma treated in our department with enucleation and adjuvant therapy followed for 10 years.
Methods: A retrospective study was done in the Department of Oral and Maxillofacial Surgery, Government Dental College and Hospital, Nagpur. The demographic data was collected retrospectively from 89 patients, and clinical and radiographic features were carefully documented. Type of ameloblastoma, size and site of lesion, sufficient amount of remaining healthy bone, and the type of treatment, received conservative as enucleation, along with or without adjuvant therapy or radical resection were studied.
Result: Total of 89 patients presented to the department with pathology, of whom 39 patients (mean age, 30 years) were diagnosed as Ameloblastoma and included in the study. Radiographically shows unilocular and multilocular radiolucency, histologically reported unicystic/mural ameloblastoma or plexiform ameloblastoma were treated by enucleation along with adjuvant therapy and under follow-up for past 10 years.
Conclusion: Therapeutically, simple enucleation has no role in the management of ameloblastoma but the study concluded that enucleation along with the adjuvant therapy has played important role in treating ameloblastoma perhaps the unicystic subtype. Advantages of enucleation include the fact that it requires no reconstruction.

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Relapse of multiple myeloma presenting as anaesthesia of lower lip: a case report

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Multiple myeloma is a rare bone malignancy. It occurs exclusively at medullary sites, and rarely at extramedullary locations. Scientific literature search revealed few case reports describing occurrence of multiple myeloma in the head and neck region as primary manifestation of the disease. However, the occurrence of relapse of multiple myeloma in these sites is exceedingly rare.

This poster describes a case of a-56-year old female with past history of multiple myeloma that was treated by chemotherapy and bone marrow transplant and was in remission state. Her chief complaint was numbness of the lower lip of sudden onset. Clinical and radiographic examination was suspicious of possible relapse of multiple myeloma which was subsequently confirmed by bone marrow aspirate and histopathological investigations. This unique case highlights the important role of dental surgeons encountering patients with malignancies. A thorough knowledge of various clinical and radiographic manifestations of these diseases is paramount to help in detecting any occurrence of the disease or its relapse.

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Calcifying cystic odontogenic tumour with odontoma formation: a case report and literature review

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Calcifying cystic odontogenic tumour (CCOT) and odontoma are two different entities which are classified as benign tumour of the jaw. These tumours derived from epithelial, ectomesenchymal or both the elements that have been part of the tooth-forming apparatus. CCOT is rare in occurrences and uncommonly associated with presence of odontoma.

We report a case of CCOT with odontoma formation at anterior of maxilla region. A 19-year-old male patient was referred to Oral and Maxillofacial Clinical Sciences, University Malaya with incidental radiographic findings of a lesion at apical to upper right incisors upon pre-orthodontic assessment. Dental panoramic radiograph and cone beam computed tomography revealed a multilocular radiolucency, well-delineated lesion containing radiopaque masses located at apical to upper right incisors region.

On intraoral examination, there was a bony hard bulge palpable palatal to upper right incisors with a normal overlying mucosa, and also noted the upper right central incisor was rotated. Surgical removal, enucleation of lesion shown a cystic lesion contained a number of mineralised structure with some of it does appear as small teeth. Histopathological examination confirmed the diagnosis of calcifying cystic odontogenic tumour with odontoma formation. CCOT can be treated successfully with enucleation, yet there are still chances of it to recur. This patient was reviewed 9 months later with no evidence of recurrence.

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Evaluation of genetic polymorphism of interleukin-1RN and interleukin-1B in central giant cell lesion

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Background: Central giant cell lesion is an intraosseous lesion, classified as aggressive and non-aggressive, of uncertain pathogenesis, not existing agreement whether it is neoplastic or reactive, but the proliferative activity was demonstrated in stromal cells, suggesting the possibility of deregulation of the cell cycle in the pathogenesis.
Objective: Evaluate polymorphism of interleukin (IL)-1RN and IL-1B −511C>T involved in inflammation in patients with this pathology.
Methods: The blood of 12 patients was collected. The presence of polymorphism was determined by DNA extraction, polymerase chain reaction (PCR) and PCR-restriction fragment length polymorphism.
Findings: Nine were females and three males, nine were aggressive and three unaggressive, causing a ratio of 2:1 in the maxilla. Among the 12 cases, 6 showed genotype L/L, 4 showed L/C and two showed C/C to IL-1 RN. For IL-1B, three were T/T, five were C/T and four were C/C. The IL 1RN C/C genotype was statistically significant for females ($p = 0.018$). According to studies, for the IL-1RN, the short allele with two replications shows more aggressive clinical results in chronic inflammatory diseases. Long alleles, on the other hand, with three or more replications, appear to promote normal immune response. In the case of IL-1B, the T/T genotype could be associated with greater risk.
Conclusion: Cytokines may play a role in better understanding of the pathogenesis and clinical behaviour, contributing to the understanding of genetic susceptibility to injury. However, further studies with larger sample relating other interleukins should be performed to clarify these correlations.

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Immunohistochemistry evaluation of cyclin D1 and p16 in central giant cell lesion

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Background: Central giant cells lesion (CGCL) is a benign intraosseous pathology of the jaws, that affects mainly child and young adults, occurring more in women than in men with preference for the mandible. This pathology presents uncertain aetiology and variable clinical behaviour thus it is important the development of researches to determine its nature. The cyclin D1 and the p16INK4a are markers of the cell cycle that have a well understanding of their relationship and association to ethiopathogenesis of other tumours.
Objectives: This study has the aim to evaluate the immunohistochemistry expression of those markers in CGCL and correlate with clinical findings.
Methods: 10 cases of CGCL were selected and underwent to immunochemistry exam for cyclin D1 and p16INK4a so positive and negative cells from both lines were counted.

Findings: It was obtained that from the 10 cases selected, six occurred in females and four in males, the average age was 23.6 years, ranging from 9 to 80 years. The proportion of mandible and maxilla was 8:2. The aggressiveness was of five lesions non-aggressive and five aggressive. As for the immunochemistry reaction, all the cells types were expressed, without any significant difference between men and women, or sites, age and aggressiveness.
Conclusion: There is expression of cyclin D1 and p16INK4a in CGCL, but it is not possible to perform a direct correlation between those markers expression in multinucleated giant cells and mononucleated stromal cells of CGCL with the classification of aggressiveness of the lesion.

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Infantile cortical hyperostosis presenting as painful bilateral swelling of the mandible

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Infantile cortical hyperostosis (ICH) is a rare inflammatory condition of unknown aetiology and histogenesis. It is characterised by unusual irritability, soft tissue swelling and cortical hyperostosis affecting multiple bones. In this poster, we are reporting a case of an eight-week-old boy presenting with painful bilateral mandibular swelling and irritability. The patient had history of neonatal sepsis that was managed with intravenous antibiotics with good recovery.

Clinical examination showed irritable child with tenderness and erythematous swelling over bilateral angles of mandible with no detectable oral infection. Facial computed tomography showed extensive inflammation of bilateral masseter muscles, intraosseous hypodensity of mandibular angles and rami with diffuse subperiosteal reaction. Mandibular osteomyelitis was suspected and biopsy of involved bone and soft tissues was conducted. Microbiology result was negative for microorganisms and the histopathology report did not show any bone necrosis. Full skeletal survey showed periosteal cortical thickening of the mandible, left clavicle and scapula, bilateral leg and forearm bones confirming the diagnosis of ICH. The patient had a four-week course of prednisolone with marked improvement. A nine months review showed resolution of the facial swellings and pain.

This poster highlights that the awareness of this condition may permit earlier recognition and less intensive diagnostic workup.

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Large odotogenic cysts of the maxillofacial skeleton — decompression and the consequent challenges

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Background: Decompression is an accepted method for managing large cystic lesions of the jaws. Advantages over immediate enucleation include avoiding damage to vital structures, pathological fracture and surgical difficulty in reaching inaccessible areas. The indications are individual to each case determined by the size, location and type of cyst. Patient cooperation is paramount to success. Decompression tubes present a variety of associated challenges. Some methods to overcome them are presented.
Methods: A small series of 10 patients presented with various unilocular and multilocular cysts treated by decompression are included. Presented are various stages of decompression of these lesions. Presentation history, imaging, pathology and surgical technique are evaluated and the radiographic dimensional changes to the cyst are demonstrated A unique way of securing the decompression tube is described.
Results: The mandibular ramii cysts had more rapid bone deposition in contrast to the body, which may be due to gravity. Challenges were faced when previously conjoined locules reduced independently. This required further minor interventions to disrupt new wall formation within the cavity. An advantage was a thickened cyst lining post decompression. Studies suggest the "neoplastic" epithelium in the KCOT is replaced through metaplasia by epithelium wholly similar to that of the oral mucosa. When enucleating the final cyst it was markedly thicker and easier to handle.
Conclusions: Decompression is a viable option for treating non-malignant cystic lesions of the jaws. The time taken for decompression can be lengthy and requires full patient cooperation. Challenges were encountered during the process and will be presented.

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Compound odontoma of the nasal floor mimicking a rhinolith

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Background: Odontomas are considered as dental hamartomas, commonly encountered in the maxillary arch, and are formed by the overgrowth of normal dental tissue. Rhinoliths are calculi of the nasal cavity, usually formed around a foreign body or by slow deposition of calcium and magnesium salts. These two lesions are commonly not considered in one another's differential diagnosis.
Objectives: Objective of our study is to present a case of compound odontoma, which was uncommonly situated on the floor of the nasal cavity. The localisation of the lesion caused a false initial diagnosis of rhinolith.
Methods: Lesion located on the nasal floor was diagnosed during routine dental examination, on orthopantomograph. Patient did not administer with any complaints but during detailed examination with the observed lesion, referred to an occasional nasal congestion and stuffiness of the associated nasal cavity. Further radiological examination was made via computed tomography. Excision of the lesion was preferred as treatment and was excised under general anaesthesia via intraoral approach from the palate. When mucoperiostal flap was raised a perforation of the palatal bone was observed and was extended in order to excise the lesion.
Findings: The lesion macroscopically resembled a tooth. Histopathological examination of the lesion was compound odontoma.
Conclusion: Although meticulous clinical and radiological examination was made a false initial diagnosis was made as rhinolith, which is not considered in differential diagnosis of odontomas. Surgeons should always keep in mind that pathologies may present

in different forms or localisations while deciding on treatments or planning surgeries.

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Paediatric recurrent preauricular sinus complicated by preauricular lymph node and abscess

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Background: Preauricular sinus is a congenital malformation of the preauricular soft tissues affecting 0.1–0.9% of the general population. Higher incidence of 4–10% has been reported in parts of Asia and Africa. The treatment for recurrent infection of preauricular sinus is complete surgical removal of the epithelialised sinus tract. Preauricular lymphadenopathy is not uncommon but it can complicate preauricular sinus surgery. We present a young child with preauricular sinus and recurrent infection within preauricular lymph node.
Case report: A 4-year-old Vietnamese girl presented with a right preauricular sinus and abscess with recurrent infection. Despite numerous courses of antibiotics and surgical drainage of abscess twice under general anaesthesia using aides such as methylene blue dye, magnifying loupes and a lacrimal probe, the sinus infection recurred. Ultrasound scan showed an infective preauricular lymph node and this was removed with preauricular sinus. At a two-year postoperative review, she remains symptom free, with no signs of recurrence.
Conclusion: Preauricular abscess involving lymph node and preauricular sinus can recur after surgical intervention. It is crucial to remove both infected lymph node, preauricular sinus and its associated deep-seated network of scar in order to prevent recurrence.

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Blandin and Nuhn gland mucoceles — an unknown oral pathology

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Background: Blandin and Nuhn glands (BNG) are situated in the ventral portion of the tongue, beside the lingual frenulum. Their size is 20 mm × 8 mm. As in other salivary gland, mucoceles can be observed in the BNG. BNG mucoceles represent around 10% of oral mucoceles.
Objectives: Because they are unknown, lingual mucoceles can be misdiagnosed of confused with sublingual mucoceles (ranula), leading to unnecessary sublingualectomy, or with venous angioma. For these reasons we decided to report our experience.
Methods: We report four cases with lingual ventral mucoceles. The mean age was 21 years. Computed tomography, magnetic resonance imaging and/or ultrasound, depending on the case, were performed. In one case a trauma was present two months before consultation. One case had a previous sialadenectomy of the sublingual gland without improvement for the patient. One case was drained with puncture and syringe aspiration but the mucocele recurred immediately after. No emergency case (hypoxia or dysphagia) was observed. Removal of the BNG was performed with good results in the four cases.
Findings and Conclusion: Two forms have been described, the exudative form with risk for hypoxia and the cystic form that grows slowly (in months). Some can be of traumatic origin (in one of our cases) whereas others are idiopathic. Some are small whereas some can be large with problem for swallowing or breathing, especially in children. BNG removal under local or general anaesthesia is recommended; it gives good results; we here report the technique.

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GTD classification for main salivary gland lithiasis

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Background: Lithiasis is one of the main pathology of the salivary gland. Minimally invasive techniques with intraoral approaches, combined approaches and sialendoscopy, sometimes with calculus fragmentation are recommended.
Objectives: A new and useful anatomical and surgical classification of salivary calculus has been developed.
Methods: To help the surgeon in choosing the best treatment and to do multicentric studies, this classification of salivary calculus is based on three criteria, gland concerned (G), calculus topography (T) and calculus diameter (D).
Findings and Conclusion: Gland concerned are submandibular (SM) and parotid. The topography of calculus in the salivary ducts is based on two landmarks. For SM, lingual nerve duct crossing and entrance of the duct in the gland are dividing the Wharton's duct in three thirds, the anterior third between papilla and lingual crossing, the posterior third that is the gland itself and the middle third between the two others. For parotid gland, the anterior boarder of the masseter muscle and the entrance of the duct in the gland are dividing the Stensen's duct in three thirds, the anterior third between papilla and masseter boarder, the posterior third in the gland itself and the middle third between the two other thirds. Calculus diameter are divided in floating 8 mm that benefit from combined approaches. The GTD classification has to be known, used and evaluated to obtain the best treatment for each patient suffering from salivary calculus.

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Temporal arteritis: an oral and maxillofacial perspective

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Background: Oral and maxillofacial surgery (OMFS) is one of several specialties that perform temporal artery biopsies. Biopsies are traditionally taken on a day theatre list. The OMFS outpatient department facilitates the biopsy being taken in an outpatient clinic setting allowing for a quicker turn around at a lower cost.

Jaw claudication is almost pathognomonic for temporal arteritis. True jaw claudication can be difficult to diagnose. Misdiagnosing jaw claudication in a patient with other nonspecific

symptoms may bias the diagnosis towards temporal arteritis, necessitating steroid treatment and a biopsy.

The American College of Rheumatology (ACR) criteria are a five-point scale for differentiating temporal arteritis from other vasculitides. It is often confused as a diagnostic tool for temporal arteritis.

Objectives:

1. Does the OMFS department achieve a faster turnaround time for temporal artery biopsy requests compared to other surgical specialties?
2. What is the incidence of misdiagnosis of jaw claudication in temporal artery biopsy patients?
3. Is the ACR criteria an accurate predictor of temporal arteritis?

Methods: The hospital pathology database was searched for temporal artery patients in a 10-year period. A retrospective review of the resulting 204 notes was undertaken.

Findings and Conclusion: 43% of patients with reported jaw claudication were not diagnosed with temporal arteritis. Careful consideration should be taken in diagnosing jaw claudication to avoid biasing a diagnosis towards temporal arteritis. Biopsy turnaround time should be optimised to reduce exposure to steroids. OMFS is an ideal specialty for this. The ACR criteria are not diagnostic criteria and have a low specificity for temporal arteritis.

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Rehabilitation of patients with oncological maxillary defects

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Background and Objectives: The rehabilitation of patients with oncological maxillary defects who underwent surgical procedures presents certain difficulties. Often, these patients require a highly qualified help from various specialists. Currently, in Russia, the treatment of these patients presents a difficulty. Clinics, with medical license for maxillofacial surgeries do not have sufficient experience to provide further rehabilitation to these patients. Our goal is to continue to rehabilitate these patients. The main problem is the functional and aesthetic consequences, which ultimately leads to a significant reduction in quality of life.

Methods: 10 patients with postoperative maxillary defects were divided into two groups and treated with the following clinical procedures. Group1 (main group) — five patients, who were treated with various implants (Southern Implants, South Africa): conventional dental implants (six implants), zygomatic implants (four implants), zygomatic oncology implants (five implants). All fixtures were immediately loaded. Two patients received a two-part prosthesis (fixed implant supported structure combined with a removable obturator). Three patients received a fixed implant supported prosthesis (with local flap reconstruction). Group 2 (control group) — five patients received traditional obturators. The patients were surveyed according to the criteria of "functionality of the prosthesis", "quality of speech", social rehabilitation and adaptation according to the Oral Health Impact Profile scale.

Results: Group 1 patients showed positive results in comparison to patients in Group 2 for all applied criteria. Although for the "quality of speech" criterion there was no significant difference between the two groups.

Conclusions: The use of non-removable implant supported prosthesis in the rehabilitation of patients with maxillectomy defects significantly improves their quality of life.

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Inflammatory pseudotumours in the oral and maxillofacial region — a rare nonsurgical entity

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Background: Inflammatory pseudotumour (IPT) is a rare benign non-neoplastic lesion. We will present a case of IPT and its current differential diagnosis and treatment.

Methods: A case study was undertaken on a 68-year-old woman who was referred to a maxillofacial department with irritation to her right tongue and a lump in the right side of her neck. The initial and follow up data was gathered from her past medical records, blood tests, radiographic and histopathological results.

Findings: A large indurated lesion was found extending from the right hand side of the soft palate to the left nasopharynx, and base of tongue with a firm 3 cm nodule on the right 1B neck level. The contrast computed tomography scan results showed a 4.8 cm × 3.9 cm infiltrating mass within the right parapharyngeal space and a 3.7 cm × 3.6 cm ill-defined scirrhous mass in the left lung apex. Treatment was with long-term high dose steroids. The three-month follow-up scan reported a decrease in right parapharyngeal mass and left lung mass measuring 1.4 cm × 1.4 cm in size.

Conclusion: Several authors have advocated surgical excision with minimal margin as treatment of choice for ITP.[1] Although, use of steroid treatment and early diagnosis of this benign lesion seems to avoid radical interventions, identification of this non-malignant lesion is crucial. The authors advocate a conservative approach with steroid treatment prior to surgical intervention.

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Immunoglobulin G4-related disease initially presented as an orbital tumour

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We report the case of an orbital tumour as a primary manifestation of Immunoglobulin G4 (IgG4)-related disease.

An 80-year-old female presented with left incomplete lid closure, proptosis and sicca symptoms 14 years before admission. No history of trauma. Magnetic resonance imaging and computed tomography (CT) showed a mass lesion in the medial region of the left orbit. One year after initial presentation the patient agreed on a biopsy.

Pathological examinations showed lipogranulomatous inflammation, higher levels of IgG4-positive plasma cells and cholesterin granuloma.

Additional positron emission tomography/CT scans revealed hypermetabolic lesions in the right masticator cavity, surrounding vessels of the scull base and the carotid bifurcation, lesions surrounding the thoracic spine and presacral vertebrae. Vasculitis could be ruled out by duplex sonography. Haematological tests revealed elevated levels of IgG4, blood cholesterol and low-density lipoprotein cholesterol.

Treatment with oral corticosteroids and cholesterol-reducing medication was initiated and resulted in a reduction of the size of the mentioned lesions.

IgG4-related disease is not limited to the orbit. It may also involve other anatomical structures in and around the eye. A thorough examination is important.

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Incidence of neoplastic versus non-neoplastic diseases of salivary glands in western Libya

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Background: Wide variety of entities may cause diseases of the salivary glands. A general classification divides the disorders into inflammatory and non-inflammatory diseases. This group of disorders can affect the major or minor salivary glands but are generally much more common in the major glands.
Methods: The medical records and case notes of all patients with histologically confirmed salivary gland pathology were reviewed retrospectively from June 2007 to June 2016 to analyse spectrum and frequency of both neoplastic and non-neoplastic diseases.
Finding: This review found 20 patients with non-neoplastic and 27 patients with neoplastic salivary glands. We also compared the different per operative diagnostic reports of different diagnostics modalities with the final report of histopathology.
Conclusion: Even though clinical assessment allows distinction between these entities and guides further investigation and management in most of the cases, Knowing the relative incidence of neoplastic versus non-neoplastic salivary gland diseases in addition to use of different diagnostic modalities such as an ultrasound, fine-needle aspiration, magnetic resonance imaging and computed tomography scan has important diagnostic, therapeutic, and prognostic implications.

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An inborn mass in the premaxilla of an infant

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Background: Melanotic neuroectodermal tumour of infancy (MNTI) is a rare congenital neoplasm of early infancy characterised by rapid growth and a high rate of local recurrences. It rarely metastasises but is locally aggressive. Since its description in 1918 the tumour was reported under a variety of names, reflecting uncertainty about its histogenesis. Recent evidence shows that the tumour is probably of the neural crest origin.

The clinical differential diagnosis of an inborn mass in the pre maxilla of an infant includes MNTI, congenital granular cell tumour, congenital, epulis, teratoma, neuroblastoma, Ewing's sarcoma, melanoma, and metastatic retinoblastoma. We present a one-day-old male with a huge maxillary soft tissue mass.
Case Report: We report a one-day-old male with a huge maxillary soft tissue mass obliterating the entire oral cavity making breathing and feeding extremely difficult.
Result: Fine needle aspiration from the mass showed a lesion composed of small neuroblast-like cells and large melanin-containing epithelial cells. The appearances were consistent with MNTI. Histologically, the excised mass is composed of dense fibro vascular tissue containing neuroblast-like cells in a fibrous stroma and alveolar spaces lined by melanin-containing cells. The mass was conservatively excised. The patient remained well thirteen years postoperatively.
Conclusion: In our case the lesion had been overlooked during prenatal sonographic examination and that led to an emergency intervention within departmental lack of critical care facilities. So, In utero diagnosis of a sizeable congenital tumour minimises possible postnatal surgical management risk and complications.

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Pain in parotid: reporting seventeen cases of first bite syndrome

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Background: First bite syndrome (FBS) is pain in parotid when the first bite of food is taken; its symptoms resembling neuralgia. Other causes of pain in the parotid include neoplastic (malignant, metastatic) and non-neoplastic (gastroesophageal reflux disease, temporomandibular joint dysfunction, neuralgias including auricular neuralgia). The matter is denervation hypersensitivity of sympathetic receptors on myoepithelial cells leading to severe contractions and hence the pain reported by patients. Surgeries inflicting FBS include; parapharyngeal and infratemporal space, deep cervical lymph node dissection, deep lobe parotid gland, submandibular tumours, internal carotid artery and styloid process resections, the latter in treatment of Eagles syndrome.
Case Report: We report 17 cases that developed FBS. 14 of those, presented with FBS and associated auricular neuralgia (touch also precipitating the pain) between 4 months and one year after receiving parotidectomies that consequently involved great auricular nerve resection, two cases were post carotid body tumour (paragangliomas) resections, initiating six weeks and five weeks, respectively and one case presented with FBS after surgical treatment of Eagle's syndrome, one-year postsurgery. Patients were treated with gabapentin 300 mg three times a day with minimal relief however improved with cryoablation.
Conclusion: Patients should be informed prior to surgery about this complication that can be both debilitating and frustrating. Further research is required to understand the true mechanism behind FBS and its prevention and diagnosis is more likely to increase in the future. Treatment is usually medicative (anticonvulsants, tricyclic antidepressants), local and regional blocks, botulinum toxin and cryoablation.

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Head and neck aspergillosis: multidisciplinary approach

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Background: Aspergillosis was first described 300 years ago by botanist Antonio Micheli. Main species causing disease include *Aspergillus fumigatus* and *Aspergillus flavus*. In Sudan, there is a rising and spreading emergence of disease with an occupational/living hazards where prevalence is high amongst rural and farmland communities. However, recent trends suggest an immunocompetent pattern of spread in urban situated patients, compared to the classical respiratory form of disease.
Objectives: We identify spread, referral patterns, patient groups, investigative methods, clinical presentations, recurrence risks and concepts of treatment approach:
(a) To improve prognosis outcomes amongst our patients.
(b) To increase awareness of presentation, investigative and diagnostic difficulties that can occur.
Methods: Retrospective study on ($n = 87$) patients with head and neck Aspergillosis in Sudan. Oral and maxillofacial surgeon and mycologist are the mainstay practitioners. Otolaryngologist, eye surgeon and neurosurgeon are enrolled in the team according to extension of pathology.
Results: A rising pattern of the disease emerges in immunocompetent patients (51/87 of patients are immunocompetent), diagnosis is often delayed (30%) and there is a high risk of recurrence amongst patients treated initially by endoscopic surgery (22/87 patients). Content of invasive aspergillosis found to be hard in cases with orbital and intracranial extension or granulomatous and mucoid in sinonasal lesion.
Conclusions: Aspergillosis is a neglected disease with limited literature and focus on its presentation and treatment is required. We discuss multidisciplinary methods of improving diagnostics including audit procedures and a national registry setup on the treatment of head and neck aspergillosis.

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Oncocytic papillary cystadenoma of the submandibular gland: a case report with review of the literature

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Background: Oncocytic papillary cystadenoma is a rare benign tumour of the salivary glands. It occurs more commonly in the minor salivary glands and rarely in the major salivary glands. These tumours usually present as slow growing painless masses. Although these tumours run a benign course, surgical removal is the treatment of choice.
Case Report: An 88-year-old gentleman presented with a squamous cell carcinoma of the lower lip and a mass in the left submandibular region along with multiple lymph nodes in the left neck. He underwent a resection of his lip SCC, reconstruction with a modified Johanson flap and a left-sided selective neck dissection. The histology report confirmed a cystic lesion at the posterior aspect of the submandibular gland to be an oncocytic papillary cystadenoma.
Conclusion: Oncocytic papillary cystadenomas occur in 0.9–2% of minor salivary glands and are more rare in major salivary glands. They are often confused with Warthin's tumours due to the histological similarity but are distinguished by Warthin's lymphoid-rich stroma. Cystadenomas can be papillary or mucinous in nature, the papillary type has intraluminal papillary projections and unilocular or multilocular cysts. In conclusion, although rare in major salivary glands, oncocytic papillary cystadenoma should be considered as a differential diagnosis in a painless, slow growing mass of the salivary gland.

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Dredging — a conservative approach for multiple keratocystic odontogenic tumour in Gorlin–Goltz syndrome: report of two cases

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Background: Keratocystic odontogenic tumours (KCOTs) can be sporadic or associated with Gorlin–Goltz syndrome. Only 10% of all KCOTs have been associated with Gorlin–Goltz syndrome. KCOTs associated with Gorlin–Goltz syndrome have higher recurrence rate (82%) compared with non-syndrome associated (61%) (Benjamin et al., 2013). Management of KCOT is varied from simple enucleation, marsupialisation, to peripheral osteotomy or resection of the jaw.
Case Report: The first case is a 27-year-old male, diagnosed with multiple KCOT in the mandible and maxilla. He also presented with frontal bossing and calcification of falx cerebri. Repeated dredging was done from 2012 to 2013. The second patient is a 33-year-old male who presented with basal cell carcinoma and multiple KCOT at maxilla and mandible. Multiple dredging was done from July 2012 to July 2013. The latest panoramic radiographs of both patients showed the lesion shrunk with evidence of bone deposition.
Conclusion: Radical treatment options such as resection or marginal resection reduced the recurrences of the tumour but higher morbidity and jaw deformity. Comparatively, conservative treatment options such as dredging methods might be the treatment of choice due to preservation of normal anatomical structure like tooth germs and bone.

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An oral lesion as the primary manifestation of sarcoidosis: a case report

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Background: Sarcoidosis is a multi-systemic disease of unknown aetiology predominantly characterised by non-caseating granulomas in the lungs and lymph nodes. Oral involvement of this disease, particularly as the first clinical presentation, is rare.
Case Report: A 39-year-old female presented with a history of long standing, asymptomatic well defined swelling on the hard palate. This was located adjacent to a grossly carious upper left first molar with a large periapical radiolucency. An incisional biopsy of

the lesion was performed under local anaesthetic, which revealed a non-caseating granulomatous inflammatory reaction with absence of acid-fast bacilli. The first molar was extracted and patient subsequently reviewed with the swelling markedly reduced in size but still persistent.

In light of the histological findings, a referral was made to respiratory medicine and further investigations revealed a small granulomatous lesion in the upper lobe of the left lung. On further questioning, the patient revealed a history of a long-term cough and shortness of breath on exertion. A diagnosis of stage II sarcoidosis with pulmonary involvement was eventually made and she was placed on prednisolone for two months and reviewed.

Conclusion: Although extremely rare, oral lesions of sarcoidosis may be the first presenting feature and can mimic other granulomatous conditions such as tuberculosis. It is important that clinicians are aware of and investigate all possibly causes of swellings including underlying systemic disease and refer if necessary to the appropriate specialty.

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Oral lichenoid lesions: a significant diagnosis in oral potentially malignant disorder management?

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Background: Clinically identifiable potentially malignant disorders (PMD) precede oral squamous cell carcinoma (OSCC). We have previously highlighted increased risk of malignant transformation (MT) in precursor lesions exhibiting lichenoid inflammation (LI) on biopsy.[1]

Objective: To characterise the significance of LI diagnosis during PMD treatment.

Method: 590 patients in North-East England underwent CO2 laser surgery for biopsy-proven PMD between 1996 and 2014; mean follow-up was 7.3 years and clinical outcome defined at 31 December 14. Clinicopathological data for lesions exhibiting LI in this cohort were examined in detail.

Findings: 438 patients (74.2%) were disease free (DF) post-treatment, whilst 53 (9%) developed further/persistent PMD; in 71 (12%) unexpected OSCC was identified on laser excision, with a further 28 (4.8%) undergoing MT during follow-up. Overall, LI was seen in 88 cases (14.9%) with 60 (10.2%) also showing varying grades of dysplasia; a trend for increased LI recognition post-2010 was observed. DF status was significantly less likely in patients with LI lesions ($P = 0.028$), although no relationship was seen with MT in this cohort ($P = 0.70$).

Conclusions: This study contributes further evidence that oral lichenoid lesions, in the absence of classic mucocutaneous lichen planus, may represent a significant PMD subgroup predictive of worse clinical outcome and poor long-term prognosis.

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Mandibular ameloblastic fibroma: enucleation and 3 years follow up. Case report and literature review

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Background: Ameloblastic fibroma (AF) is an uncommon benign neoplasm formed by proliferative odontogenic epithelium immersed in an ectomesenchymal matrix. The age range of appearance varies between 0 and 6 decades of life, showing a clear predilection for the first and second decade. It occurs in males and females in similar proportions and usually are located in the posterior sites of the mandible. Clinically, it is manifested with a slow growth swelling, with or without symptoms. The treatment can be conservative (enucleation and curettage) or radical (block resection), nevertheless both modalities may have recurrences. We present a clinical case of a 30 years healthy patient with asymptomatic and great paramandibular swelling of two years of evolution diagnosed like ameloblastic fibroma, and the treatment with enucleation and curettage.

Objectives: The aim of this case presentation is to show the surgical management and clinical imagenological follow-up of a mandibular AF treated by conservative techniques (enucleation and curettage).

Methods: Through a vestibular mandibular intraoral approach, there has been made a enucleation of a high size lesion situated in left posterior mandibular site and placing a reconstruction plate. Three years follow up has been made with orthopantomography and computed tomography scan.

Findings and Conclusion: AF can be treated by conservative techniques but require a closed clinical and imagenological control. Nevertheless, it is important to considerate the high rate of recurrence and the possibility of eventual malignisation.

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A rare case of progressive hemifacial atrophy (Parry–Romberg syndrome) — a case report

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Parry–Romberg syndrome is a rare disorder characterised by slowly progressive hemifacial atrophy with loss of skin, subcutaneous fatty tissue, muscle and bone structure on one side of the face. It occurs more in females and neurologic involvements are common. The progression of the atrophy often lasts from 2 to 10 years and then it enters a stable phase. Up to date, the possible aetiology is unclear without any known cure.

We report a rare case of Parry–Romberg syndrome in a 48-year-old female with classical features. The clinical, radiological imaging findings, differential diagnosis and available treatment options are discussed in this report.

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Labial gland biopsies in the diagnosis of Sjögren's syndrome

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Background: Labial gland biopsies are invasive and the histological information gathered from them is key to establishing a definitive diagnosis in Sjögren's syndrome. Insufficient sampling and inaccurate reporting risks unnecessary morbidity, however no consensus on the diagnostic criteria currently exists. Following consultation with the East Kent Hospitals University Foundation Trust head and neck lead histopathologist, a standard was devised where six or more minor salivary gland lobules were required to be deemed of sufficient diagnostic quality, and a focus score of 1 or more (1 focus score is 1 mm^2 with more than 50 lymphocytes) as diagnostic of Sjögren's syndrome. An initial retrospective audit between 11 December 2011 and 28 October 2014 of our Trust (population of 759,000) established that biopsies were of insufficient diagnostic quality and reporting inadequate, with many failing to comment on the focus score or number of lobules.
Method: We retrospectively reviewed all Sjögren's related labial gland biopsies between 01 November 2014 and 27 September 2016 using our histopathology database, following implementation of the newly established standard.
Results: 37 biopsies met the selection criteria. 23 (62%) had sufficient diagnostic quality. 20 (54%) had focus score reported. 15 (40%) were both of sufficient diagnostic quality and reported the focus score. 17 (46%) were both diagnostic and reported as positive for Sjögren's syndrome, but 3 had no numeric focus score.
Conclusion: The implementation of new standards in 2014 has improved diagnostic consistency. Reporting and harvesting of labial gland biopsies has been recognised as being predominantly performed by junior trainees, therefore teaching is to be implemented to improve accuracy.

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Peripheral odontoameloblastoma in an elderly man: a case report and literature review

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Odontoameloblastoma (OA) is a very rare and unusual ondotogenic neoplasm comprised of both odontoma and ameloblastoma tissue. It is thought that the lesions arise via proliferating ameloblastic epithelium that induces neighbouring mesenchymal tissue to form mineralised dental tissue. The clinical behaviour of OA is said to resemble the more sinister ameloblastic component, and aggressive treatment has typically been prescribed. To date, the published literature is limited to a small number of case reports, with lesions limited to people below 50 years of age. This case report likely presents the first case of OA in an elderly man, who presented with a painless lump beneath the mucosa of the right cheek. The case satisfies the three requisite histologic criteria set out by Kaugars and Zussmann for such a diagnosis; unequivocal ameloblastoma, connective tissue with a mature, homogeneous appearance, and fragments of malformed calcified dental structures.[1]

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Squamous odontogenic tumour: a case report

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Background: The squamous odontogenic tumour (SOT) is a rare benign odontogenic epithelial neoplasm, which is deemed to be originating from the rests of Malassez. There are less than 30 cases reported by these days. Even though the lesion is known to be asymptomatic, it may present with symptoms of pain, swelling and tooth mobility. The characteristic radiographic appearance normally shows a unilocular radiolucency associated with the roots of teeth. The SOT is frequently seen in the anterior maxilla and the posterior mandible. Histologically, the tumour is characterised by the formation of variably sized nests and cords of uniform, benign-appearing, squamous epithelium with occasional vacuolisation.
Patient: The 12-year-old male patient visited Chonnam National University oral and maxillofacial surgery (OMFS) department. Approximately one month before visiting OMFS department, the patient visited Chonnam National University ear, nose, and throat department with chief complaint of swelling and localised fever on left cheek and infraorbital area. Marsupialisation of left sinus ostium area using endoscope was performed. However, the swelling had onset after one month and patient was referred to Chonnam National University OMFS department due to re-growing mass on left maxillary antrum.
Method: Patient underwent surgery under general anaesthesia. Surgery was performed in a similar manner to Caldwell-Luc surgical procedure. The cystic lesion was removed with No. 28 tooth, and No. 27 tooth was extracted due to severe supporting bone loss. Biopsy result was found out to be squamous odontogenic tumour.
Findings: At three months follow-up computed tomography, the enucleated area did not show any remarkable change. And the symptom of the patient remained asymptomatic.

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Keratocystic odontogenic tumour of anterior maxilla mimicking radicular cyst: a case report

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Keratocystic odontogenic tumours (KCOT), previously known as odontogenic keratocysts (OKC), are benign cystic neoplasms involving the mandible or maxilla and believed to arise from dental lamina. They are locally aggressive and has high recurrence potential rate due to its infiltrative behaviour. KCOT usually presented in young age, second to third decade of life, most commonly occur in posterior body and ascending ramus of mandible.

We report an unusual presentation of keratocystic odontogenic tumour of anterior maxilla, which mimicked a radicular cyst in a 67-year-old male. Following completion of root canal treatment for tooth 11, enucleation and peripheral ostectomy were performed

with intraoperative use of Carnoy's solution. Histopathological examination of the specimen confirmed it as KCOT. Currently, the patient was put under strict periodical follow-ups. As of six months follow-up, no sign of recurrence noted clinically and radiologically. Surgeons should be aware of such atypical presentation of KCOT to avoid misdiagnosis.

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Odontogenic myxoma: report of three cases

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Background: Odontogenic myxoma (OM) represents an uncommon benign odontogenic tumour of the jaw bone with locally aggressive behaviour. Most reports show a slight predilection for females. It is a slow growing tumour consisting of an accumulation of mucoid ground substance with little collagen. Radiographic features are always lucent, although the pattern may be quite variable. It may appear as a well-circumscribed or diffuse lesion.
Objectives: To report three cases of odontogenic myxoma. Clinical findings and radiological features along with diagnostic and treatment were review.
Methods: Three cases of odontogenic myxoma, age ranged from 10 to 42 years, were diagnosed and underwent surgical treatment at the Faculty of Dentistry, Chiang Mai University between 2013 and 2015. Biographic profiles, clinical manifestations, radiological features and surgical treatment of each case were analysed.
Findings: Most of patients presented with a non-tender, bony hard swelling of jawbone. Radiograph showed unilocular radiolucency in two cases and multilocular radiolucency (tennis racquet strings appearance) in one case. All cases wunderwent bone resection. No clinical or radiological signs of recurrence have been found until now.
Conclusions: Surgical treatment of odontogenic myxoma varies from simple enucleation and curettage to bony resection. We discuss the important factors that must be considered when determining the proper management approach to odontogenic myxoma. Long-term follow up examination should be performed.

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Chronic recurrent mandibular osteomyelitis consistent with SAPHO syndrome: a case report

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Synovitis, acne, pustulosis, hyperostosis, and osteitis (SAPHO) syndrome is a rare condition of nonsuppurative osteomyelitis. Its name is an acronym for various osteoarticular and dermatological manifestations that can appear in the same patient. Its diagnosis is based on medical history, clinical symptoms, imaging, histopathology, and scintigraphy bone scan that show inflammation of bone with neither abscess nor sequestrum. Appropriate treatment cannot be concluded.

An eight-year-old boy consistent with SAPHO syndrome presented. He had an underlying disease of beta Thalassemia, haemoglobin type E. He first presented with two-month painless, hyperostotic mandibular swelling, with later intermittent painful swelling of the surrounding soft tissue and third degree mobility of the anterior teeth. Severe trismus was also appeared later. There was neither pus or chronic fistula nor any sequestration. Radiograph showed ill-defined mixed radiolucent and radiopaque of expanded mandible, no root resorption. Scintigraphy bone scan showed two active osteomyelitis foci: mandible and finger bone. Histopathological examination showed nonspecific acute and chronic inflammation of bone and soft tissue with the diagnosis of nonsuppurative osteomyelitis. The patient was treated with various modalities including antibiotics (Augmentin, penicillin), non-steroidal anti-inflammatory drugs (NSAIDs; Ibuprofen), and decortications. These treatments seemed to provide some improvement but not cure, particularly NSAIDs. Improvement of inflammation, trismus and bone swelling was seen after the child was growing.

After a long-term of 10-year follow-up, the patient had symptom-free with underdeveloped mandible caused by previous trismus. The patient is still in the follow-up appointments. Steps of diagnosis and treatment strategies of this interesting case are presented.

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Comparative study of metronidazole and clarithromycin in the treatment of severe chronic periodontitis

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Objective: To compare the clinical efficacy of metronidazole and clarithromycin in the treatment of severe chronic periodontitis, provides the evidence and reference for the clinical therapy.
Methods: 112 severe chronic periodontitis patients were enrolled to conduct oral clarithromycin treatment after stomatological conventional basic therapy, which is the observation group (OG), in our hospital from September 2015 to the present. Retrospective analysis between the observation group and the control group (CG), the patients who were given oral metronidazole treatment after stomatological conventional basic therapy, is chosen to compare their prognostic indicators three months after treatment such as sulcus bleeding index (SBI), probing depth (PD), attachment level (AL), and the inflammatory factors in gingival fluid of 7 days before and after treatment, which include interleukin-1 (IL-1), tumour necrosis factor-α (TNF-α).
Results: There was no significant difference in SBI, PD, AL, IL-1, and TNF-α between the two groups ($P > 0.05$) before the treatment, but they had comparability. After the treatment, they all had declined than before, especially the PD and AL of OG were lower than CG ($P < 0.05$). Meanwhile, seven days after the therapy, IL-1 and TNF-α of OG were lower than CG too ($P < 0.05$).
Conclusion: The curative effect of clarithromycin in the treatment of patients with severe chronic periodontitis is better than that of metronidazole. Accordingly, the clarithromycin therapy is worthy of promotion and extension.

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Chronic osteomyelitis following extraction of a lower premolar

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Background: Chronic osteomyelitis; defined as osteomyelitis that is present for more than four weeks, can be difficult to manage. We present a case of chronic osteomyelitis managed using a targeted antibiotic regime only. Surgery was not required.
Case Report: A 67-year-old female patient presented complaining of recurrent right-sided mandibular swelling and associated lip numbness, following extraction of the lower right second premolar. She was allergic to penicillin.

On examination, she had right-sided facial swelling and a sublingual extraoral fistula. She had swelling both buccal and lingual to the extraction site.

Dental panoramic tomography (DPT) radiograph showed a 1 cm diffuse moth-eaten radiolucency in the lower right premolar region. A computed tomography (CT) scan of the mandible showed osteomyelitis of the mandible, involving the inferior alveolar nerve canal. To confirm the diagnosis, SW underwent urgent bone biopsy, which revealed a chronic osteomyelitis process.

Culture and sensitivity revealed a rare combination of microorganisms — *Candida dubliniensis*, *Streptococcus anginosus* and *Streptococcus mitis*. We liaised with the microbiology team who recommended an initial six-week course of clarithromycin and fluconazole. Later, a four-week course of linezolid was prescribed. SW was monitored closely and a final DPT showed substantial reduction in the radiolucent area.
Conclusion: Although osteomyleitis is uncommon in developed countries, it is prevalent and often difficult to distinguish from osteoradionecrosis, if correctly identified and managed then this can prevent disease progression and surgical intervention. A close relationship with the microbiology team aided effective management of this case.

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Osteomyelitis of the zygomatic bone: a case report and literature review

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Background: Osteomyelitis (OM) is a bone inflammatory state caused by microorganisms, which may involve the integrity of the cortex, medulla and periosteum. In general the most frequent OM, are presented in 63% lower limbs and craniofacial massif only 5%, the jaw being the most affected by such pathology. The few reports OM malar bone indicate the low incidence, represented 1.42% of cases. There are several classifications of the OM, according to the affected (medullary, superficial, localised or diffuse) anatomy, according its development time in acute and chronic and non-suppurative and suppurative.
Objective: Describe the presentation of the OM of malar bone and implant reconstruction done as (PSI) through a case.
Methods: Clinical case of female patient 54 years old with clinical 1-year evolution of left zygomatic bone chronic suppurative OM diagnosed by incisional biopsy, with a history of tooth extraction 28. The treatment was based on antibiotic therapy and resection left zygomatic bone with PSI reconstruction.
Conclusion: Treating OM depends on its stage and aetiology. In acute OM antibiotic treatment is the choice, whereas in chronic OM treatment will focus towards the surgical management in conjunction with antibiotic therapy. This will depend on the extent of injury and involves drainage.

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Ameloblastic fibroma: a peculiar clinical course

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Ameloblastic fibroma represents a true benign and extremely rare mixed odontogenic neoplasm. It is believed that ameloblastic fibroma consist of odontogenic epithelium and mesenchymal tissues which makes it a unique entity compared to the classical ameloblastoma. In the types of mixed odontogenic tumour, ameloblastic fibroma produced the least differentiated neoplastic elements that producing odontogenic substance such as dentin or enamel matrix. It is more common affecting the posterior mandible and 75% associated with unerupted tooth. The tumours commonly classified as a childhood and adolescence tumour and it usually occurs in the first two decades of life. It has least aggressive behaviour and the recurrence rate considered to be low.

We report a case of a recurrent ameloblastic fibroma of the left mandible with remarkable clinical manifestation; it presented in a third decades gentleman and demonstrated as an extensive lesion but not associated with any impacted tooth. The tumour affecting the posterior mandible and extended to the anterior region. Its unusual clinical and histopathology features of an odontogenic tumour, illustrating a diagnostic challenge to the clinicians and pathologists. Radical surgical procedures were performed with an immediate reconstruction of defect.

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Chronic mandibular osteomyelitis in a patient with long-term steroid use in order to treat leprosy symptoms

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Leprosy is a disease caused by the acid-fast bacteria *Mycobacterium leprae*, which affects the skin and peripheral nerves. Erythematous dermal subcutaneous nodules, malaise and neuritis can happen any time during the course of the disease and even in patients considered cured. Thalidomide is extremely effective in improving symptoms and long-term corticosteroid use may be required in order to reduce pain arising from neuritis.

We report a case of 55-year-old male patient who has a history of a cured lepromatous leprosy and presented to the maxillofacial department with a history of pain in the left mandibular body for five months, which had started initially as localised pain in the region of a previously extracted left mandibular first molar. He also has a history of long-term use of prednisone and thalidomide in order to treat skin lesions and pain symptoms. Panoramic radiograph revealed presence of a mixed radiographic pattern lesion

occupying all the left mandibular body also extending to the inferior border. A bone biopsy revealed chronic osteomyelitis and a segment mandibulectomy was performed.

Osteomyelitis is an inflammatory condition of bone in which the natural course of the disease is greatly influenced by the patient's overall condition. Team hypothesis was that long-term corticosteroid use could have predisposed to osteomyelitis and even worsened leprosy symptoms, as leprosy symptoms are also reported to increase due to a concomitant infection.

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Necrotising fasciitis of neck secondary to infection in lower third molar region: case report

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Background: Necrotising fasciitis (NF) is a severe soft tissue infection characterised by rapidly progressing necrosis, involving fascia and subcutaneous tissues. This rare condition carries high mortality rate and require prompt diagnosis and urgent treatment with radical debridement and antibiotics
Objective: Clarifying and support the potential of dental infection to cause head and neck NF in immune compromised patients
Method: We prescribe in our case of 61-year-old male who presented to emergency with history of known diabetes mellitus. He reported dental infection and swelling related to lower right jaw one week ago, which subsequently developing necrosis, ill-defined black border and gas formation in the neck region
Result: Patient underwent extensive debridement within 24 h and second debridement after another 24 h with antibiotics therapy. Then reconstruction after infection subsided with supraclavicular pedicle flap combined with split-thickness skin graft to cover the eroded area.
Conclusion: The surgeon should suspect NF when dental abscess is resistance to the conventional therapy. Satisfactory outcomes can be achieved with early diagnosis and aggressive surgical therapy in concert with empirical antimicrobial therapy.

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Oral and maxillofacial tumours in paediatric and adolescent patients presenting to Hospital Kuala Lumpur: a 10-year review

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Background: Oral and maxillofacial tumours in children and adolescents have not been documented in the Malaysian setting.
Objective: To document the pattern of paediatric and adolescent oral and maxillofacial tumours treated in Department of Oral and Maxillofacial Surgery and Paediatric Dentistry, Hospital Kuala Lumpur, over a 10-year period.
Methods: Data of 60 patients were retrieved from the operation theatre book and biopsy reports from the years 2000 to 2009. The collection of data included gender, age, location, histopathology and treatment of the tumour.
Results: The patients' age ranged from 4 to 18 years. Female outnumber males 1.07:1. The majority of patients were Malays (53.3%, $n=32$) followed by Chinese (30.0%, $n=18$), Indian (13.3%, $n=8$) and others (3.33%, $n=2$). 52 cases were benign and seven cases were malignant andone1 was not specified. Odontomas were the most prevalent tumour followed by ameloblastomas. Ewing's sarcoma was the most common malignant tumour. The maxilla was the main site of occurrence. Treatment modality was mainly surgical in both benign and malignant tumours. Combined surgery and chemotherapy were employed in patients who had Ewing's and osteogenic sarcoma.
Findings and Conclusion: Most oral and maxillofacial tumours of children are benign. Malignant tumours of soft tissue, salivary glands and bones must be taken into account. A mainly conservative approach was the preferred method of treatment in these patients.

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Case report: an unusual case of absolute trismus

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Background: This article describes an unusual presentation of absolute trismus complicated by catagelophobia in a 68-year-old female.
Case Report: The patient failed to remove her immediate dentures for 15 years and subsequently presented to the Emergency Department after developing absolute trismus, which was due to the presence of gross calculus deposits. Her inflammatory markers were normal but she posed an airway risk. Orthopantomograph showed bilateral C-shaped calcified masses extending superiorly from the zygomatic buttresses and inferiorly to the mandibular alveolar ridge.
Treatment and Follow-up: The patient was admitted for supportive measures and removal of the dentures under general anaesthetic. Both lower canines were extracted due to them being embedded in the calcified mass. Patient recovered without complications and referred for psychological assessment and dental rehabilitation.
Conclusion: The effect a phobia can have on how a patient manages their oral care and how as dental practitioners we must work with the patients to prevent such situations occurring.

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Case report: tetanus, a forgotten case of trismus

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Background: Cases of tetanus have been on the decline since the 1960s. Tetanus is a rare but serious infection caused by *Clostridium tetani*. A recent case highlights the presentation, diagnosis and treatment of tetanus with trismus as the initial presenting factor.
Case Report: An 82-year-old female presented to the Emergency Department at Poole Hospital with a history of worsening trismus and dysphagia. On examination she had mouth opening of 5 mm and dysphagia with fluids. Investigations showed the patient

was not septic and dental pathology was excluded by clinical and radiological examination.
Treatment: The patient was initially admitted for supportive measures and antibiotic treatment, which proved in effective. Upon further questioning the patient disclosed having had a fall in the garden. Subsequently a spatula test was conducted on lacerations from the patient's leg which tested positive for tetanus. Human immunoglobulin Vigam infusion was prescribed and examination of the oropharynx under general anaesthetic.
Conclusion: Suspected cases of tetanus should be recognised and treated with the appropriate medication and management regime, which could otherwise lead to critical airway complications.

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Case report: a rare variant of a maxillary dentigerous cyst with an angiomatous component

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Background: Dentigerous cysts are seen as benign pathology associated with developing, unerupted teeth. Individuals affected present with slow growing expansion of the bone, straw-coloured fluid on aspiration and displacement of involved and adjacent teeth.
Case Report: An 11-year-old boy was referred with a painless reddish mass of three months duration. Examination revealed mild, diffuse swelling over the left maxillary region with an erythematous, soft tissue sessile swelling intraorally. Orthopantomograph showed radiopacity over the left maxillary sinus with displaced 27, 28 crowns. Contrast computed tomography (CT) and angiography identified feeder vessels from the branches of the left internal maxillary artery.
Treatment and Follow-up: Embolisation was performed initially to block the supplying artery. Enucleation of the lesion followed three days post-embolisation. A histopathological examination of the lesion was carried out once enucleation complete. A review and monitoring programme was followed at three-, six- and nine-month intervals.
Conclusion: Judicial use of contrast CT and angiography can aid accurate diagnosis of erythematous oral growths in young patients.

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Paediatric and adolescent non-cleft orofacial anomalies

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Background: A comparative analysis of anomalies in paediatric population puts in perspective the relative frequency and burden of each anomaly in this population.
Objective: This study aims to present the relative frequencies of paediatric orofacial anomalies to one another.
Methods: Records of patients under the age of 21 years seen in the Department of Oral and Maxillofacial Surgery from January 2010 to August 2016 were accessed. Cleft anomalies and infectious conditions were excluded from the study. Information on the biodata, site of lesion, type of lesion were retrieved from the patients' records. The patients were categorised into four age groups; Infant group, Paediatric group 1, Paediatric group 2, and the Adolescent group. Lesions were grouped into tumours, vascular anomalies, cysts and others. Frequencies were generated and Chi squared test was used for categorical variables while Student's *t*-test was used for continuous variables. Statistical significance was set at $P = 0.05$.
Findings: A total of 202 patients were seen during the study period of seven years and eight months. In the paediatric population the commonest congenital anomalies were congenital epulis, lymphangioma and mucus extravasation cysts. Ameloblastoma was the commonest odontogenic tumour expect in the infant group, where no odontogenic lesions were seen and rhabdomyosarcoma was the commonest malignant lesion.
Conclusion: This study suggests that the pattern distribution of non-cleft anomalies varies within paediatric age groups and adolescents, and odontogenic malignancies are extremely rare among non-adult populations.

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Fibrous dysplasia in the maxillomandibular region: retrospective study

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Background: Fibrous dysplasia (FD) is a sporadic disease of bone, classified as benign bone tumours. It is a congenital defect of bone maturation. In the craniofacial region, fibrous dysplasia is rare. Surgical treatment remains controversial. The aims of this study are to illustrate the different aspects of the FD of the craniofacial region and compare our results with a literature review.
Methods: We conducted a retrospective study of 20 cases of DF collected in maxillofacial and dental surgery department of CHU Sahloul of Sousse, on a 10-year period between 2005 and 2015.
Results: The average age of patients is 23 years. There is no sex predominance. The main reason for consultation is the appearance of swelling which was found in 14 cases. All patients received standard radiography and computed tomography scan. Magnetic resonance imaging has been requested in any of our patients. Mandibular location is found in 50% of cases. The modulating resection was the most practiced surgical technique. In two cases of mandibular FD a large resection was needed and reconstruction was done by fibular free flap graft. The majority of FD was operated favourably.
Conclusion: The head and neck fibrous dysplasia requires an individualised progressive multidisciplinary approach. Shaping resection is the gold standard. Several alternative therapies such as immunotherapy, endoscopic decompression and genic therapy are nowadays proposed.

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Tumours and dysplasia of the oral cavity occurring in paediatric age: retrospective study

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Background: Tumours and dysplasia of the oral cavity occurring in paediatric age are almost benign taking origin from the epithelial ectodermal layers or salivary glandular components. Diagnosis will be confirmed by histology. Most lesions will need surgical treatment. In some cases, no treatment is required. We propose an algorithm of diagnosis and therapeutic indication to different tumours or tumour-like in infant.
Methods: We conducted a retrospective analytic study over 10 years from 2005 to 2015, on cases of tumours and dysplasias of the oral cavity in the newborn, infants and children aged below 15 years. We proceeded to the establishment of a patient file to explore the following parameters: age, gender, reason for consultation, family history, the location of the lesion, additional exams, discussed diagnosis, treatment, histological examination and evolution of these lesions.
Results: We reported 200 cases of tumours and dysplasia of the oral cavity in infant aged from 1 day to 15 years. No significant difference was noted between females and males in general. Vascular pathology was predominant, salivary dysplasia, dermoid cyst and several others rare or exceptional lesions were found. The signs motivating consultation were: functional disorder, an aesthetic disorder, swelling and pain. Based on the clinical and histological diagnosis, we found 45.7% of vascular anomalies.
Conclusion: Tumours and dysplasia of the oral cavity occurring in paediatric age are varied and they must be treated by surgeons specialised in this pathology to avoid sequelae which may be serious.

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Familial basal cell nevus syndrome associated with multiple keratocystic odontogenic tumour

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Basal cell nevus syndrome, also known as nevoid basal-cell carcinoma syndrome (NBCCS) and Gorlin syndrome, is an autosomal dominant inherited condition involving various defect and disorders such as multiple basal-cell carcinomas (BCCs) and keratocystic odontogenic tumour (KCOT) in the jaws.

Among major and minor criteria, clinical diagnosis of basal cell nevus syndrome can be made by having two major criteria or one major and two minor criteria. Furthermore, it is reported that a mutation of PTCH, tumour suppressor gene, located at 9q22.3 is a cause of the syndrome.

Here, we present a father and son case who had remarkable multiple keratocystic odontogenic tumour (KCOT). In addition to the odontogenic tumour, bilamellar calcification of falx cerebri, bifid ribs, moderate hypertelorism and cleft lip and palate were found in this family. Any remarkable skin lesion has not been found. Both patients were conservatively treated for the multiple KCOT.

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A clinical study of traumatic ulcerative granuloma with stromal eosinophilia: review of eight cases

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Background: Traumatic ulcerative granuloma with stromal eosinophilia (TUGSE) is a reactive benign and self-limiting lesion of the oral mucosa. This lesion is almost ulcerated but some is described as submucosal mass. It may mimic squamous cell carcinoma as well as other malignant lesion. The cause is unknown but a traumatic background has been suggested. Oral TUGSE shows regression after a conservative surgical treatment.
Objectives: To analyse the clinical findings, histopathological features, clinical diagnosis and choices of treatment of TUGSE.
Methods: The study cases of TUGSE were retrieved from the data of oral and maxillofacial clinic, Faculty of Dentistry, Chiang Mai University from 2009 to 2015.
Finding: The reported cases included six males and two female patients. Age ranged from 10 to 86 years with mean age of 59.1 years. The most common site was the tongue (37.5%). Clinically, the lesions showed chronic ulcers (75%) and submucosal masses (25%). Several differential diagnoses were given. The lesions were resolved after the biopsy. All patients were followed up for six months, no recurrence had been found.
Conclusion: In this report, eight cases of TUGSE in various regions of oral cavity were described. It is important to recognise this mucosal entity as it has a close resemblance with malignancy of the oral cavity. Prognosis of TUGSE is normally favourable.

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Management of extensive right submandibular abscess with necrotising fasciitis, sepsis and ketoacidosis diabetic complication: a case report

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Background: Submandibular abscess is one of the most common of deep neck infection. Diabetes mellitus type 2 with ketoacidosis complication is a comorbid factor that make poor prognosis.
Objectives: To review a case of a patient who suffered an odontogenic infection which evolved to submandibular abscess and necrotising fasciitis combine with sepsis and ketoacidosis diabetic complication and discuss how to manage these life-threatening infection.
Methods: A 56 years old female patient was diagnosed with submandibular abscess dextra that extended to colli dextra

with necrotising fasciitis, sepsis and ketoacidosis complication. Patient's first right lower molar was extracted. Incision at submandibular region was made to provide adequate drainage and silicon drain were inserted. Then three kinds of antibiotics (metronidazole, ceftriaxone, and ciprofloxacin) were administered. Metabolic support and nutrition management that aims to correct hyperglycaemia, ketoacidaemia and acidosis metabolic are given to the patient.

Findings: After treatment, the patient's condition began to improved, vital sign was stable, leukocyte, C-reactive protein and activated partial thromboplastin time was decreased, and swelling was reduce. Blood glucose, ketoacidaemia, and acidosis metabolic level was also corrected. The patient was discharged on postoperative 15 days in good condition.

Conclusion: Submandibular abscess with sepsis and ketoacidosis complication in severe infection with comorbidity possibility. Management include resuscitation physiologic support, source control, metabolic support and nutrition.

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Total maxillectomy for treatment of bisphosphonates osteonecrosis: diagnosis and reconstruction. Report of two cases

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Bisphosphonate-related osteonecrosis of the jaw is a condition that has been described in the literature for about 15 years and is caused by the use of bisphosphonate therapies for treatment and or prevention of various bone diseases. It is characterised by bone necrosis of the jaws decreasing local vascularisation with or without the presence of trauma in the region. It is known that the surgical procedures as the installation of osseointegrated implants can contribute significantly to its occurrence.

We aim to report two cases of female patients using bisphosphonates orally and developed extensive necrosis compromising the entire superior jaws. This paper was carried out through the compilation of clinical data, surgical procedures and rehabilitation of these patients. Both used the alendronate sodium for more than five years, held osseointegrated implants placed in the upper jaw and had extensive necrosis that committed all of the maxilla, requiring its complete removal. Complete bone resections of maxilla and the rehabilitation of patients were carried out, giving back in this way the possibility of social interaction of both.

We conclude that in cases of extensive osteonecrosis, it is possible the complete removal of the upper jaw bone with its reconstruction, in order to allow better quality of life for patients with this condition.

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A case report of absence of the left submandibular gland, secondary to gland obstruction due to a sialolith and a review of the literature

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Sialolithiasis (salivary stones) is the most common disease of the salivary glands and more than 80% occur in the submandibular gland or its duct. The symptoms develop as a consequence of obstruction of the duct and include swelling and pain, which is usually manifested during meal. However, the incidence of a sialolith, occurring in a patient with isolated absence of a unilateral submandibular gland is rare. The case we present is therefore of an unusual nature.

The case is of a medically fit and well, 52-year-old male referred to our Oral and Maxillofacial Surgery Department by his general dental practitioner. The referral was regarding an incidental radio-opacity seen around the left angle of the mandible on an orthopantomogram. The patient had previously experienced episodes of recurrent swellings during meal times previously but was asymptomatic for many years. A computed tomography scan of the neck showed an 18 mm × 18 mm sialolith in the duct and interestingly, also revealed that the left submandibular gland was absent. The patient who was unable to recall having ever had any surgery, agreed to have the sialolith removed, which was carried out via a transoral approach.

In conclusion, a review of the literature, which has been provided strongly advocates that the cause of the absent submandibular gland in this case to be due to salivary gland atrophy instead of congenital absence, although it cannot be confirmed.

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Cutaneous necrosis of the jaw secondary to spondolytic kyphosis of the spine

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In a London foundation trust, an immobile 96-year-old female suffering with significant kyphosis of the thoracic and cervical spine was admitted under orthopaedics.

On examination she was found to have a facial ulcer thought be related to chronic pressure from the head resting on the chest. She then developed a necrotic ulcer of the left hemimandible with a corresponding ulcer overlying the manubrium.

Pressure ulcers typically arise from the impact of shearing forces, the burden of load bearing areas and chronic immobility. Typical sites for such ulcers include; the heels, the lumbar and sacral spine, greater trochanter and medial epicondyle.

With only one other published example this unusual case study documents a chronic ulcer that spans the hemimandible proceeding submentally to the left angle of the mandible. The ulcer penetrated deep to the bone but fortunately without any sign of osteomyelitis.

In this case the ulcer was managed though conservative measures. The author explores in depth the risk factors leading to such ulcers and the various management options available in clinical practice.

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Intraorbital mucocele: case report and review of literature

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Background: Mucoceles are benign, slow-growing lesions defined as mucus-filled cystic formations, capable of bony destruction through orbital walls. This orbital affection is a very rare entity; 52 cases of intraorbital mucocele (IM) have been reported in the literature since 1993. Surgical treatment consists in cyst extirpation and sinus drainage.
Methods: We describe two cases of IM originated from the frontal sinus, with a review of the published data concerning the aetiology, diagnosis, and treatment planning. In our cases of IM (a 36-year-old female and a 47-year-old male) we describe the history, diagnosis, radiologic studies and outcome of the treatment. Review of the literature was made using PubMed database.
Results: These patients where successfully treated, with total removal of the IM and without any complications. The follow-up results were satisfactory. According to our review; most common chief complaint was eye proptosis, diagnosis was made by computed tomography scan and surgery was the treatment of choice.
Conclusions: IM is one of the differential diagnosis that needs to be considered in the management of frontal sinus tumours. The choice of surgical approach seems the best option according to the literature and our experience.

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Actinic cheilitis and oral lichen planus of the lips, management and prognosis (case report)

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Background: In actinic cheilitis, keratinocytes have undergone transformation forming a field of epithelium which is potential for neoplastic transformation. Persons with actinic cheilitis most of at lower lips, which a partly exposed to sunlight. These clinical features were similar with oral lichen planus. Oral Lichen planus and actinic cheilitis were regarded as being potentially malignant transformation squamous cell carcinoma.
Objective: The early detection of oral abnormalities with the same clinical, prognosis, and management.
Findings: Case 1 — a 25-year-old female complained painful with erythematous lesion on upper lip since four months and has been diagnosed as actinic cheilitis. Case 2 — a 54-year-old female complained painful with erythematous bulosa lesion on lips since one month ago and has been diagnosed as oral lichen planus. Patient with hepatitis C virus infection one year ago. Both cases were treated with topical steroid (hydrocortisone 0.125 g), topical antibiotic (kemicetine ointment 0.125 g), lanolin 0.5 g and vaseline 5 g were blended into an ointment was applied on her lip, three times a day for two weeks. Lesion in case 1 improved in two weeks, but lesion in case two improved take a long time because of associated hepatitis C virus infection. Hepatitis C must be treated well so that therapy of oral lesions can be successful.
Conclusion: Early diagnosis and good management an oral lesion will influence the risk of malignant transformation and the prognosis patients affected by systemic conditions.

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Central giant odontogenic fibroma of the maxilla: management and a follow-up of a case report

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Background: Odontogenic myxoma (OM) is rare benign tumour of jaw bones which is locally aggressive and non-metastasising. They are classified as benign neoplasms that arise from odontogenic ectomesenchyme origin with or without odontogenic epithelium.
Objectives: To present specify and rare clinical entity of giant benign aggressive tumour of the jaws in 23-year-old male following clinical and radiographic features as well as treatment and recurrence rate.
Methods: We studied and analysed the clinical, radiolographs and pathological presentation. The tumour tissue received was sent for routine processing, sectioned, and stained with haematoxylin and eosin and was observed under optical compound microscope.
Findings: Patient presented with a rapidly evolving maxillary swelling. CT-scan showed a maxillary homogeneous well-defined radiolucent mass associated with impacted teeth within the right maxillary sinus. Under general anaesthesia the tumour was exposed through a Weber Ferguson incision. Histopathological examination showed hypocellular and hypovascular lesion with myxoid component of stellate-shaped and spindle fibroblast like-cells typical for odontogenic fibromyxoma. Odontogenic fibromyxoma was the definitive histopathological diagnosis measuring 80 mm × 67 mm × 44 mm and 125 g in weight. The postoperative period was uneventful and the patient fully recovered. No sign of recurrence has been observed during the 12-month follow-up period.
Conclusion: Accurate clinic-pathological, immunohistochemical and ultrastructural findings of OM is crucial for the proper diagnosis in some confused occasions. OM should be treated according to the size and behaviour of the tumour. Long-term surveillance is required due to the high recurrence nature of this disease proposed in the literature.

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A case series of the removal of large sialoliths from the hilum of the submandibular gland via a transoral approach

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Background: There are several treatment options for patients presenting with sialoliths in the submandibular gland. These include sialadenectomy of the gland, basket retrieval, lithotripsy, and transoral removal.

For sialoliths not amenable to basket retrieval or lithotripsy, generally those situated more proximally or at the hilum of the duct and larger than 7 mm in size, sialadenectomy, complete excision of the gland, has been the traditional surgical treatment of choice. This is associated with postsurgical morbidities including scarring, lower lip weakness, altered sensation, and often a prolonged stay in hospital. These can significantly affect patient experience and postoperative quality of life.

Objective: We present a case series of three patients who presented to a district hospital in south Wales, United Kingdom, with symptomatic sialoliths at the hilum of the submandibular gland requiring removal.

Method: Three patients had sialoliths removed using the transoral surgical technique under general anaesthetic. The sialoliths were deemed unsuitable for basket retrieval or lithotripsy as they were situated at the hilum of the submandibular duct.

Findings: All three patients had sialoliths safely and successfully removed. On review six months postoperatively, their symptoms had completely resolved and there were no residual morbidities associated with submandibular gland excision.

Conclusion: Transoral removal of larger sialoliths unsuitable for lithotripsy may be an effective, viable procedure for gland preservation and reduction of postoperative morbidity. This can be performed under general anaesthetic as a cost-effective short-stay procedure in a district general hospital.

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Xerostomia in Crohn's disease

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Background: Crohn's disease has several oral manifestations including xerostomia and other non-specific oral symptoms.

Objectives: To determine the relation between Crohn's disease activity and xerostomia. Furthermore, the salivary flow rate will be determined to distinguish a dry mouth experience from actual salivary gland hypofunction. Additionally, the frequency of some non-specific oral symptoms and their correlation with disease activity was explored.

Methods: 53 consecutive patients with Crohn's disease in a tertiary referral hospital were included. Primary outcomes were the xerostomia inventory (XI)-score, the salivary flow rate and oral and dental complaints. Disease activity was determined with the Harvey Bradshaw Index (HBI) and the shortened version of the Inflammatory Bowel Disease Questionnaire (IBDQ-9).

Findings: Mean XI-score in patients with Crohn's disease was 25.4 ± 8.6. XI-scores correlated significantly with the IBDQ-scores ($r = -0.352$, $P = 0.010$), but not to the HBI-scores ($r = 0.137$, $P = 0.328$). No significant correlation was found between saliva secretion rates and disease activity. Significant correlations were found between the XI-score and oral ($r = 0.554$, $P < 0.001$) and dental complaints ($r = 0.372$, $P = 0.008$). The number of oral complaints correlated with disease activity (HBI: $r = -0.349$, $P = 0.011$; IBDQ: $r = 0.403$, $P = 0.003$). Patients with lower IBDQ-9 scores experienced more temporomandibular joint complaints (OR 8.76, 1.01–76.08) and angular cheilitis (OR 5.69, 1.38–23.39).

Conclusions: Patients with Crohn's disease experience more severe xerostomia. Xerostomia is not related to clinical disease activity, but associated with disease activity associated quality of life. Patients experiencing xerostomia do not necessarily have reduced saliva secretion rates. Oral complaints are more frequent in patients, especially during active disease.

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Epithelial–myoepithelial carcinoma of the palate: our experience

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Epithelial–myoepithelial carcinoma arising in the palate is rare. It comprises about 1% of all salivary gland tumours. This is a case of 38-year-old Chinese lady with painless slow growing palatal swelling of six months duration. The 2 cm diameter nodular mass located at the hard palate had a well-defined border with a central ulcerated mucosa.

Computed tomography scan revealed palatal bony erosion. Incisional biopsy was suggestive of benign pleomorphic adenoma of palate. Surgical wide excision of tumour was undertaken. The microscopic findings confirmed the diagnosis of epithelial-myoepithelial carcinoma of palate upon the immunostaining with S100, EMA, GFAP, p63 and MNF 116. This report describes the clinical features, histopathology, differential diagnosis, relevant prognostic factors and follow-up, which are extremely valuable in management of such cases.

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Plasmacytoma in the oral cavity — a case report

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Background: Plasmacytoma refers to a discrete neoplastic plasma cell tumour that proliferates within the soft tissue or skeletal bone. The International Myeloma Working Group (2003) has divided it based on the site of the tumour present. It may present in the bone as solitary plasmacytoma of bone, in the soft tissue as extramedullary plasmacytoma and multifocal systemic involvement as multiple myeloma.

Objective: The aim of this study is to report an extramedullary plasmacytoma in the oral cavity.

Case Report: A 38-year-old, Malay ethnic female presented to us with progressive limitation of mouth opening and painful erythematous ulcer over the left palate and retromolar region for the past

6 months. There was a palpable tight fibrous band over the left buccal mucosa. Computed tomography scan reported of an ill-defined soft tissue mass in the left oropharynx region involving the left medial and lateral pterygoid muscle, infratemporal fossa, temporalis muscle, maxilla, ramus of mandible and extends into the left parapharyngeal space. Histopathology examination reported the lesion as plasmacytoma and her bone marrow trephine result was negative for myeloma. She was diagnosed with extramedullary plasmacytoma of the left oropharynx. She completed the radiotherapy treatment, and currently she is free of disease for two years.
Conclusion: Extramedullary plasmacytoma often occur in the posterior mandible region and frequently occurs within the mucosa of the oral cavity and pharynx. It has a favourable prognosis of 70% 10-year survival (Weber DM, 2005).

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Expression of fibroblast growth factor receptor type 2 in primary and recurrent ameloblastoma are correlated with ameloblastoma clinic characteristics

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Background: Fibroblast growth factor receptor type 2 (FGFR2), a receptor tyrosine kinase, is involved in a number of cell signalling pathways that contribute to cell growth and differentiation. Whether it presence in primary ameloblastoma and recurrent ameloblastoma has not been previously investigated.
Objectives: This study was undertaken to detect the immunohistochemical expression of the FGFR2 in primary ameloblastoma and recurrent ameloblastoma, and to determine if it was involved in the development of ameloblastoma, especially in the invasion and recurrence of ameloblastoma.
Methods: In this study, 96 formalin-fixed, paraffin-embedded tissue blocks of ameloblastoma specimens which come from patients with two surgery and patients with only one surgery were compared at protein expression level using immunohistochemistry for FGFR2 staining.
Finding: The results indicated that, FGFR2 immunostaining was evident in all groups of the specimens, the staining in recurrence ameloblastoma was stronger than in primary ameloblastoma. Statistical analysis showed that FGFR2 expression levels were significantly higher in recurrence ameloblastoma than in primary ameloblastoma, and the patient with tumour size over 3 cm had a higher rate of recurrence.
Conclusion: Our study suggests that the high expression rate of FGFR2 plays an important role in the invasion and recurrence of ameloblastoma.

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Clinical feature of Sjögren's syndrome in our hospital comparison of the Japanese criteria with the internationally approved criteria edited by American College of Rheumatology

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Background: The revised criteria for the diagnosis of Sjögren's syndrome (SS) issued by the Japanese Ministry of Health study group (JPN) is usually used in daily clinical practice and clinical study for SS in Japan. On the other hands, the American College of Rheumatology (ACR) classification criteria for SS are internationally used.
Objectives: We reported the clinical feature of Sjögren's syndrome in our hospital, and examined the characteristics of JPN criteria when compared with ACR criteria.
Methods: 248 patients diagnosed with SS by the JPN criteria in our Hospital from 2007 to 2015 were retrospectively re-diagnosed by ACR criteria, and were examined the difference and the characteristics of these diagnosis criteria.
Findings: 70 (28%) patients diagnosed by JPN criteria did not meet ACR criteria. Nine patients who met JPN histopathological criteria did not fulfil ACR criteria. Conversely, two patients who met ACR histopathological criteria did not fulfil JPN criteria. Five patients who met ACR serological criteria did not fulfil JPN criteria.
Discussion and Conclusion: Relative sensitivity of JPN criteria might be higher than that of ACR criteria, conversely relative specificity of ACR criteria might be higher than that of JPN criteria. Because SS was developed based on autoimmune disorder, when the disease was diagnosed by only clinical signs and symptom, such as dry mouth and dry eyes without any serological and histopathological abnormality, the diagnosis would be overdiagnosis. We should understand the characteristics of several diagnosis criteria for SS, and utilise these criteria to reach true SS.

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A case of spontaneous regression of plasmablastic lymphoma in the upper gingiva

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Background: Plasmablastic lymphoma (PBL) is a rare, aggressive neoplasm that most commonly occurs in immunodeficient patients. The most common site of PBL is the oral cavity and the prognosis is poor. Spontaneous regression of malignant lymphoma is extremely unusual. Here, we report a spontaneous regression of PBL in the upper gingiva without any treatment.
Case Report: An 80-year-old male was referred with a swelling at the right upper gingiva. He had been extracted the second molar at the same side before two months at a private dental clinic. Computed tomography (CT) scan demonstrated a mass involving alveolar bone at the right upper molar region. Positron emission tomography-CT showed hypermetabolic lesion on the right side of the maxilla with increased fluorodeoxyglucose uptake

(SUVmax = 29.29). He had prior infection with Epstein–Barr virus, but no history of human immunodeficiency virus infection, or underlying immunosuppression. Histopathological examination and immunohistochemical analysis of a biopsy revealed proliferation of large lymphoid cells with centroblastic morphology, which were positive CD138, EBER, LCA, negative for CD20, CD79a, and high Ki-67 labelling index. He was diagnosed with stage IE PBL. After the biopsy, tumour shrunk gradually, therefore he was underwent tumour resection. There was no evidence of remaining tumour cells histopathologically. He is currently alive and without recurrence.
Conclusion: While precise spontaneous regression of malignant lymphoma is still unclear, immune system might be modulated by traumatic factors such as a biopsy, infection or inflammation. Our finding suggested that even high-grade lymphoma such as PBL could regress spontaneously.

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Orthognathic and Aesthetic Surgery

Macrocheilia — aetiology, management and a case report

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Background: Majority of macrocheilia is seen as normal ethnic variations in Afro-Caribbean and Asian populations. Various other aetiologies have been reported, which include glandular hypertrophy, vascular malformations, granulomatous disorders and trauma. Congenital causes include double lip and labial pits. Clinical features mostly are related to aesthetic problems but functional problems due to incompetent lips like drooling and speech have also been reported.

Lip enhancement complications (e.g. postoperative infection or overfilling with fillers) and trauma-related scar formation are additional indications for lip reduction surgery.

Dentofacial abnormalities resulting in pseudo-macrocheilia has to be recognised before any irreversible damage is done. Acute inflammation and psychiatric instability are contraindications for lip reduction surgery.
Management: Principles of surgical correction are to correct any underlying dento-osseous deformities and establish a balance between upper and lower lip tailored to the individual patient.

We present a case of a 26-year-old Asian male with hypertrophic upper and lower lip who requested lip reduction surgery purely for aesthetic reasons.

Oral and maxillofacial surgeons should be aware that "cheiloplasty" is a simple procedure, which is reliable and has predictable results when surgical principles are adhered to and contraindications are kept in mind.

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Health related quality of life and satisfaction following orthognathic surgery

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Background: Orthognathic surgery is performed to correct facial skeletal deformities and associated dental irregularities. This correction improves the harmony of the facial skeletal bones resulting in favourable facial aesthetics. This improved facial aesthetic usually raises the patient's self-esteem and social confidence The aims of this study were (1) identify the reasons for seeking the surgery, (2) estimate patients' satisfaction and (3) whether the orthognathic surgery improves their health related quality of life.
Methods: 67 patients who had surgery were enrolled in this study. We used a translated Arabic version of the Orthognathic Quality of Life Questionnaire (OQLQ) and two visual analogue scales (VAS) — one relating to satisfaction and another to general health. The patients rated themselves along these scales twice: before and after the surgery.
Results: Among the 67 patients invited, the main reasons for seeking treatment were to improve appearance of the face (80%), bite (76%), pronunciation (38%), breathing (33%) and joint pain (27%). Pre- and postsurgery comparisons showed statistically significant improvements along all the domains of OQOL ($P < 0.001$) (social aspects of deformity, facial aesthetic, oral function, awareness of facial deformity) as well as the scores of VAS general health (pre = 73 ± 26 and post = 94 ± 9). On the VAS satisfaction scale, 92% scored 70 or above; and 50% scored 100.
Conclusions: Enhancement of facial appearance by orthognathic surgery improves the psychological and general health status of persons with facial skeletal deformities.

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Rigid external distraction treatment of a patient with dentofacial deformities

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Background and Objectives: Distraction osteogenesis (DO) with an external distraction device such as the rigid external distraction (RED) frame has become an established method for treating midface hypoplasia. It allows for greater advancement of the midface than achievable with traditional Le Fort I osteotomy. The aim of this presentation is to evaluate an alternative custom made device and its postoperative stability in maxillary DO in three patients with RED II device.
Methods: Three severe maxillary hypoplasia patients, whose two of them had cleft lip and palate deformity referred to our department. Presurgical orthodontic treatment was applied to all patients. Le Fort I osteotomy was performed under general anaesthesia, including pterygomaxillary disjunction, and the maxilla was mobilised. Once the osteotomy was completed and the oral mucosa was sutured, custom-made intraoral device designed by the senior authors were fixed to maxilla with intermaxillary fixation screws. The heading part of the RED device was adapted and connected to the intraoral device.

Results: Immediately following DO, the average amount of distractions were 18 mm, 14 mm, 15 mm. A significant advancement of the maxilla and correction of the sagittal Class III skeletal relationship was achieved. Unfavourable rotations and dental compensations were eliminated during maxillary advancement.
Conclusions: There was no problem with stability of the device. Unfavourable tooth movements were prevented. The obtained amounts of advancement were found to be stable in three- to five-years follow-up postoperatively.

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Modified mandibular inferior border sagittal split osteotomy versus traditional grafted sagittal split osteotomy to reduce mandibular lower border defects in orthognathic surgery. A cohort study

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Background: Bilateral sagittal split osteotomy (BSSO) in orthognathic surgery is one of the most used techniques. In large mandibular advancement, healing defects of the inferior border of the mandible may affect 30–40% of the operation sites.[1]
Objectives: To compare traditional grafted BSSO technique versus modified BSSO technique in order to prevent the incidence of lower border mandibular defects.
Methods: A cohort study comparing the traditional grafted BSSO technique versus the modified BSSO technique in patients that required a large mandibular advancement. The presence or absence of mandibular border defect after 12 months was defined using an orthopantomography view.
Results: 251 patients were included in the study. Age, sex and mandibular advancement were similar between patients submitted to surgery techniques ($P > 0.05$). Of the 502 operation sites measured, the proportion of defects in the mandible border was similar in both groups (1.5% grafted BSSO versus 5.1% modified BSSO, $P > 0.05$).
Conclusion: Both techniques are appropriate alternatives to prevent lower border mandibular defects. We found no significant difference regarding mandibular defects when performing surgery with either technique.

Reference

1. Agbaje, J. O., Gemels, B., Salem, A. S., Anumendem, D., Vrielinck, L., & Politis, C. (2016). Modified mandibular inferior border sagittal split osteotomy reduces postoperative risk for developing inferior border defects. *J Oral Maxillofac Surg*, *74*, 1062.e1-9.

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Three-dimensional analysis of condylar position after conventional versus surgery-first approach for mandibular prognathism

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Objectives: To evaluate the condylar position after orthognathic surgery, we used three-dimensional (3D) superimposition to compare changes in the position of the condyle following mandibular setback using the conventional approach (CA) versus the surgery-first approach (SFA).
Methods: We evaluated 55 patients (110 condyles) who underwent sagittal split ramus osteotomy (SSRO) for mandibular prognathism. The patients were divided into two groups: those treated with the CA ($n = 26$) and those treated with the SFA ($n = 29$). Computed tomographic images were obtained and analysed preoperatively (T0), postoperatively (T1), and at the six-month follow-up (T2). The medial and lateral poles of the condylar head were measured using the 3D coordinate system, and the results were computed.
Results: After SSRO, the condyle of the both groups exhibited lateral and inferior displacement with inward and forward rotation. During the postoperative follow-up period, the condyles of the condyles tended to return to their preoperative positions. At six months after surgery, the condyles showed the displacement in lateromedial, anteroposterior and superoinferior direction less than 0.3 mm in both groups, compared with preoperative condylar position. There were no significant differences between the two groups when the changes from T1 to T0, T2 to T1, and T2 to T0 were compared.
Conclusions: The results indicate that the condylar position after the surgery-first is similar to that of conventional approach, and the SFA may be considered as an alternative to the CA in SSRO of mandibular prognathism.

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The surgical management of obstructive sleep apnoea: a case report and review of the literature

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Background: Obstructive sleep apnoea (OSA) is a sleep related breathing disorder caused by the partial or complete obstruction of the upper airways. Left untreated, OSA can impact detrimentally on the patient's quality of life, and is a risk factor for hypertension, cardiovascular morbidity and mortality and stroke. We report on a case of OSA treated by maxillomandibular advancement (MMA) surgery and review the literature for this type of surgery and other treatment options for OSA.
Case: A 55-year-old male was referred to our Maxillofacial Hospital Department for surgical review and management of his debilitating OSA. Throughout most of his adult life he had been plagued by this condition, and reported adverse effects on his work, family and social life. He had previously tried multiple medical and surgical management options, none of which provided him with any long-term improvement. He proceeded to MMA surgery, which advanced his maxilla 8 mm and mandible 18 mm. This resulted in significant enlargement of the pharyngeal space by expanding the skeletal framework. On follow up he patient reported a significant improvement in his quality of life.
Discussion and Conclusion: This case highlights the evidence demonstrated in the literature to date — there is an increasing body of evidence that MMA is the most effective surgery for OSA. This type of surgery should be considered when medical therapy

has failed or is not tolerated, and patient anatomy suggests other surgical procedures are not likely to produce significant benefit.

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Retrospective evaluation of skeletal and airway stability of patients undergoing surgery maxillomandibular advancement

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Background: Orthognathic surgery (OS) is considered a golden standard treatment for correcting dentofacial deformities.
Objectives: To assess the volumetric changes and the point of major constriction of the upper airways in class II patients that had OS of maxillomandibular advancement (MMA).
Methods: 22 patients who underwent MMA were assessed through cone-beam computed tomography, in three periods.
Findings: The MMA provided a volumetric gain of the upper airways of 8.82 cm^3 ($P < 0.001$) with a mean relapse of 1.17 mm (P 0.2960). Positive correlation was encountered between change of the airway volume and increase of the minimum axial area (Pearson's r 0.7728) and between the airway volume and its recurrence (Pearson's r 0.5963). There was no statistical difference between the genders.
Conclusions: Maxillomandibular advancement might be considered a stable movement. Although the relapse of airway volume demonstrated a statistically significance in the long-term analysis, but the increase of minimum axial area was maintained within the same period.

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Tomographic evaluation of nasal tissue changes in patients undergoing bimaxillary orthognathic surgery

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Background: Orthognathic surgery is performed when you want to correct dentoskeletal deformities, to improve the aesthetics and function of the patient. The cone-beam computed tomography (CBCT) helps the clinician to provide accurate information on facial morphology.
Objectives: to examine volumetric and nasal tissue changes in patients undergoing bimaxillary advancement with or without forward genioplasty or counterclockwise rotation of the occlusal plane.
Methods: The study analysed nasolabial angle, nasal volume, and alar base width of the nostrils and nasal projection through CBCT. Patients performed in the same apparatus, in the periods (T1), preoperative; (T2), immediate postoperative; (T3), late postoperative period. The sample consisted of 22 patients (12 males, 10 females) aged between 20 and 35 years.
Results: The results showed that patients had a significant increase in base width and breadth of the nose wing and a significant change in operative times between the thickness of the upper lip, as the nasolabial angle and nasal volume was not observed significant changes between operative times.
Conclusion: The study concluded that tissue changes in the alar base and alar width are common after maxillary advancement and rotation, being necessary to evaluate these changes preoperatively.

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Evoked potentials: an objective measure in determining neurosensory alterations of the lower lip post sagittal split ramus osteotomy and intraoral vertical ramus osteotomy

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Background: Neurosensory alterations of the inferior alveolar nerve (IAN) are potential complications in sagittal split ramus osteotomy (SSRO) and intraoral vertical ramus osteotomy (IVRO). Multiples authors have described the potential damage on the IAN, yet in a subjective manner. The evoked potentials method is a standardised and reliable test, which is used for determining localised somatosensory alterations.
Objectives: The purpose of this study was to compare the evidence of the use of evoked potentials in order to determine hypoesthesia as a result of corrective surgery for mandibular prognathism.
Methods: There were a total of 204 patients with mandibular prognathism. They were divided into three groups: the Obwegeser method (Ob), the Obwegeser–Dal Pont method (ODP), and the IVRO. The trigeminal somatosensory evoked potentials (TSEP) method was carried on preoperatively and at 1, 2 weeks, 1, 3, 6 months, and 1 year postoperatively.
Findings: In the first study most of the sides in the Ob group and all sides in IVRO group recovered within 1 month. There was no permanent hypoesthesia on any group after 1.5 years. In the second study most of the sides were measurable after six months. After one year only 4 sides in the ODP group and 8 sides in the Ob group remained immeasurable by TSEP.
Conclusion: Both authors found similar results using TSEP. The IVRO groups showed the earliest signs of recovery. The ODP method delayed the recovery period and was associated with a higher incidence of lower lip hypoesthesia in comparison with the Ob method.

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Predisposing factors affecting to postoperative skeletal stability in class III malocclusion patients: analysis by recurrence rates

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Background: Postoperative stability is a key factor of orthognathic surgery, and various factors are known to affect skeletal stability of postoperative period; reorientation method of condyle of mandible, method of fixation between proximal and distal segment of mandible, period of intermaxillary fixation, direction and amount of surgical movement, age and growth pattern, etc. These

factors have independent effect, as well as constitute the complex interrelationships.
Objectives: In this study, for precise and predictable results, we analysed the predisposing factors affecting to skeletal stability of orthognathic surgery in Class III malocclusion patients.
Methods: A total of 153 patients with Class III malocclusion had orthognathic surgery from November 2013 to July 2015 at Oral and Maxillofacial Surgery of Pusan National University Dental Hospital. All patients had surgery from the same surgeon. We evaluated the cephalograpic images and cone-beam computed tomography images (preoperative, immediately after surgery, and postoperative after 6 months). The skeletal relapse rate was calculated and compared to the results previously reported. Furthermore, we analysed the known factors, which had reported whether they affect to the stability in this study. In addition, by evaluating the high/low recurrence rate groups in this study, analysis performed on the predisposing factors that are associated with postoperative skeletal stability.
Findings and Conclusion: It was confirmed that well-known elements have influence to the relapse rates.

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Quantitative linear assessment of posterosuperior airway space following maxillary impaction

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Background: Impaction of the maxilla during orthognathic surgery results in sliding along the anterior cranial base. Considering the inclination of anterior cranial base, superior repositioning should also result in an anterior movement of the maxilla. The surgical anteroposterior movement of the facial bones implies secondary positional and tensional changes in the attached soft tissues that introduce significant changes in the facial appearance and in the pharyngeal airway space.
Objective: To evaluate changes in cephalometric measurements of the PSAS before and after superior impaction of the maxilla.
Methods: Pre- and postoperative cephalometric analysis was performed on five patients who underwent superior impaction of the maxilla by Le Fort I osteotomy. The linear cephalometric measurements in the retropalatal region were done to examine changes in the posterior pharyngeal airway.
Findings: The results show an advancement of 3 mm, 2.5 mm, 2 mm, 3 mm and 3 mm in the retropalatal region for a superior impaction of 5 mm, 5 mm, 4 mm, 5 mm and 5 mm in patients one, two, three, four and five respectively. The mean advancement was found to be 1 mm for every 1.6 mm superior impaction of the maxilla
Conclusion: It is of the authors' opinion that superior repositioning of the maxilla results in predictable advancement of the maxilla and concurrently of the posterosuperior airway space.

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Temporary intraoperative maxillary ischaemia in a patient with sickle cell trait during a bimaxillary osteotomy — a case report

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A petite 21-year-old female patient with a history of smoking and sickle cell trait, sickle haemoglobin (HbS) of 38%, underwent a bimaxillary osteotomy. The planned maxillary advancement was 7 mm. Following the maxillary advancement and plating, the maxilla was found to be increasingly dusky in appearance. The plates were removed. The maxilla was moved back and warm packs were placed. The haematology advised that a HbS of 38% did not warrant an exchange transfusion intraoperatively and would not be beneficial in preoperative optimisation. After 30 min there was an apparent improvement in the perfusion of the maxilla and surgery was completed.

In 700 patients that have undergone osteotomies in our unit a further 7 patients were noted to have sickle disease or sickle cell trait, therefore 1% of osteotomies. The patients all had impactions and/or advancements less than 7 mm. None of these patients were noted to have intraoperative or postoperative complications with regard to ischaemia or avascular necrosis. The most likely explanation is that this patient was of slight stature, a smoker and had undergone a relatively large anterior–posterior movement. None of the 7 other patients with sickle cell disease or trait were smokers.

In patients such as these the following is recommended: preoperatively: IV fluids, antibiotics and possible exchange transfusion with a high HbS following haematology advice; intraoperatively: good oxygenation, avoid a hypothermic state, IV fluids; postoperatively: IV fluids and antibiotics

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Patient satisfaction with orthognathic treatment — does the view change with time?

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Background: One consultant maxillofacial surgeon and three consultant orthodontists work closely together to provide orthognathic treatment for suitable patients in Essex.
Objectives: We looked at patient perceived benefits pre- and post-orthognathic surgery at debond and repeated 12 months after debond. Any differences in patients' memory of their preoperative motivation and experience of treatment would be noted.
Methods: A validated questionnaire was used to examine patient's perceptions of the benefits of orthognathic treatment. All patients that had combined orthodontic-orthognathic treatment over a four year period were included. The survey looked at the following domains; patient reasons for treatment, information given pre treatment, benefits of treatment, hospital stay experiences and the patients' recovery.
Findings: 113 surveys were returned out of 137. Out of these 64 had single jaw surgery and 73 had bimaxillary surgery. The top three reasons for patients wanting surgery were: straighten their teeth (102–90%), improve their smile (97–86%) and improve their self-confidence (87–77%). After treatment 108 (96%) of patients

reported improved facial appearance, 108 (96%) reported straight teeth and 106 (94%) felt their smile had improved. The overall perception was very closely similar for pretreatment motivations at repeat survey at 12 months and later. However their perception and memory of the surgical experience varied from the initial report in some cases.
Conclusion: Overall patient expectations were met, indicating patients were satisfied with the service provided by this team at debond. The repeat survey after 12 months post-debond revealed some interesting differences when there was no obligation/elation bias.

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Peer assessment rating index outcomes for orthognathic patients in south Essex

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Background: The Peer Assessment Rating (PAR) index is commonly used to evaluate the outcome and improvement in patients treated with a combined orthodontic and orthognathic approach. Southend Hospital houses orthodontic and oral and maxillofacial surgery centres which helps to provide a close multidisciplinary approach to patient care in correcting malocclusions.
Objectives: To evaluate the standard of care given by an in-house multidisciplinary team by measuring occlusal outcomes.
Methods: We compared PAR outcomes of close to 200 patients who had received consecutive orthodontic and orthognatic treatment over a period of 48 months from 2012 to 2016. 162 cases commenced treatment and 121 were debonded and placed in retention in this period.
Results: Class II mean PAR score before treatment was 39 (10–68), after treatment was 3 (0–8), with a mean improvement of 91%. Class III mean PAR score before treatment was 42 (16–54), after treatment was 3 (1–7), with a mean improvement of 92%. Total PAR scores improved by a mean of 91.5% after treatment, indicating that results are above those in the published literature.
Conclusions: Most orthognathic patients reported improvements in their dental and facial appearance and thought that the treatment had been beneficial. Stability of the improvement was not measured in subsequent annual reviews which would prove of greater value and is now an ongoing project combining PAR and standardised cephalometric assessment.

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Three-dimensional airway changes after subcranial Le Fort III osteotomy combined with Le Fort I osteotomy

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The purpose of this report was to describe changes of airway volume in nonsyndromic patients after simultaneous subcranial Le Fort III and Le Fort I osteotomy for midface advancement associated with bilateral sagittal split osteotomy.

11 consecutive patients were studied comparing the airway volume, area and minimum cross-sectional area by using Dolphin Software, before, immediately after and 18 months after surgery. The airway space was divided in nasopharynx, oropharynx and hypopharynx. There was an increase in the three variables analysed, but statistical differences were observed in the increase of the minimal cross-sectional area after surgery. There were no differences between male and female patients.

In conclusion, although mandible setback should be avoided because it has a negative effect on the airway, the midface advancement compensates this narrowing by maintaining or increasing the airway volume, by advancing the palatopharyngeal arch. Linear midface and maxillary advancement will have positive effects on the airway volume and patency.

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Stability of the subcranial Le Fort III osteotomy associated with Le Fort I osteotomy for nonsyndromic patients

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Objectives: The purpose of this study was to evaluate post treatment skeletal stability of a sequence of eleven nonsyndromic patients who underwent subcranial Le Fort III and Le Fort I osteotomy.
Methods: To test if the long-term stability was satisfactory, the authors compared cephalometric changes from immediately after surgery to 18 months follow-up taken from multislice computed tomography using two different software.
Findings: All patients were submitted to a final advancement of upper incisor of at least 10 mm. There was no statistical difference between the measures taken from the two different software and interclass correlation was at least good for each cephalometric variable. The advancement of the upper incisor, A-point, posterior nasal spine and nasion was highly stable, presenting less than 01 mm of relapse after 18 months in vertical and horizontal analysis. No statistical difference was seen between short- and long-term follow-up. Infraorbital also showed a highly stable result, without significant differences after 18 months.
Conclusion: Subcranial Le Fort III midface advancement combined with Le Fort I is an effective surgical technique to correct malocclusion and midface hypoplasia with excellent postsurgical stability. Both software showed similar results and proved to be an efficient clinical tool to study stability.

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Risk factors involved in reabsorption condylar in patients undergoing orthognathic surgery: systematic review

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The purpose of this systematic review was to seek uniformity of information, based on existing scientific evidence, establishing the risk factors involved in postsurgical condylar resorption of patients undergoing orthognathic surgery. A search of the journals was done using the following keywords

condylar resorption, progressive condylar resorption, idiopathic resorption, condylar atrophy, dysfunctional remodelling, avascular necrosis, osteonecrosis and condylysis and also these descriptors were used in combination with the term orthognathic surgery, Le Fort I osteotomy and split sagittal osteotomy.

The study included only articles published in English, using the databases of MEDLINE (PubMed and Ovid), Web of Science, Scopus and Cochrane Library, the January 1978 period to February 2015. The search strategy selected 56 articles dealing with post-surgical condylar resorption in patients undergoing orthognathic surgery; of these 20 articles were selected according to the inclusion criteria. It concludes that the main risk factors involved are: Class II patients with high mandibular plane angles preoperatively, combined osteotomies and female patients. In relation to age, could not objectively conclude the relationship between age and the involvement of condylar resorption due to lack of consistent data. It is necessary to conduct more studies to justify the existence of these risk factors, so that we can minimise the damage of this phenomenon to patients eligible for this type of procedure.

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Evaluation of the knowledge of the university students about oral and maxillofacial surgery

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The objective of this study was to evaluate the level of knowledge about oral and maxillofacial surgery. 800 questionnaires were used — respondents were divided into six groups: 200 students of exact sciences; 200 students of humanities; 100 dental students; 100 medical students; 100 dentistry and 100 doctors.

The questionnaire comprised 26 clinical situations in four different specialties (maxillofacial surgery, plastic surgery, otorhinolaryngology and head and neck surgery) divided the two mentioned groups were interviewed, which responded to a questionnaire regarding the knowledge they had about this specialty. The results showed that in all groups, there was a lack of information on the extent of the treatment of oral and maxillofacial surgery.

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Effect of the use of combination uridine triphosphate, cytidine monophosphate, and hydroxycobalamin on the recovery of neurosensory disturbance after bilateral sagittal split osteotomy: a randomised, double-blind trial

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The change in neurosensory lesions that develop after bilateral sagittal split osteotomy (BSSO) was explored, and the influence of the application of combination uridine triphosphate (UTP), cytidine monophosphate (CMP), and hydroxycobalamin (vitamin B12) on patient outcomes was assessed. This was a randomised, controlled, double blind trial.

The study sample comprised 12 patients, each evaluated on both sides (thus 24 sides). All patients fulfilled defined selection criteria. Changes in the lesions were measured both subjectively and objectively. The sample was divided into two patient groups: an experimental group receiving medication and a control group receiving placebo. The statistical analysis was performed using SPSS software.

Lesions in both groups improved and no statistically significant difference between the groups was observed at any time. Severe injuries in the experimental group were more likely to exhibit a significant improvement after six months. Based on the results of the present study, it is concluded that the combination UTP, CMP, and hydroxycobalamin did not influence recovery from neurosensory disorders.

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Piezo sagittal split ramus osteotomy

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Background and Objectives: The outcomes of utilising a novel and powerful ultrasonic apparatus (BoneScalpel™ by Misonix Inc., Farmingdale, New York, United States of America) with tissue selective cutting characteristics in a series of 53 patients who underwent orthognathic surgery in the oral and maxillofacial surgery department of Taichung China Medical University Hospital between July 2014 and October 2015 will be presented.
Methods: All cortical osteotomies were performed purely ultrasonically and without auxiliary use of reciprocating saw or rotary burs. The kurf of osteotomy is about 1.6 mm which enables convenient access (insertion) of Obwegesor's osteotome and/or Smith Ramus Separator to complete the splitting procedures. It seemed to be a safer and much more comfortable instrument to free the inferior alveolar neurovascular bundle when it trapped within the proximal segment.
Findings: Statistics from literatures and our own experience have shown no significant difference in the amount of intraoperative blood loss and postoperative neurosensory disturbance regarding the instruments used to perform osteotomy.
Conclusion: BoneScalpel™ in our hands did provide improved control over orthognathic osteotomies and resulted in reductions in the occurrence of bad splits without significant extra-working time.

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The mandibular rotations were not roll or yaw in facial bone asymmetry patients

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Background: The mandibular rotation has been described as roll or yaw with relation to the midface. However, little is known regarding how the mandible rotates in clinical cases.
Objectives: The purposes of this report were to locate the rotational axis of the mandible in facial asymmetry patients.
Methods: A retrospective review was conducted on 60 facial asymmetry patients. They all underwent computed tomography (CT) examination for symmetry analysis. Optimal symmetry planes (OSPs) of the midface and the mandible were generated

by computing the CT data of the structures. The mandibular rotation was broken down into the frontal and the horizontal rotation. Connection of the two rotational centres was the mandibular rotation axis. The rotational centre was measured from the point where the midface OSP met the lower chin border (FC) and the frontal rotational centre distance (FRCD) and the horizontal rotational centre distance (HRCD) were recorded.
Findings and Conclusion: Analysis results showed that the rotational axes highly varied in its location. The median FRCD was 126.1 mm (range, −195.9 to 2304.1 mm) and the median HRCD was 153.4 mm (range, −110.3 to 2942.7 mm). There was no significant difference between the FRCD and HRCD ($P = 0.855$). Because of the highly variable location of the axes, the mandibular rotations could hardly be categorised as roll, yaw or a combination of them, which is defined as rotation around the geographic centre of the structure. As a result, de-rotation of the mandible would be difficult without using the OSPs as guides.

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The application of digital technology for 12 patients in dentomaxillofacial deformities

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Objective: To explore the application of digital technology in the treatment of dentomaxillofacial deformities.
Methods: Twelve patients of dentomaxillofacial deformities were enrolled with three-dimensional (3D) computed tomography of maxillary and mandible. The dicom date was input into the software of Proplan CMF. We built a digital skull model and 3D-printed skull model to perform surgical planning, postoperative prediction and simulate operation. Clinical examination of facial symmetry was performed 3 months later.
Results: All the surgical planning, postoperative predictions and simulate operations of the twelve patients of dentomaxillofacial deformities were performed, and the orthognathic surgeries were successful. The patients were satisfied with the facial symmetry 3 months after operations, with a satisfaction rate of 91.67%.
Conclusion: Using digital technology to perform surgical planning and simulate surgery improved the accuracy of surgeries and resulted in satisfied effect. Therefore, digital technology has practical value in dentomaxillofacial deformities.

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Non-grafted sagittal split osteotomy versus grafted sagittal split osteotomy to reduce mandibular lower border defects in orthognathic surgery. A cohort study

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Background: The prevention of mandibular lower border defects is an important issue to be taken into account after large mandibular advancement with bilateral sagittal split osteotomy (BSSO).
Objectives: The aim of this study is to compare the incidence of mandibular border defects when non-grafted BSSO versus grafted BSSO are used.
Methods: The authors undertook a retrospective cohort study comparing two different sagittal split osteotomies techniques: Group A: traditional non-grafted BSSO technique and Group B: traditional grafted BSSO technique. One year after surgery, the presence or absence of a defect was determined by the use of panoramic X-rays.
Results: A total of 600 operation sites in 300 patients were included in the study (age, sex and mandibular advancement were similar between the groups $P > 0.05$). The proportion of lower border mandibular defects of operation sites was: group A 36.5% and group B 1.5%. Traditional grafted BSSO technique was substantially superior preventing the incidence of mandibular lower border defects compared with traditional non-grafted BSSO technique ($P < 0.05$).
Conclusions: Mandibular lower border defects are likely to happen after large mandibular advancement. The results in this study show a considerably reduced occurrence of this type of defect using grafted BSSO.

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Evaluation of condylar positioning in bimaxillary orthognathic surgery using intraoperative cone-beam computed tomography

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Background: Bilateral sagittal split osteotomy (BSSO) constitutes the most used surgical method in the treatment of dentofacial deformities. Alterations in the condylar position, after the BSSO, can lead to recurrence of postoperative malocclusions, temporomandibular joint disorders (TMJ) and condylar resorption. Nowadays, the use of intraoperative cone-beam would allow to objectify the condylar position after the BSSO, avoiding deleterious effects on TMJ for wronged condylar positioning, optimising masticatory efficiency, functionality and postoperative skeletal stability.
Objectives: Design a tomographic intraoperative control protocol, with O-Arm cone-beam equipment, of condylar positioning in BSSO on orthognathic surgery (OS) and evaluate its utility.
Methods: Clinical prospective study made between July 2013 and August 2016 of 300 patients who underwent OS at the Oral and Maxillofacial Unit, Faculty of Medicine, School of Dentistry Clínica Alemana – Universidad del Desarrollo Clinica Alemana Santiago, Chile. In operating room, after BSSO, with radioprotection protocol, O-Arm cone-beam is used with multiplanar and three-dimensional images. The condylar position is evaluated, and if necessary, new repositioning and new control is made.
Conclusions: The use of intraoperative cone-beam is a reliable technique that allows performing an immediate diagnosis of wrong condylar positioning in OS, avoiding future complications.

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A masticatory mystery — the development of an intra-masseteric lump following botulinum toxin injection for masseteric hypertrophy

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A 26-year-old female presented to our services with bilateral masseteric and temporalis hypertrophy. She was treated with botulinum toxin type A injections into the muscles and subsequently developed a lump in her right masseter on clenching. This was initially thought to be a haematoma but was in fact due to the deeper fibres of the masseter remaining active, thus forcing out the now redundant superficial fibres on mastication. It resolved spontaneously, and she went on to achieve excellent reduction and a much-improved mandibular contour.

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Analysis of the nasofrontal angle measurement

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Background and Objectives: The classic interpretation of the nasofrontal angle (NFA) are intersection of the tip-nasion-glabella with average angle vary 115°–130° by different authors data. To correlate data of NFA measured by classic and new methods.
Methods: 100 random participants with different deformities of the nose were divided in five groups by the "nose shape" — significant saddle, saddle, straight, hump and significant hump. To create frontal plane we used one of the classical method — nasion and glabella soft points. But to create nasal plane we have used model that differs from classical. Two points were marked — upper and lower dorsal which were above and bellow K-area.
Results: Remarkably four patients did not have any change in NFA. In the group with significant saddle nose (16) there was mean difference 3.38° (2.49%), maximum 10° (7.35%) and minimal 1° (0.72%). In the group with saddle (14) the mean difference was 2.43° (1.71%), max 5° (3.68%), min 0°. In the group with straight (26) the mean difference was 2.23° (1.59%), max 5° (3.82%), min 0°. In the group with hump nose (28) the mean difference was 2.43° (1.68%), max 5° (3.33%), min 1° (0.68%). In the group with significant hump nose (16) the mean difference was 4.50° (3.0%), max 7° (4.93%), min 1° (0.69%). The total (100) mean difference was 2.88° (2.03%), max 10° (7.35%) and min 0°.
Conclusions: Difference in NFA is not significant in most cases, but it is still present. There is a correlation in increase of NFA discrepancies with increasing severity of nose's shape pathology.

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Mandibular canal and bilateral sagittal split osteotomy: a topographic analysis

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Background: The mandibular canal ratio analysis with the design of the bilateral sagittal split osteotomy of the mandible can provide important information to enable the professional to set standards and osteotomy levels for each type of malocclusion.
Objectives: To analyse the topography of the mandibular canal of a sample of patients undergoing orthognathic surgery using cone-beam computed tomography (CBCT).
Methods: 213 CBCT of patients in the preoperative phase who underwent orthognathic surgery were analysed. Points in mandibular foramen, anterior border of the mandible, distal second molar and interproximal first and second lower molars served as reference to perform the measurements in software Dolphin Imaging 3D®.
Findings: Patients class III had bilateral reduction in bone height in the regions of anterior border of the mandibular branch, distal second molar and between the molars. Also had bilateral reduced bone thickness in the anterior border of the mandibular ramus. Class II patients showed increased thickness of the base jaw. As the distance of the second molar in relation to the mandibular lingula, class II patients had lower height, and class III patients had greater height.
Conclusion: The mandibular canal showed topographical differences between the types of malocclusion, suggesting the need to differentiate the depth and the thickness of the bone cuts.

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Computer-assisted surgical planning and simulation for unilateral condylar benign lesions causing facial asymmetry

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Background: Surgical sequence for the treatment of unilateral condylar benign lesions causing facial asymmetry has not been well reported.
Objectives: The purpose of this study was to investigate the best surgical sequence for the treatment of unilateral condylar benign lesions causing facial asymmetry by the application of computer-assisted surgical planning and simulation.
Methods: Computer tomography (CT) data from 12 patients whose maxillary cant were corrected by maintaining the vertical position of the central incisors and equally intruding the long side of the maxilla and extruding the short side were analysed by Pro-Plan CMF 1.4 software (Materialise Medical, Leuven, Belgium). Condylectomy and double jaw orthognathic surgery with two different surgical sequences were simulated: (1) maxillary Le Fort I osteotomy first (MaxF), then condylectomy, followed by bilateral sagittal split ramus osteotomy (BSSO); (2) mandible first (ManF) which begins with condylectomy, then BSSO, and lastly LeFort I osteotomy. The greatest space between the maxillary and mandibular first molar in the interim positions was measured virtually to compare the two surgical sequences.

Findings: The vertical distance between the upper and lower teeth of ManF patients was significantly smaller than MaxF (mean, 2.99 mm, $P < 0.001$).
Conclusion: When occlusal cants are corrected by equally intruding one side and extruding the other side of the maxillary dentition, the interim position is more conducive to sequencing corrective surgery by performing condylectomy, then BSSO, followed by Le Fort I osteotomy.

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Computational fluid dynamic simulation of pharyngeal airway before and after mandibular setback surgery

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Background: The narrowing of the posterior airway space (PAS) after orthognathic surgery has received increasing attention in recent years, because PAS narrowing has been implicated in the development of obstructive sleep apnoea (OSA). There are few studies with computational fluid dynamics (CFD) for possibility of OSA caused by mandibular setback surgery.
Objective: This study aimed to evaluate the influence to the pharyngeal airway after mandibular setback surgery using CFD.
Methods: Eleven patients with mandibular prognathism who underwent bilateral sagittal split osteotomy for mandibular setback. Three-dimensional models of the upper airway were reconstructed from preoperative and postoperative computed tomography images. The three-dimensional models were simulated with computational fluid dynamics. Pressure drop and the narrowest cross-sectional area (minCSA) in the pharyngeal airway were calculated, and relationship between them was evaluated with nonlinear regression analysis.
Findings and Conclusion: In all cases, CSAs at the velopharynx were minCSAs. Pressure drop increased significantly and minCSA decreased significantly after surgery. The coefficient of determination (R^2) between pressure drop and minCSA was 0.959. The nonlinear regression equation between them was showed as pressure drop = 3.73 × minCSA-2.06. When minCSA was less than 1 cm^2, pressure drop increased greatly. According to the risk of potential airway compromise, surgeons should consider bimaxillary orthognathic surgery rather than mandibular setback surgery to prevent the development of iatrogenic OSA when correcting skeletal Class III patients. Present study gives a new perspective to treatment based on change of minCSA of the PAS following mandibular setback surgery.

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Perioperative evaluation and management of obstructive sleep apnoea after mandibular setback by sagittal split ramus osteotomy

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Background: Perioperative state of obstructive sleep apnoea (OSA) and optimal airway management after mandibular setback by bilateral sagittal split ramus osteotomy (BSSRO) is unknown.
Objectives: The aim of this study is evaluate respiratory conditions and our perioperative airway management after mandibular setback by BSSRO to patient with OSA.
Methods: The subject was a 31-year-old male who had skeletal Class III malocclusion and OSA (apnoea–hypopnoea index [AHI] 12.1, lowest SPO2 was 84%, BMI 33.4 kg/m^2, over jet −4 mm, over bite 5 mm). Respiratory and sleep states were measured during the night for six days after surgery using peripheral arterial tonometry (WatchPAT®; Itamar Medical Ltd, Israel). Patient was sat up in bed with 60 degrees after four days for airway management and stayed in intensive care unit during two nights after surgery with oxygen administration. Intermaxillary traction by elastics was started only during daytime from two days after surgery.
Findings and Conclusion: Airway obstruction was not found however PAT AHI (pAHI) was up to 12.7 after three days without oxygen administration. Rapid eye movement (REM) sleep was remarkably extended from three days until four days after surgery than another period. The pAHI was increased according to extension of REM sleep periods. Sleep and oxygen administration in the sitting position and without intermaxillary traction at over nights might be effective in the prevention of respiratory tract complications. Incidence of AHI and REM sleep periods might have relationship.

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Three-dimensional growth pattern of the rat mandible revealed by periodic live microcomputed tomography

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Objective: To evaluate the growth pattern of the Sprague-Dawley (SD) rat mandible in three-dimensional (3D) without sacrifice of the animal for a limited time period.
Design: Twenty SD rats were used for microcomputed tomography (micro-CT) scan from T0 (4 week) to T3 (16 week) for every 4 weeks. We reviewed and selected the reference point for the 3D spatial measurements. After 3D reconstruction of micro-CT images, we performed linear and angular measurements and superimposition of the 3D micro-CT models to evaluate the mandibular growth of rat.
Results: Each site-specific growth rate was observed as follows. In functional cranial analysis, the longitudinal growth of angular process was the greatest, it increased 184% of the size of T0

period, compared to other measurement; condyle (170%), coronoid (157%), body (130%), symphysis (128%) respectively. The height of condyle increased 161%, and coronoid and anterior alveolar area showed 151–140% increase in height respectively. In anterior posterior length, condyle, coronoid, gonion from anterior alveolar bone showed similar increase of 143–138%. The width of angular process (Go-Go) increased 135%, however, width of condylar process (Con-Con) increased 110%. By the superimposition of the models, we could observe this growth pattern that the mandible grew radially, and the width of lower border of ramus was widen.
Conclusions: We analysed the growth pattern of mandible in SD rat visually through the image superimposition in three dimensions and calculated the growth ratio of each part of mandible according to the time periods.

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Biomechanical evaluation of different plates osteosyntheses, for fixing sagittal split osteotomy in major mandibular advancements, with or without counterclockwise rotation

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Objective: The aim of this study was to assess the biomechanical stability of six different osteosynthesis, in major advancements after sagittal split osteotomy, simulating the masticatory forces by a three-point biomechanical test.
Methods: 60 polyurethane hemimandibles were assigned to two groups, containing six subdivisions each ($n = 5$). After 10 mm advancement of the distal segment (group 1) and 10 mm advancement combined with 20 degrees counterclockwise rotation (group 2), the bone segments were fixed by different osteosynthesis methods using 2.0 mm miniplates/screws: Subdivision A, one conventional straight miniplate; Subdivision B, two conventional straight miniplate; Subdivision C, one conventional sagittal miniplate; Subdivision D, one locking straight miniplate; Subdivision E, two locking straight miniplate; Subdivision F, one locking sagittal miniplate. The hemimandibles were loaded in compressive strength until 3 mm displacement occurred between segments vertically or horizontally.
Findings: In all cases, the fixations showed better performance in group 1 against group 2, with statistic signification in subdivions A,C,D. The use of 2 straight miniplates shows more resistant, followed by sagittal miniplates in both groups. However, in counterclockwise rotations, the use of two straight miniplates of conventional system showed no statistical significance against sagittal locking plate.
Conclusions: Two miniplates still remain as a form of fixation with less displacement. If surgeon opts to use only one miniplate, the sagittal miniplate must be preferred.

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Evaluation of obstructive sleep apnoea using peripheral arterial tonometry during perioperative period after removal of impacted third molar with dentofacial deformity in general anaesthesia

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Background: It is necessary to be careful for airway obstruction during perioperative period after oral and maxillofacial surgery with general anaesthesia.
Objectives: The purpose of this study is to evaluate obstructive sleep apnoea after removal of impacted third molar with dentofacial deformity in general anaesthesia.
Methods: Subjects in this study comprised of 8 patients (3 males, 5 females) with dentofacial deformity and impacted third molar. The mean age at surgery was 24 years (range, 15–44 years). Mean body mass index was 21.8 kg/m^2 (18.3–33.4). They were examined by polysomnography before orthognathic treatment. Respiratory disturbance index (RDI), apnoea–hypopnoea index (AHI), oxygen desaturation index (ODI), sleep state were measured using peripheral arterial tonometry over the night during 2 nights after surgery in general anaesthesia. These factors were compared between before and after surgery.
Findings: pAHI was increased in all patients at the day after surgery (T0) and one day after surgery (T1) together rather than before surgery. Five patients in pAHI, four patients in pRDI, four patients in ODI of T1 were increased rather than these of T0. Mean lowest SPO2 at T0 was 92.4% (90–97) and at T1 was 88.4% (73–95). Lowest SPO2 was under 80% in two patients at T1. Rapid eye movement (REM) sleep at T0 was 18.5% (0–40.9) and at T1 was 23.3% (3.7–38.8).
Conclusion: Worsening of respiratory condition and change of REM sleep periods were found after surgery.

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Adjunctive procedures in orthognathic surgery to enhance facial aesthetics

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Background: The main goal of orthognathic surgery is to correct dentofacial deformities and to restore occlusion. As the result of orthognathic patients should have a normal jaws function and improved facial aesthetics. Both high aesthetic expectations and correct occlusion have made orthognathic surgery a demanding procedure. This makes adjunctive simultaneous surgery a great need in these patients. We present our experience in performing different simultaneous adjunctive procedures with orthognathic surgery.
Methods: 135 patients who underwent simultaneous operation during the period of 2012–2016. Three-dimensional and conventional planning was performed for all patients to achieve correct position of jaws and good aesthetic projection of soft tissues. Ancillary procedures were planned simultaneously and were performed after jaws reposition. Orthognathic surgery was

combined with chin osteotomy (40%), rhinoplasty (20%), bilateral or unilateral zygoma osteotomy (20%), facial fat grafting (35%), submental liposuction (60%). All the patients expressed satisfaction with their postoperative results.
Conclusion: Patients, especially women, not only ask for good functional results, but also seek to obtain a good aesthetic facial outcome. Performing simultaneous operation allows us to solve jaw and facial aesthetic problems of the patients in one procedure. Advantages include one-time recovery, one general anaesthesia, economic benefits, good functional and aesthetic outcome.

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A comparison study between computer-aided design/computer-aided manufacturing surgical splints obtained by three-dimensional software 'TIMEUS' and two-dimensional surgical splints used in orthognathic surgery

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Objectives: In this study we compare the use of computer-aided design/computer-aided manufacturing (CAD/CAM) surgical splints designed by a three-dimensional (3D) software called TIMEUS and two-dimensional surgical splints made in the conventional articulator, in patients with facial deformities that underwent orthognathic surgery.
Methods: We selected 30 patients in a period of two years, between 2014 and 2015. We made a cone-beam computed tomography (CBCT) prior to the surgery and 6 months later. The type of splint and other data were recorded.
Results: The 3D software obtains the patient's images from the CBCT and serves as a matrix in which the surgical splints are made. We found that the use of this type of splints shortens the time of surgery and give us more accuracy in the osteotomies and movements made.
Conclusions: We recommend the use of 3D software and CAD/CAM surgical splints in this type of surgery, as they have demonstrated in our experience the good outcomes achieved.

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Contemporary orthognathic preparation for the orthognathic surgery: do we have to need the surgical wire for 4 weeks before the surgery?

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Background: In orthognathic surgery, traditionally, we know that the stability wire need to be prepared in at least 4 weeks before surgery, so does passive state of stability wire when the impression for surgical splint taken (generally, 1–2 weeks before surgery). Otherwise, recently, two-jaw surgery with minimal orthodontics or before the orthodontics is preferred. Even, two-jaw surgery without orthodontics is reported.
Objectives: We do a study about the clinical needs of the surgical wire for 4 weeks before the surgery and how it affects the postoperative stability.
Methods: We compared the surgical wire for 4 weeks before the surgery with other groups, which were cases with rectangular wire, nickel titanium and none (does not proceed orthodontics). We studied about 174 patients who underwent two-jaw surgery for correction of class III malocclusion at the Department of Oral and Maxillofacial Surgery, Pusan National Univ. Dental Hospital between November 2013 and July 2015. We compared two cephalograms between postoperative and 6–12 months after surgery about FH-palatal, FH-occlusal, FMA, SNA, SNB and so on in the lateral cephalograms.
Findings: Any groups do not have significant difference than other groups.
Conclusion: Four weeks period for stability does not offer a better result, we could drop the stability period which increase the treatment period and needless surgical wire-making course.

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Nine years follow-up after double-jaw surgery for skeletal class III malocclusion correction: a case report

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Background: Orthognathic surgery may be indicated to one-fourth Class III malocclusion patients at the completion of active growth. However, it presents some limitations due to the possibility of incomplete surgical success or of postsurgical relapse.
Objectives: This paper aims to present a nine years follow-up of a skeletal Class III 17-year-old male patient with midface deficiency, mandibular excess and face asymmetry who underwent double-jaw surgery with a maxillary advancement and mandibular repositioning.
Methods: The treatment initiated with presurgical orthodontic alignment and further LeFort I advancement and mandibular repositioning to correct mandibular asymmetry. Patient was followed through nine years, and facial, occlusal and cephalometric relationships were accessed.
Results: Facial and occlusal relationships were improved. Maxilla moved forward and mandible was repositioned. Intraorally, negative over jet was corrected and Class I occlusal relationship was achieved. The nine years follow-up showed the maintenance of facial and occlusal balance, agreeing with ANB angle values, pre (−4.6), post (1.99) and nine years after orthognathic surgery (2.5).
Conclusion: Double-jaw surgery seems to be a stable procedure to correct Class III skeletal malocclusions. However, some factors such as the amount of advancement and type of fixation appears to influence negatively the stability.

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Simultaneous modified Le Fort III/Le Fort I osteotomies: a treatment option for midface hypoplasia in nonsyndromic patients

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Background: Le Fort III osteotomy represents the main technique for midface hypoplasia correction in syndromal and non-syndromal patients in order to improve midface advancement and achieve better aesthetic and functional results.
Objectives: To present a treatment of a nonsyndromic male patient with severe midface hypoplasia, concave profile and Class III malocclusion treated with Le Fort III surgery in association with Le Fort I advancement osteotomy followed by mandibular repositioning.
Methods: The treatment initiated with presurgical orthodontic alignment and further orthognathic surgery with both Le Fort I and Le Fort III advancement and mandibular repositioning to correct mandibular asymmetry.
Results: The maxilla moved forward and downward and midface projection improved. The mandible anteroposterior relationship was maintained, the laterognathism was corrected and an orthognathic profile and Class I occlusal relationship were achieved.
Conclusions: Development of the simultaneous Le Fort III and Le Fort I osteotomy technique improved stability and facial aesthetics, increasing its indication for nonsyndromic skeletal Class III patients with severe midface deficiency.

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Management of dentofacial deformities and facial asymmetry with orthognathic surgery concomitant alloplastic temporomandibular joint replacement whit stock prosthesis

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Temporomandibular joint (TMJ) disorders or pathology and dentofacial deformities (DFD) commonly coexist. The TMJ pathology may be the causative factor of the jaw deformity or develop as a result of the jaw deformity. Total alloplastic replacement is indicated in TMJ ankylosis, congenital deformation or absence of the TMJ, other end-stage TMJ pathologies, etc.

Studies have shown that both custom and stock alloplastic TMJ replacements resulted in statistically significant improvement in pain level, jaw function, and incisal opening. The TMJ stock prosthesis has the advantage of having a more flexible adjustment and lower cost compared to custom made prosthesis, also has immediate placement availability.
Objective: The aim of this study is to describe stock alloplastic TMJ total replacement with orthognathic surgery in patients with DFD and concomitant facial asymmetry.
Methods: Two patients presenting with congenital and acquired disease DFD and facial asymmetry underwent orthognathic surgery with TMJ alloplastic replacement with stock prosthesis. All patients were planned by traditional model surgery.
Conclusions: The TMJ is the basis of the mandibular position, the function, occlusion and facial balance. Several authors have described the performance of orthognathic surgery in conjunction with TMJ alloplastic replacement with custom-made prosthesis, however, there is little literature on performing orthognathic surgery concomitant with stock prosthetic.

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Anterior segmental osteotomies: throwback to a timeless procedure

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Anterior segmental osteotomies (ASO) have been historically popular in orthognathic surgery due to their ability to move the anterior dentoalveolar segments in almost every conceivable direction. These are highly useful in clinical situations like bimaxillary protrusion, anterior open bite and skeletal class II or III situation with satisfactory posterior occlusion.

We retrospectively analysed the outcome in subjects treated by anterior maxillary/mandibular segmental osteotomies in our department in the past 12 years (October 2003–2015). 25 subjects were included in the study (17 females and 8 males) with a mean age of 21.3 years. 10 subjects underwent maxillary ASO, two underwent mandibular ASO whereas 13 subjects underwent both osteotomies. Clinical outcomes were assessed in terms of patients satisfaction regarding aesthetics and function postoperatively.

All patients were found to have attained satisfactory results with these minimally invasive procedures. The procedure was found to be effective, relatively safe and simple. We are presenting our surgical technique, results and encountered complications, if any.

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A case of maxillary protrusion and gummy smile treated by multi-segmental horseshoe le fort i osteotomy

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Background: We have treated maxillary protrusion by premolar extraction and multi-segmental Le Fort I osteotomy. However, in severe gummy smile which shows not only horizontal but vertical excess of the maxilla, an improvement by this method is insufficient due to a difficulty of superior repositioning of the maxilla. We treated such a patient by horseshoe Le Fort I osteotomy (HLFO) with multi-segmental alveolar osteotomy (MSAO), and got a good result.
Methods: An 18-year-old female came to an orthognathic clinic complaining maxillary protrusion and gummy smile. She was diagnosed indication of orthognathic surgery, and referred to our department. She showed over 7 mm gum exposure at smiling and class II malocclusion by maxillary protrusion. 7 mm upward repositioning and 5 mm setback at U1 was needed for the correction of gummy smile. Therefore, HLFO with MSAO was planned.
Findings and Conclusion: HLFO was performed following bilateral first premolars extraction and alveolar multi-segmental osteotomy. We could reposition the maxilla as we planned without

any complications. She got a good aesthetical improvement and occlusal stability more than 1 year after the operation. We need to pay enough attention to stability of bone fixation and blood supply. This surgical method seems to be effective for a maxillary protrusion with severe gummy smile patient.

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Comparison of condylar displacement between single-jaw and double-jaw surgery-first orthognathic surgery in mandibular prognathism

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Objectives: To compare the postoperative positional change of the condyle between single-and double-jaw orthognathic surgery via surgery-first approach (SFA) in mandibular prognathism with facial asymmetry.
Methods: A retrospective study of 18 mandibular prognathism (12 males, 6 females; mean age, 21 years) with facial asymmetry, who underwent orthognathic surgery via SFA, was conducted. Using serial three-dimensional facial computed tomography, which was taken preoperatively (T0), 2 weeks postoperatively (T1), and 6 months postoperatively (T2), skeletal landmarks in the maxilla and mandible were analysed.
Results: The condyle exhibited lateral bodily displacement and inward and inferior rotation 2 weeks after surgery in both single- and double-jaw groups. There is no significant difference between two groups. During the retention time, the condyle showed a medial return, but the double-jaw group showed more obvious returning movement than the single-jaw group ($P < 0.05$). Although the condyle positioned slightly medially in the single-jaw group and laterally in the double-jaw group, both groups showed no significant difference in the condylar position compared with preoperative position. Regarding rotational movement, both groups showed inward and inferior rotation 2 weeks after surgery. During retention time both groups rotated to its original condylar axis. However, at 6 months postoperatively, single-jaw group and double-jaw group still showed inward rotation compared with preoperative condylar axis. There is no statistical difference in two groups.
Conclusions: This study suggests that, the postoperative condylar positional changes are similar between the single-jaw and double-jaw orthognathic surgery via SFA.

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Prediction of mandibular position after bilateral sagittal split ramus osteotomy via surgery first approach in patients with mandibular prognathism

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Objectives: To predict the mandibular position after bilateral sagittal split ramus osteotomy (BSSRO) via surgery-first approach and following postoperative orthodontic treatment, and to compare it with actual mandibular position in patients with mandibular prognathism.
Methods: We evaluated 29 mandibular prognathic patients who underwent BSSRO using lateral cephalograms which were taken in preoperative, immediately after surgery and immediately after debonding. To predict mandibular position at post-treatment stage, we preoperatively measured the increase of vertical dimension on surgical occlusion and calculated mandibular forward movement due to the postoperative clockwise autorotation during postoperative orthodontic treatment.
Results: Actual mandibular forward movement (2.1 mm) was significantly greater than preoperatively predicted forward movement (0.9 mm; P 10 mm) or greater vertical dimension increase (>2 mm), even though there was no statistical difference.
Conclusions: This study suggested that postoperative mandibular rotational movement and additional relapse should be considered in surgery-first orthognathic surgery.

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Evaluation of obstructive sleep apnoea and sleep quality in patients with skeletal class III malocclusion

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Background: Maintenance of airway is most important perioperative management in orthognathic surgery. Obstructive sleep apnoea (OSA) of skeletal class III malocclusion is unknown, however OSA is severe risk of airway obstruction.
Objective: The aim of this study was to evaluate OSA and sleep quality in patients with skeletal class III.
Methods: Subjects in this study comprised 14 patients with skeletal class III who were treated orthognathic surgery at Kanazawa University Hospital, Kanazawa, Japan. They had no symptoms of OSA. The median age at the time of examination was 23 years (range, 17–31). Polysomnography was performed before treatment. Apnoea–hypopnoea index (AHI), lowest arterial oxygen saturation ($LoSpO_2$), cumulative percentage time at SpO_2 below 90% during the measurement (CT90), oxygen desaturation index (ODI), longest apnoea time (LAT) and sleep state were measured.
Findings: Median and range of measurements was follows: AHI, 0.4/h (0–12.1/h); $LoSpO_2$, 92% (85–95%); CT90, 0 min (0–0.9 min); ODI, 0.2/h (0–21.6/h); LAT, 0 s (0–25.9 s); rapid eye movement (REM) 20.1% (0–34.1%); NREM, 79.9% (65.9–100%); S1, 6.8% (2.2–22.6%); S2, 60.8% (54.1–70%); S3, 7.9% (0.6–19.3%); S4, 2.4 (0–10.4). One patient was diagnosed with mild OSA. AHI during REM 1.8 (0–21) was higher than AHI during NREM 0.2 (0–9.7).
Conclusions: We require attention to OSA in patients with Class III even without the symptoms of OSA and obstruction during REM sleep periods in perioperative orthognathic surgery.

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Duration of orthognathic treatment

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Background: One of the most important factors influencing patient's post-treatment satisfaction in orthognathic treatment is the accuracy and comprehension of information patient has received. For adult patients it is important to know the total duration of the treatment and particularly how long orthodontic treatment takes.
Objectives: The aim was to study the duration of orthognathic treatment conducted with conventional pre- and postsurgical orthodontic treatment phases.
Methods: Study material comprised files of 185 patients who had undergone orthognathic treatment at the Oral and Maxillofacial Unit, Tampere University Hospital, Finland between 2007 and 2014. Data was obtained on gender and age, duration of presurgical treatment (until operation), duration of postsurgical treatment (from operation until fixed orthodontic appliances were removed), information about orthodontic tooth extractions and type of surgery. Pretreatment digital cephalograms were used to study severity of malocclusion.
Findings: Average presurgical and postsurgical treatment durations were 26 months and 8 months, respectively. If orthodontic treatment included tooth extractions, duration of presurgical treatment was in the average 10 months longer ($P < 0.001$, linear regression). Age (range 17–70 years) or initial severity of malocclusion did not affect treatment time. Treatment duration was almost the same in each type of surgery (Le Fort I osteotomy 2.6 years, bilateral sagittal split osteotomy 2.8 years and bimaxillary osteotomy 2.8 years).
Conclusions: Orthodontic extractions have clinically important impact on the duration of orthognathic treatment. Initial severity of malocclusion, type of surgery, age or gender of patients does not seem to have an impact on treatment time.

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Audit at the Royal London Hospital to assess the proportion of orthognathic cases completed within an established time frame

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Background: Combined orthodontic and orthognathic treatments require team coordination due to the length and complexity of cases. However, this is often compounded by additional delays due to waiting lists for surgery and other complications. This results in potential emotional and physical distress to the patient. As clinicians, we should deliver efficient and safe care to our patients within a reasonable time frame to minimise adverse effects.
Objectives: The objectives of this audit are to identify causes for delays to orthognathic treatment and establish a pathway to minimise avoidably prolonged treatment times.
Methods: A retrospective case note review of data over 6 months of patients undergoing mixed orthodontic and orthognathic treatment. This audit looked at the total treatment time from new patient multidisciplinary assessment, through preoperative orthodontic treatment to orthognathic surgery and postoperative orthodontics. The end of treatment was classed as discharge after retention was provided.
Findings: Results found that in the majority of cases, the treatment was significantly longer than the established gold standard. This was due to several factors e.g. bed availability. In a small proportion, waiting list cancellations meant that patient treatment was accelerated and completed within the recommended timeframe.
Conclusion: A retrospective evaluation of the Royal London Hospital orthognathic service highlighted significant drawbacks within the patient pathway. Effective identification and management of patient and hospital factors can minimise these, thus enhancing treatment efficiency and minimising patient impacts. The success of changes implemented to enhance the service will be re-audited in a further 6 months time.

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Large maxillary advancement to treat a prognathic profile in an acromegalic patient with a narrow airway and a thin mandibular ramus

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Background: Acromegaly is a rare syndrome resulting from a chronic excess in the production of growth hormone, in most cases due to a pituitary adenoma, resulting in a disfiguring disease that reduces life expectancy because of cardiovascular and respiratory complications.
Objectives: The aim of this study is to report a case of a 50-year-old acromegalic male patient, whose clinical features include elongated body ends and nose, thickened skin and cheekbones, frontal bossing, severe prognathism, dental malocclusion and macroglossia.
Methods: The patient underwent surgical removal of the pituitary adenoma, and his growth hormone levels were normalised, however he still had masticatory complaints. To treat the prognatism was performed a orthognathic surgery using virtual planning software three-dimensional involving only a maxillary advancement of 15 mm.
Findings: It was observed that the patient had a reduced airway, common in patients with acromegaly. It was also observed the presence of a mandibular ramus purely with cortical bone and minimum thickness, making a mandibular surgery prone to mandible fractures and airway obstruction.
Conclusion: The treatment of maxillomandibular discrepancies in patients with acromegaly is not always possible to improve the aesthetics and function at the same time by dividing the surgical movements between the two jaws because the airway differences in these patients and individual factors related to bone structure. The patient was followed-up for 1 year without recurrences.

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The effect of orthognathic surgery polysomnography and apnoea/hypopnoea index in treatment planning

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Obstructive sleep apnoea syndrome (OSAS) is a serious health condition that affects 2–4% of the adult population and reduces quality of life. Polysomnography (PSG) with recording of respiratory variables is considered to be the gold standard for the diagnosis of OSAS. For the diagnosis of OSAS, five or more episodes of apnoea/hypopnoea per hour of sleep is necessary during sleep. An important aspect of orthognathic surgery is the changes on oropharyngeal airway caused by maxillary/mandibular movements. The aim of this study is to evaluate the relationship between the apnoea/hypopnoea index and PSG results with the degree of jaw deformity and its consequences in treatment planning of orthognathic surgery.

This pilot study was performed on patients undergoing orthognathic surgery in the Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, Ankara University. 19 patients who had diagnosed skeletal disorders and planned orthognathic surgery underwent PSG preoperatively. Also patients were evaluated by Epworth sleep scale. Cephalometric analysis was performed for each patient. Apnoea/hypopnoea index was seen between 5 and 15 in 6 of 17 patients with mandibular prognathism. One of the 17 patients had an index score more than 15. It is found to be below 5 in 10 of 17 patients. Apnoea hypopnoea index was observed more than 15 in 2 patients with mandibular retrognathism. Pharyngeal airway changes after orthognathic surgery. Apnoea/hypopnoea index should be considered in treatment planning of orthognathic surgery by making the decision of which jaw to move.

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Changes in the nasolabial angle associated with advance and maxillary impact surgery

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Objectives: The aim of this study is to determine changes that occur in the nasolabial angle (ANL) in patients who received Le Fort I advancement surgeries with or without maxillary impaction.
Methods: A cephalometric evaluation of McNamara was performed in 16 healthy Chilean patients after orthognathic surgeries. Only patients with pre- and postsurgery teleradiography were included in this study. The radiographs were standardised in head posture position, with olives and first tooth contact. Pre- and postsurgery images were on the same scale (1:1). A comparison was made between two types of surgeries: (1) forehead and maxillary impaction (eight patients); (2) pure maxillary advancement (eight patients). The efficiency of the ANL change in degrees was demonstrated. Cephalometric analysis was measured with Nemoceph 11 software, by a calibrated operator, between 2 and 4 weeks after surgery.
Findings: Maxillary movement showed that maxillary impaction and maxillary impaction surgery produced an average increase of 15.125°, while pure advancement determined an average increase of 8.625°. Thus, it was established that the maxillary impaction and advancement surgery is more efficient in the change of nasolabial angulation.
Conclusion: The objective of this study was to determine the most efficient maxillary movement to achieve changes in ANL. This is of paramount importance in surgical planning, because when considering these results, the clinician will be able to predict what kind of movement is convenient and how much the patient's soft profile may change after one or the other type of maxillary movement.

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Segmental maxillomandibular rotational advancement in obstructive sleep apnoea: a long-term follow-up

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Background: Maxillomandibular advancement (MMA) is a safe and highly effective treatment for obstructive sleep apnoea (OSA). MMA is one type of orthognathic surgery planned to maximise the forward movement of the maxillomandibular complex (MMC) and expand pharyngeal airway in OSA patients. Therefore, MMA may cause excessive maxillomandibular protrusion, especially on patients with thinner facial soft tissue.
Objective: To prevent unfavourable facial aesthetics after MMA while maintaining the maximal advancement of MMC, the authors perform segmental maxillomandibular rotational advancement (SMMRA) as the modification technique of the MMA.
Methods: SMMRA is combination with Le Fort I osteotomy, maxillary anterior segmental osteotomy to provide additive advancement of posterior maxilla using extracted premolar space and bilateral sagittal split osteotomy. MMC is undergoing counterclockwise rotation.
Findings and Conclusions: A 33-year-old male patient suffered from sleep disorder was referred to our hospital. He had body mass index of 23 kg/m^2 and mandibular retrognathism. Cephalometric X-ray showed mandibular retrusion and narrow pharyngeal airway. Polysomnography (PSG) indicated moderate OSA (apnoea–hypopnoea index [AHI] = 23/h; lowest SaO_2 = 80%). SMMRA combination with trapezoid mortised genioplasty was performed. Postoperative cephalometric X-ray showed that ANB improved 13–3°. Pogonion was advanced by 20 mm. Middle and lower pharyngeal airway increased by 8 mm and 10 mm, respectively. Postoperative PSG indicated drastic improvements (AHI = 1.7/h; lowest SaO_2 = 89%). Six-year follow-up will be presented. The patient's sleep condition, occlusion and aesthetic were stable 6 years after SMMRA. However further follow-up and management is recommended.

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Computed tomography evaluation with iohexol oral rinse in obstructive sleep apnoea

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Background: Observing the oropharyngeal soft tissue structures, including the tongue, soft palate, and uvula, helps to better understand the narrowed airway in obstructive sleep apnoea (OSA). However it is difficult to detect the border of their tongue and the soft tissues of the palate in computed tomography (CT), because the soft tissues was crowded in the oral cavity of patients with OSA, and density of their tongue and the soft tissues of the palate was similar in CT.
Objective: To detect the tongue and soft palate of OSA patient in CT, simple technique of CT evaluation with iohexol oral rinse was reported.
Methods: Before CT scanning the patient gargled 5–10 mL iohexol, 350 mg I/mL, for 1 min, and spit out the excessive contrast but to not clean it out of their throat until the CT was completed.
Findings and conclusion: CT evaluation with iohexol gargle could evaluate the form of tongue, border of tongue and palate, relationship of tongue and facial skeleton. It could be useful for reference data in OSA patient.

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Nonsurgical cosmetic procedures — review and management of complications

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Background: The popularity of nonsurgical cosmetic treatment has increased over the past 10 years – in particular that of dermal fillers and botulinum toxin. They offer cosmetic results previously only achievable by surgery at a reduced cost and shorter recovery time. There is little in the literature with regard to the range of possible complications from these elective procedures. There is no consensus on the management of complications that can arise.
Objectives: We present a case series of patients who suffered complications and propose guidelines for management.
Methods: The Medline, EMBASE and PubMed databases were searched for articles in the English language for management of complications from these cosmetic procedures. The case series features patients who attended the accident and emergency department with facial swelling.
Results: 37 articles were found describing complications and management strategies including reversing facial filler injections, incision and drainage and systemic medication. Most complications are associated with volume and technique, though some are related to the material used. The majority of unfavourable reactions are mild and temporary, such as bruising and postoperative oedema. No one article is a panacea for management. Evidence is anecdotal.
Conclusion: All procedures have the potential to cause complications. Following a literature review and clinical experience we propose guidelines for the management of these adverse events.

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Nasolabial angle changes after orthognathic maxillary repositioning

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Objective: The aim of this study was to determine whether changes in the nasolabial angle correlates to the maxillary movement after orthognathic surgery.
Methods: 40 patients (14 males and 26 females, mean age 24 ± 4) who underwent an orthognathic maxillary one jaw surgery (five patients) or two jaw surgery (35 patients). 12 patients were classified as skeletal class II and 28 patients as skeletal class III. Lateral cephalometric radiographs were taken preoperatively and postoperatively 2–24 months later. The cephalograms were traced. Changes in the nasolabial angle were calculated. The A point was used as an indicator for maxillary horizontal and vertical movement. The horizontal reference line was the Frankfort horizontal (FH) plane and the vertical reference plane was the line perpendicular to the FH plane passing through Nasale point.
Results: The mean maxillary horizontal movement depicted in changes in the A point was 2.98 ± 4.1 mm and the mean vertical movement was 0.5 ± 4.1 mm. The mean delta for the nasolabial angle was only $1.95 \pm 9.7^{\circ}$. No significant correlation was found between A point movement and changes in the nasolabial angle and the results did not reach the statistical significance of $P < 0.05$.
Conclusion: Nasolabial angle changes in orthognathic surgery do not correlate to maxillary movement.

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Inpatient stay following orthognathic surgery at the tufts medical center: a retrospective study

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Background: Inpatient care for orthognathic surgery is necessary to monitor their postoperative recovery. Research has indicated that demand for healthcare is exceeding supply in every industrialised nation. Increased knowledge of the factors affecting inpatient stay following orthognathic surgery will improve treatment planning and cost.
Objective: The purpose of this study is to investigate the factors affecting length of hospital stay after orthognathic surgery. Prior knowledge of factors contributing to increased hospital stays could give providers opportunity to mitigate their effects, reduce the cost to the patient and use of hospital resources.
Method: This retrospective cohort study patients was conducted in the Department of Oral Surgery at Tufts University School of Dental Medicine. Following institutional review board approval, we reviewed medical records of all patients who underwent Orthognathic Surgery in our Department in the past 10 years

(4/1/2005–4/1/2015). The dependent variable was length of hospital stay (LOS) in hours and the independent variables were age, gender, BMI, type of orthognathic surgery, amount of blood loss. Descriptive statistics were computed for all variables. Mann–Whitney *U* test and Spearman's correlation was applied to clinical variables and LOS.
Results: Medical records of 100 (54 females and 46 males) patients have been analysed. The mean length of hospital stay was 58 h. There correlation between LOS and age ($P = 0.315$), BMI ($P = 0.177$) and gender ($P = 0.142$) were not statistically significant.
Conclusions: This is an ongoing study and the preliminary results did not show any correlation between LOS and the variables listed above.

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Evaluation of bite force, lower jaw width and area, and masseter length before and after sagittal split ramus osteotomy in patients with mandibular prognathism

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Background: Occlusal force of the improvement or the surrounding hard tissue after jaw surgery, there are reports that allow morphological changes in the soft tissue. However, no studies have investigated whether improvement in bite force is associated with changes in any position.
Objectives: The purpose of this study was to examine how changes in occlusal force are associated with anatomical changes in the lower jaw after sagittal split ramus osteotomy (SSRO).
Methods: The subjects were 50 women who had been diagnosed with mandibular prognathism. All of them had undergone SSRO and 25 of them underwent Le Fort I osteotomy concomitantly. The bite force, occlusal area, and lower jaw branch, masseter and the lower jaw head length, was measured width, area, the angle, were measured preoperatively and at 1 year postoperatively, and the results were compared and analysed using statistical tests.
Findings and Conclusion: The increase in bite force at 1 year after surgery was associated with significant increases in lower jaw width ($P = 0.024$) and area ($P = 0.014$), length ($P = 0.02$) and area ($P < 0.001$) of the lower jaw head, and masseter length ($P = 0.042$). The improvement in occlusal force after SSRO observed in this study was significantly associated with increases in lower jaw width and area, lower jaw head length and area, and masseter length.

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Evaluation of maxillary sinus after Le Fort I osteotomy using different fixation materials

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Background: Although studies regarding postoperative stability and nerve disturbance after Le Fort I osteotomy has been reported, there has been no report that evaluated the effect of the maxillary sinus using various fixation materials.
Objectives: The purpose of this study was to evaluate the maxillary sinus and to predict the factors affected the postoperative sinus condition after Le Fort I osteotomy using different fixation materials.
Methods: The subjects consisted of 71 patients (21 males and 50 females, 142 sides) who underwent Le Fort I osteotomy with sagittal split ramus osteotomy. The rate of intact sinus area (the inside air area/the maxillary sinus bony area) was calculated using computed tomography. They were divided into the groups according to gender, preoperative diagnosis, plate fixation materials use or non-use of bone alternative material and compared statistically. Furthermore, factors to predict the rate of intact sinus area after 1 week and 1 year were examined statistically.
Findings and Conclusion: The rate of intact sinus area after 1 week was significantly correlated to age, anterioposterior movement amount, preoperative rate of the intact sinus area ($P < 0.0001$). The group used the bone alternative material was significantly lower than the group without it in the rate of intact sinus area after 1 year ($P = 0.0282$). The study suggest that the bone alternative material might be a cause of inflammation in the sinus after 1 year and age, anterioposterior movement amount, preoperative rate of the intact sinus area should be paid attention in Le Fort I osteotomy.

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Changes in the upper airway after orthognathic jaw surgery and maxillar mandibular as the origin of sleep related respiratory disorders

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Objective: Determinate volumetric dimensional changes in the upper way at the nasopharynx and oropharynx level, after bimaxillary orthognathic and monomaxilar. in patients class III skeletal deformity associated to sleep-related breathing disorders.
Methods: 19 adult patients (12 males, 7 females) average age 27 years, with class III skeletal deformity, suitable for orthognathic surgery: Le Fort I osteotomy of maxillary advancement of bilateral sagittal backward branch.

Cone-beam computed tomography was performed one week before the surgery and 3 months later, then, maxillofacial and otorhinolaryngologist clinical evaluation.
Conclusions: The preoperative maxillofacial-ENT evaluation indicated signs and symptoms of increased resistance of the upper airway: predisposition mild in nine (47.4%), moderate in seven (36.8%) and severe in one (5.3%). The clinical revaluation three

months after orthognathic surgery showed a change in the predispositions 23% of the patients submitted to bimaxillary surgery. 15% changed their resistance from moderate to mild and 8% severe to moderate. There is a tendency to increased volumetric dimension of the upper airways after orthognathic surgery in patients with class III skeletal dimorphism, mandibular prognathism and maxillary deficiency.

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Pre- and postsurgical evaluation of the position and stability over time of the base of tongue, hyoid bone and airway volume in skeletal class III patients submitted to orthognathic surgery

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Background: The purpose of this study is to examine changes in the stability of the volumetric capacity of the upper airway, the position of the base of the tongue and the hyoid bone in patients Class III treated with orthognathic surgery.
Methods: The reference measurements in air, base of the tongue and hyoid bone by using the program 5 INVIVO in a sample of 19 Class III patients treated with orthognathic surgery, in which the preoperative measurement (T0), four months postoperative (T1) and after eight months after surgery (T2) is done.
Results: An increasing trend higher volumetric capacity relating the different times shown a tendency to increase as the volume of air in T0 and T1 which remained at T2, postoperative retraction of the hyoid bone is presented with an advance T2 and a tongue base with recoil and decrease in T1 with a regression to the original position in T2.
Conclusions: In the treatment of orthognathic surgery in patients with class III there was a trend of increasing the volumetric capacity of the upper airway in T1 and a tendency to decreased volumetric capacity in T2, having direct relation to the change in the hyoid bone position with a previous, as the base of the tongue, which have a tendency to reset the initial position.

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Bilateral sagittal split osteotomy with splitter and separators, risk factors for complications

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Background: Bilateral sagittal split osteotomy (BSSO) is a widely used orthognathic surgical technique. It is generally considered the golden standard to treat mandibular deformity.
Objectives: This study investigated BSSO with splitter and separators. The occurrences of common complications and their risk factors are assessed.
Methods: BSSO was performed according to the Hunsuck modification with splitter and separator without the use of chisels. Retrospective analysis was performed of more than 250 patients. The incidences of common complications, including neurosensory disturbances of the lower lip (hypoaesthesia), bad split, postoperative infection, and removal of osteosynthesis material are reported. The patients' age, gender, and the presence of third molars were analysed as risk factors for complications.
Findings: BSSO with splitter and separators is associated with a low mean incidence of permanent hypoaesthesia of 9.9% per patient. Age was a significant risk factor for hypoaesthesia with marked differences between age groups (30 years, 15.2%). The incidence of bad split was 4.0% per patient. Intraoperative presence of third molars significantly increased the risk of bad split. Infection occurred in 15.1% of patients. Removal of bicortical screw osteosynthesis material because of symptoms was indicated in 4.9% of patients. No significant risk factors were recorded for infection or removal of osteosynthesis material.
Conclusion: BSSO with splitter and separators without the use of chisels is associated with a low risk of hypoaesthesia. Relevant risk factors for complications are age (hypoaesthesia) and the presence of third molars during surgery (bad split).

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The application of virtual orthognathic design in the treatment of dentomaxillofacial deformities

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Background: Dentomaxillofacial deformities are usually located in a three-dimensional space and present as structural abnormities of the jaw, while the traditional craniofacial modelling tends to focus on dental occlusions and does not directly reflect the movement of the jaw.
Objectives: This study was to explore the application of virtual orthognathic design in the treatment of dentomaxillofacial deformities.
Methods: Fifteen patients with dentomaxillofacial deformities were enrolled in this study. A digital craniomaxillofacial-dentition model was established by combining three-dimensional (3D) computed tomography (CT) and laser-scanned dentition models. Based on this composite model, surgical planning, simulations, and postoperative predictions were performed. Under the guidance of a 3D printed splint and guide, orthognathic surgeries and asymmetry corrections were performed. Clinical examinations were performed 3 months after surgery. Surgical accuracy was evaluated by comparing the postoperative CT 3D model with preoperative surgical planning.
Findings: All patients successfully underwent virtual surgical planning, splint and guide 3D printing, and orthognathic surgery. Facial symmetry was greatly improved after surgery. The mean deviation between the preoperative design and actual surgical results was less than 2 mm.
Conclusion: With preoperative planning, surgical simulation, and postoperative prediction, virtual orthognathic design demonstrates great value in improving the accuracy of orthognathic surgery and restoring facial symmetry. It is regarded as a valuable technique to improve the results and execution of this potentially complicated procedure.

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Reconstructive Surgery

Colour Doppler ultrasound in the assessment and mapping of vessels of the anterolateral thigh flap in the reconstruction of head and neck defects

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Background: Preoperative mapping and evaluation of the location, presence or absence of anterolateral thigh flap perforators with measuring the diameters and blood flow of vessels in donor and recipient sites by colour Doppler ultrasound techniques in patients who undergo microvascular free flap procedures for reconstruction of the head and neck, has been a great asset to the surgeon for planning the reconstruction technique, this article discusses the role of such ultrasound techniques.
Methods: 47 patients who have undergone reconstructive surgeries; preoperative ultrasound examination was done to the vessels and perforators. The suitability between the donor and recipient sites was assessed. Comparison between the existence of perforators on ultrasound and intraoperatively was done.
Results: 45 of the patients were found to have one or more perforators, 95.6% of the flaps have survived after follow-up, in total two flaps have failed, one flap was with complete necrosis, and the second one was with partial necrosis. 87.5% of the ultrasound detected perforators were confirmed intraoperatively to be present.

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Autogenous bone harvesting from iliac crest and symphysis for implant reconstruction

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Horizontal and vertical bone resorption may be seen after tooth loss in the maxilla and mandible. The deficient edentulous ridge may interfere with the insertion of implants of adequate length placed in the correct position and with the ideal inclination. The severe alveolar bone resorption or pneumatisation of the maxillary sinus makes it difficult to perform the conventional dental implantation procedure.

Functional implant-supported oral rehabilitation is increasingly being used as a restoration strategy for fully and partially edentulous patients, whenever sufficient bone volume is available. Implant-supported restoration is possible even in severely resorbed jaws using a reconstruction technique with bone augmentation that includes vascularised or nonvascularised bone grafting and tissue regeneration techniques. Standard donor sites for free autogenous bone-graft techniques are: the chin or ramus mandible, the iliac crest, the tibia and the calvaria.

Advantages of intraoral mandibular sources include easy access, low morbidity, short healing periods, minimal graft resorption, and maintenance of high bone density; side effects include possible postoperative sensory disturbances and discomfort. Calvaria and iliac crest donor areas are most commonly used in cases of extensive alveolar ridge augmentation. The iliac crest generally supplies large quantities of corticocancellous bone.

In this report, we present autogenous bone graft harvesting of 48 patients (40 iliac anterior crest, 8 symphysis) for facial reconstructive surgery.

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Stress and displacement of mandible reconstructed with fibular bone – a finite element analysis

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Background: Microvascular fibular graft is the treatment of choice for large-sized mandibular reconstructions. Cross-section of fibular segments is much smaller than that of the original mandible.
Objectives: To analyse and compare the stress and displacement distributions to a reconstructed mandible between fibular and same size bone block graft using finite element analysis (FEA).
Methods: Three-dimensional mandibular models were created from cone-beam computed tomography scans. The same length of bone blocks from original mandible (G1) and fibular (G2) were used for segmental reconstruction. Three 500 N forces were applied to the mandible as contralateral loading (CL), ipsilateral loading (IL) and anterior loading (AL). The von Mises stress and displacements were evaluated.
Findings: Maximum stress (MPa) and displacement (mm) distributed to the mandible for Group 1 and Group 2 were 446 MPa, 463 MPa and 9.59 mm and 9.92 mm respectively for AL; 585, 585 and 7.15, 7.40 for CL; 315, 330 and 5.58, 5.75 for IL. Maximum stress in grafted bone segment for G1 and G2 were 42 MPa and 318 MPa and displacement 7.42 and 7.46 mm for AL; 31 and 236 and 5.36 and 5.40 for CL; 296 and 274 and 4.77, 5.02 for IL.
Conclusions: Ranking of stress distribution to the mandible based on the FEA from high to low is CL, AL and IL. Ranking of displacement is AL, CL and IL. For the graft bone block alone, G1 and G2 were similar; however, the fibular group (G2) had much higher stress distribution than that of G1.

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Through-and-through cheek defects

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Objectives: Reconstruction of through-and-through cheek defects has always been difficult and remains a challenging aspect of facial plastic and reconstructive surgery. This involves two different anatomical and functional epithelial structures: the external face and intraoral lining. Several options have been reported with variable results.
Methods: In a first part we conducted a retrospective study of patients requiring reconstruction to provide both an inner and an outer lining for major full-thickness cheek defects. Data studied were: epidemiological (age, sex), clinical preoperative semiology, aetiologies (TNM classification), characteristics of the defect, surgical procedures and complications.
Findings: From January 2006 to January 2015, 15 patients with through-and-through cheek defects resulting from resection of

cheek tumour (93.3%), trauma or osteoradionecrosis underwent reconstruction. The age of patients ranged from 22 to 84 years (mean, 59.3 years). There were 10 males and 5 females. Mandibular involvement was found in eight patients. We reconstructed the cheek by four types of flaps: lingual, pectoralis major, latissimus dorsi and the fibula free flap.
Conclusion: Various surgical options have been described for repair of these conspicuous defects including reconstruction with the pectoralis major flap, radial fore-arm flap, latissimus dorsi flap, and anterolateral thigh flap. Double flaps have also been used. With the advancement of microsurgery, free flaps have become the first choice for the reconstruction of through-and-through oral and maxillofacial defects. Regardless of the method chosen, the optimal result will require correction of both functional and cosmetic abnormalities.

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Reconstruction of composite midfacial defects including maxilla by using fibula free flap

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Objective: The objective of this study was to evaluate the outcomes of using fibula free flap (FFF) in the reconstruction of midfacial defects including maxilla.
Methods: Six consecutive cases of midfacial reconstruction with the FFF were reviewed. All clinical data were analysed, including primary disease, type of operation, defect area, fibular bone length, the number of osteotomies, radiotherapy, and implant installation.
Results: Midfacial reconstruction was performed with the guidance of preoperative planning and using fibular osteotomy and positioning guide templates. The fibulas were osteotomised into two segments in five patients, and three segments in one patient. At surgery, the mean length of fibula bone was 75.75 mm. Four patients had dental implants placed after the reconstruction. Four patients received radiation therapy. In one case, the navigation surgery system was utilised with a special template technique. In addition, we also reconstruct the defect with fibula osteomyocutaneous flap flow-through from radial forearm free flap in computer-aided design/computer-aided manufacturing case. The overall success rate for six flaps was 100%.
Conclusion: This clinical study demonstrated that the fibula osteomyocutaneous flap is an ideal donor site in midfacial defect including maxilla reconstruction, because of its thickness, length, and bone uniformity, which makes ideal support for dental rehabilitation. The three dimensional model simulation and preoperative surgical planning are effective methods to refine reconstruction surgery, shorten the surgical time, and predict the outcome after operation.

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Fibular free flap stabilisation by using a zygomatic implant — a case report

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Background: With the zygomatic implants is dealt with edentulism in cases of very atrophic maxilla. They can also be used in cases of major bone defects in the upper jaw. They are placed through the mouth into the zygomatic bone body. Osseointegration shows a very high success rate.
Objectives: Defect of maxilla occurring after injury in a car accident, has been reconstructed using fibular free flap and titanium mesh. The distal end of the fibula was not in contact with bone tissue, was not fully stable and it is necessary to stabilise it in some way.
Methods: By accessing through the mouth, the zygomatic implant was placed passing through the distal end of the fibula and fixed in a zygomatic bone. Two more standard dental implants were placed in fibula in the same operative procedure. After four months the prosthetic treatment has been started.
Findings and Conclusion: Follow-up period was 10 months after the completion of prosthetic treatment. The appearance, and functions of swallowing and speech of the patient are good. He has fully returned to his professional obligations (lecturer at the university).

Zygomatic implant served as a great stabilising factor in this case, and it certainly can be used in complex reconstructions in the upper jaw.

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The value the buccal fat pad for the intraoral defect reconstruction

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Background: The buccal fat pad is a pedicled flap used mainly for the closure of oroantral communications, but it can also provide a valuable and reliable tool in the reconstruction of medium sized defects of the oral mucosa, proving favourable healing due to its vascularity.
Objectives: To present our experience regarding the applicability of this method in the plasty of defects located at different levels of the oral cavity.
Methods: We reviewed 25 cases of oral defects situated at the level of the hard palate (11 cases), buccal region (8 cases), soft palate (4 cases) and intermaxillary region (2 cases) following resection for benign or malignant tumours. In most of he cases was use only the buccal fat (21 cases) and in other 4 cases the buccal fat was used only for lining the intraoral defect, in combination with other flaps to reconstruct more complex defects.
Results: The mucosal lining was restored in all cases with complete healing occurring after 1 month, with minimal contraction. There were no residual fistulas and trismus did not develop in any of the patients. The facial soft tissues were not distorted as consequence.
Conclusions: The simplicity of this method, reduced surgery time, lack of distortion of the local tissues, the local harvest and absence of a second donor site, together with the overall good results in

restoring the oral lining, recommend this flap for the plasty of medium sized oral defects, even in complex one.

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Double external jugular vein – a rare anatomical variation and literature review

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Background: The external jugular vein is an important vessel of the head and neck. Clinically, the jugular veins are considered important vessels for ligations during neck dissections and for anastomosis during free tissue transfer for head and neck reconstruction. In addition, it may be used for assessing central venous pressure, haemodialysis and parenteral nutrition and also for venous access in emergency situations.

There are many reported anatomical variations in the superficial system of veins in the head and neck. This is due to the complex embryonic development of veins.

We describe an unusual variation of this anatomical structure and present a literature review.

Case report: A 39-year-old patient was diagnosed with squamous cell carcinoma (T4N1M0) in the left buccal sulcus. A wide local excision and a modified radical neck dissection was completed under general anaesthesia.

During the neck dissection, two parallel veins were identified superficial to the cervical fascia. Both veins followed a course lateral to sternocleidomastoid and penetrated the deep fascia inferiorly. These vessels were confirmed as a double external jugular vein.

Conclusion: Numerous anatomic variations of the external jugular vein have been reported in the literature. Awareness of such variants is important before any surgical interventions to the head and neck. A colour ultrasound Doppler can be useful to detect variations prior to microvascular reconstruction. This may not be cost effective to screen everyone however, it can be considered a useful adjunct.

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Surgical outcome of superficial parotidectomy on the treatment of pleomorphic adenoma

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Background: Pleomorphic adenoma considered as the most common benign tumour of the parotid gland. The most effective treatment for this lesion is a surgical excision. Superficial parotidectomy is considered to be gold standard for benign tumours localised in superficial parotid lobe but has higher complication rate.

Objective: The objective of this study was to analyse surgical outcome of superficial parotidectomy on the treatment of pleomorphic adenoma.

Methods: Clinical records on a 3-year period of 15 patients were analysed for surgical outcome characteristics.

Findings: On this review, tumour recurrence was found on one patient (6.67%), four patients (26.67%) with auricular numbness, three patients (20%) with facial nerve palsy, one patient (6.67%) with Frey's syndrome. The surgical complication was higher on the tumours with diameter >4 cm.

Conclusion: Superficial parotidectomy is favourable as surgical approach on pleomorphic adenoma localised in superficial parotid lobe in certain condition.

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A morphometric study of the hypoglossal and facial nerves for hypoglossal-facial nerve anastomosis

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Objectives: This study aimed to identify the relationship of hypoglossal and facial nerves among Sudanese people with emphasis on its surgical implications, particularly hypoglossal nerve (HGN)-facial nerve (FN) anastomosis.

Methods: 81 cadavers were dissected unilaterally and the distance between anatomical structures including the FN, the stylomastoid foramen (SMF) and the hypoglossal notch of the HN (where HGN crosses the lateral side of the external carotid artery) were recorded.

Results: The mean distance between the SMF and the hypoglossal notch of the HGN in specimens included in this study was 3.73 cm.

Conclusions: Surgical exposure and mobilisation of the HGN and FN can be performed easily given the surgeon is equipped with adequate anatomical knowledge and awareness of anatomical variations. The structural characteristics of the HGN are favourable for anastomosis with the FN, which may be regarded as the standard approach for HGN-FN anastomosis if its efficacy is confirmed by further controlled.

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Application of vacuum-assisted closure therapy and hyperbaric oxygen therapy for an exposed titanium plate after mandible reconstruction: a case report

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Background: In 1997, Argenta and Morykwas introduced negative pressure wound therapy to manage complicated wounds. Recently, some authors described this technique to manage complex wounds in the craniomaxillofacial region. We report a case of an 84-year-old woman with an exposed mandibular plate after reconstruction, which finally healed with combination therapy using vacuum-assisted closure (VAC) therapy and hyperbaric oxygen therapy (HBOT).

Objectives and Methods: The woman was diagnosed with carcinoma of the right buccal mucosa. During reconstruction after segmental excision of the mandible, a titanium plate was selected based on several risk factors. After the operation, the plate became exposed at the centre of the chin. A second surgery was deemed inappropriate because of her age, malnutrition and recurrent

aspiration pneumonia. Instead, combination therapy consisting of VAC therapy and HBOT was initiated, leading to epithelisation of the wound.
Findings and Conclusion: Adapt Barrier Rings® was effectively used to generate a stable negative pressure at the complicated craniofacial wound. A surgical or conservative approach is chosen as salvage treatment of an exposed plate. In this case, only conservative treatment involving combination therapy resulted in complete healing of the wound with plate exposure. This case highlights two important clinical issues: combination therapy was effective for an exposed mandibular plate, and a dressing technique using Adapt Barrier Rings enabled stable negative pressure in the craniofacial wound.

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Accuracy of 3D model printing compared with MSCT scan as maxillofacial surgical guidance

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Surgical planning is an essential part in reconstruction surgery, the use of three-dimensional (3D) models is becoming popular as surgical guidance and to support, there are many computer-aided design applications and 3D printers available. The concern from this technology advance is always patient safety.

Accuracy and precision is a benchmark that must be set high. Since there is no standard calibration for medical use, we compared commonly used 3D model fabrication in reconstruction surgery for accuracy and precision. Final results reveal high accuracy although not precisely same with control group. The 3D model could be considered as surgical guidance for maxillofacial reconstruction surgery.

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Complications of frontal reconstruction with alloplastic materials — a literature review

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Background: Among several bone substitutes which have been used for craniofacial reconstruction, known properties of alloplastic materials like no donor site morbidity, less operation time and complexity, and less probability of cross infection, transcend disadvantages of autograft, allograft and xenograft. Calcium-phosphate based materials are analogous of the inorganic bone matrix and because of osteoconductivity, good moldability and structural stability they are widely used for craniofacial defects. Although several matters indicate biocompatibility of calcium-phosphate based materials, but there are reports of foreign body reaction and seroma collection after craniofacial reconstruction using different cements like Norian CRS (Synthes-Stratec, Oberdorf, Switzerland), Mimix (Walter Lorenz Surgical, Jacksonville, FL) and Bone Source (Stryker Leibinger, Freiburg, Germany).
Objectives: To find the best alloplastic material for forehead reconstruction.
Methods: We reviewed on literatures that reported outcomes of calcium-phosphate cements after craniofacial reconstruction and concluded the results.
Findings and Conclusion: Complications after calcium-phosphate biomaterial application are divided into two category; immunologic reactions and non-immunologic events like infection, fragmentation, ejection and migration, etc. According to studies, some situations like proximity of the incision line to the surgical site, wound tension which results in wound dehiscence, previous radiation or experience of minor trauma at the site of surgery and biomaterial fracture are the probable reasons for complication after the use of these materials. It is wise to use calcium-phosphate based materials only in selected cases and long term follow-up is needed to observe its consequences.

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Correlation analysis of serum biochemical factors and vascular crisis of free tissue flap in oral and maxillofacial region

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Background: Reconstruction of oral and maxillofacial defects by using vascularised free flap become popular, but up to 5% patients suffered failure for thrombogenesis in the anastomosis vessels. The affection of biochemical factors to the vascular crisis is not clear.
Objective: To investigate the correlation between serum biochemical factors and survival rate of free flaps in oral and maxillofacial defects.
Methods: The medical records of patients who had undergone free flap for oral and maxillofacial reconstructions between January 2002 and April 2014 at the Stomatology Hospital Affiliated to Guangxi Medical University were reviewed retrospectively. Of the 799 patients who experienced free flap reconstructions, 64 free flaps in crisis — 46 free flaps were salvaged successfully and 18 were lost. 66 patients stratified sampling from the 735 patients without vascular crisis of free flap were selected as the control group. Preoperative routine serum biochemical parameters including albumin, globin, prealbumin, fibrinogen, PT, etc. was collected and statistic analysed by independent samples t test and binary logistic regression model to identify risk factors related with vascular crisis of free flap. $P < 0.05$ was considered statistically significant.
Findings: Independent samples t test result shows fibrinogen and albumin $P < 0.05$; binary logistic regression shows fibrinogen $P < 0.05$. It means that the effect of fibrinogen on the survival rates of free flap for oral and maxillofacial reconstructions was statistically significant.
Conclusions: Increased fibrinogen in serum may raise the risk of vascular crisis of free flap for oral and maxillofacial reconstructions.

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Use of the free lobulated and chimeric radial collateral artery perforator flaps to repair soft tissue defects of oral and maxillofacial

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Objectives: To explore the value of lobulated and (or) chimeric radial collateral artery perforator flap in repairing soft tissue defects of oral and maxillofacial.
Methods: A retrospective analysis was performed for 11 OSCC cases of free lobulated and (or) chimeric radial collateral artery perforator flap for immediately repairing of soft tissue defects after radial dissection operation between December 2014 and February 2016, including two lobulated flaps, six chimeric flaps and two lobulated-chimeric flaps. The lobulated flaps were harvested basing on separated skin perforators of radial collateral artery, the muscle flaps of chimeric flaps were harvested basing on the muscle perforators which enter into lateral head of the triceps muscle of arm.
Findings: All flaps survived completely. The size of flap ranged from 1 cm × 4 cm to 6 cm × 8 cm, and the thickness was 0.3–1.0 cm. The length of vessels pedicle was 9–14 cm. All cases were followed up 3–21 months (mean, 11 months). All flaps had desirable texture and appearance. Donor sites healed primarily with linear scars, and no sensory or movement loss was found in any of the patients.
Conclusion: The radial collateral artery possesses several skin and muscle perforators then make the lobulated and (or) chimeric radial collateral artery perforator flap be available. These novel styles of radial collateral artery perforator flap expanded the application scope and provided better results in the reconstruction of small and medium size soft tissue defects of oral and maxillofacial.

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Dental implants used to replace structures of the maxillofacial complex

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With advent of dental implants designed to replace missing teeth, it was possible to advance for use in other anatomical structures of the maxillofacial complex, often absent for birth defects, or mutilations by trauma and/or cancer.

In this case report will show a male patient, who had the left ear mutilated due to trauma caused by dog bite, and settling 3, 4 mm implants in the mastoid bone under general anaesthesia.

After 3 months performed conventional molding thereof for making a ear prosthesis, what made it possible replacement of the anatomical structure and even improved self esteem and social life of the patient.

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A fixation guide for the accurate insertion of fibular segments in mandibular reconstruction

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Background: Computer-aided design/computer-aided manufacturing (CAD/CAM) of cutting guides is now being used in mandibular reconstruction with fibular bone flaps. Improvements in guide design and accuracy are needed to increase the benefits to patients. Cutting guides have become popular, but fixation guides are rarely considered.
Objectives: The aim of this study was to determine whether using a fixation guide would contribute to better accuracy in mandibular reconstruction.
Methods: Mandibular segmental osteotomies and fibular reconstructions were performed using model surgery. Models were divided into two groups: without ($n = 13$) or with a fixation guide ($n = 13$). After reconstruction, the distances between reference points such as the condylion laterale (Cl), gonion, and mental tubercle (T), were measured and compared with the preoperative virtual plan. Deviations in final positions between the two groups were analysed.
Findings and Conclusion: The mean deviation was 2.61 mm (range 0.05–7.65 mm) in the group without a fixation guide, and 2.05 mm (range 0.07–8.52 mm) with a fixation guide. The overall results were significantly better when using a fixation guide ($P = 0.03$). Distances including the Cl reference points such as Cl–Cl ($P = 0.02$) and Cl–T ($P = 0.001$) were particularly improved.

Using a fixation guide together with a cutting guide makes mandibular reconstruction more accurate, particularly for positioning the Cl reference points. Therefore, when a CAD/CAM-produced cutting guide is used in preparing for surgery, it is recommended to use a fixation guide as well for more accuracy.

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Pneumosinus dilatans of frontal sinuses: cosmetic deformity treatment

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Pneumosinus dilatans of frontal sinuses is a rare entity that is documented only by a few reports. It is an abnormal expansion of the aerated frontal sinus. The expansion of the bone may be generalised or focal. It is not only an aesthetic problem but may also have functional consequences.

We present tow cases: the first one is about a 23-year-old female who had been referred to the maxillofacial and plastic unit in Sousse (Tunisia) complaining of a prominence on her right supraorbital region and forehead and the second one is a 22-year-old male. The cause was unknown for the two cases and there were functional problems only with the second one (cephalalgia without sinusitis).

Computed tomography scan showed a right front pneumosinus for the first case, a huge bilateral one for the second patient. The patients were operated, with exposition of the forehead through

a bicoronal incision. The anterior wall of the frontal sinus was removed, and was divided into segments that were then fixed in the desired position using a titanium mesh plate. Excellent results were obtained, and the patients had no complaints and were satisfied with there appearance.

Pneumosinus dilatans is an entity every plastic surgeon should be aware of because its treatment falls within the realm of craniofacial surgery. The aetiology remains unclear, and surgical management is directed toward surgical exploration of the sinus to ensure recontouring of the anterior table of the frontal sinus to correct any cosmetic deformity. Several authors have published different surgical techniques.

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Adipofascial anterolateral thigh flaps for reconstruction of maxillary defects with infratemporal fossa extension

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Objectives: Tumours of the posterior hard palate or maxilla tend to involve the infratemporal fossa. Resection of these tumours creates an ablative infrastructural maxillectomy along with an infratemporal fossa defect. The objective of this study was to ascertain the versatility of the adipofascial anterolateral thigh flap in the reconstruction of these defects.
Methods: The study period was from August 2010 till July 2015. Four patients were identified from the database who underwent adipofascial anterolateral thigh flap for reconstruction of infrastructural maxillectomy defects with infratemporal fossa extension.
Results: The pathology in the patients was adenoid cystic carcinoma ($n = 2$), ameloblastoma ($n = 1$) and squamous cell carcinoma ($n = 1$). The mean flap size was 150 cm^2. All the flaps were harvested based on a single perforator. All donor sites were closed primarily and there were no donor site related complications. All the flaps mucosalised by 6–8 weeks and on an average follow-up of 1 year all patients were taking a regular oral diet.
Conclusion: The adipofascial anterolateral thigh flap is an excellent option for maxillary defects with infratemporal fossa extension. The advantage of this flap is that on mucosalisation it provides a taut surface giving a stable support for the prosthesis, the obliteration of the infratemporal fossa ensures no postoperative trismus and there is minimal donor site morbidity.

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Inferior alveolar nerve regeneration with bifocal distraction osteogenesis in dogs

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Background: Bifocal distraction osteogenesis has been shown to be a reliable method for reconstructing segmental mandibular defects. However, there are few reports regarding the occurrence of inferior alveolar nerve regeneration during the process of distraction.
Objectives: We investigated the possibility of the inferior alveolar nerve regeneration after bifocal distraction osteogenesis procedure.
Methods: Using a bifocal distraction osteogenesis method, we produced a 10-mm mandibular defect, including a nerve defect, in each dogs and distracted using a transport disk at a rate of 1 mm/day. The regenerated inferior alveolar nerve was evaluated by histological examination, electrophysiologic analysis and retrograde transportation of horseradish peroxidase (HRP).
Findings and Conclusion: On histological examination, although consecutive nerves were observed in all areas, cellular nerve fascicles were seen, consistent with Wallerian degeneration at 3 and 6 months in the nerve connection area on the distal side of the transport disc. On electrophysiologic analysis, stable evoked potential measurements were obtained from the nerves at 6 months. At 3 and 6 months, HRP-labelled neurons were observed in the trigeminal ganglion. The number of HRP-labelled neurons in each section increased, while the cell body diameter of HRP-labelled neurons was reduced over time. We found that the inferior alveolar nerve after distraction osteogenesis successfully recovered until peripheral tissue began to function. Although our research is still at the stage of animal experiment, it is considered that it will be possible to apply this method in the future to humans who have the mandibular defects.

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Total and near-total lower lip reconstruction — 20 years experience

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Background: Reconstruction of total and near-total lower lip defects presents a formidable challenge for the reconstructive plastic surgeon. Many methods have been described, and each has its own advantages and disadvantages.
Objectives: Discussing the selection of techniques and reporting our experience of total or near-total lower lip reconstruction.
Methods: Over a 20-year period from January 1993 to December 2013, a total of 87 patients underwent total or near-total lower lip reconstruction. Bilateral Yu's flaps were used in 61 patients, double mental neurovascular V-Y island advancement flaps in 16 patients, bilateral Mutaf's techniques in four patients, and reconstruction with free radial forearm flaps in 6 other patients. Drooling rating scale and patient and observer scar assessment scale were used to evaluate oral competency and aesthetic outcomes.
Findings: All patients underwent single-stage total or near-total lower lip reconstruction successfully. There were no flap failures. Only one patient who accepted the bilateral Yu's flaps developed microstomia, having difficulty in wearing her dentures postoperatively. Oral competencies were well preserved in other patients, and aesthetic results were satisfactory.
Conclusion: Based on our experience, we recommend using the bilateral local techniques or free flap introduced in this article, according to the extent of defects and the patient's general condition, to achieve a personalised ideal reconstruction of the lower lip.

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Materialogical properties of bone grafting materials containing different ratio of calcium phosphate cement and beta-tricalcium phosphate

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Background: Calcium phosphate cement (CPC) is reported to have excellent biocompatibility and osteoconductivity. And it can be contoured to replace lost bone and restore its original shape. However, it is necessary to improve its slow resorption rate. Combining calcium phosphate cement and porous beta-tricalcium phosphate (β-TCP) may solve this problem.
Objectives: The purpose of this study was to create new bone grafting material containing different ratio of CPC and β-TCP and to examine its materialological properties.
Methods: A commercially available CPC (Cerapaste®: NGK Spark Plug Co. Ltd, Aichi, Japan) and porous β-TCP (Cerabeta®: NGK Spark Plug Co. Ltd, Aichi, Japan) were used for this study. Four testing materials with different mixing ratios of CPC and β-TCP (C0, C30, C50; mixing ratio of β-TCP was 0 wt%, 30 wt%, 50 wt% respectively) were constructed. We evaluated the basic properties of each material.
Findings: The setting time for the C30 was 15 ± 1.09 min and C50 was 18 ± 1.41 min, which is within the clinically acceptable range. As compared to group C0 (control), compressive strength decreased as the content of β-TCP increased, due to higher porosity. In a dipping examination to stain, stain reached at the inside of the sample immediately in C50. Therefore, the formation of the communication pore was suggested.
Conclusions: CPC mixed with β-TCP has good handling characteristics, sufficient porosity and strength.

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Nonvascularised fibular bone graft after vascular crisis – a compensate on the failure of vascularised fibular

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Objectives: To discuss the feasibility of preserving nonvascularised fibular bone grafts after the failure of vascularised free fibular flaps and clarify the key points.
Methods: Ten patients who had preserved nonvascularised fibular bone grafts after the vascular crisis of vascularised free fibular flaps were included in this study. All of these cases were performed in Peking University School and Hospital of Stomatology from 1 January 2010 to 31 December 2014. Segmental mandible resection was performed due to tumours and trauma, reconstructed with vascularised free fibular flaps simultaneously. After the first operation, vascular circulation could not be obtained again. Nonvascularised fibular bone grafts were kept to restore the function and the facial aesthetics. At this time, the soft tissue, which included muscle, fascia and marrow, should be removed as thoroughly as possible and rigid fixation was done. Then intraoral incision was closed by several layers and water-tight result should be gotten. Proper drainage was put and kept for a few days after operation accompanying with sufficient antibiotics.
Findings: Nonvascularised fibular bone grafts were preserved successfully without infection in all 10 cases. Follow-up results proved that all grafts have good combination with the residual mandible. The basic function and facial aesthetic results was kept and the patients were satisfied.
Conclusion: Nonvascularised fibular bone grafts can be preserved successfully to restore the segmental bone defect of mandible after the failure of vascularised free fibular flaps. Some special key points should be pay attention to get good result.

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Management of donor and recipient veins in the vascularised autogenous submandibular gland transfer

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Objective: To discuss the management and selection of donor and recipient veins in the transfer of vascularised autogenous submandibular gland (SMG).
Methods: The SMGs of 55 patients with severe keratoconjunctivitis were transferred to the temporal region by microsurgery. The secreted saliva was used as the substitute of tear. Donor and accepting-site vessels, vessels crisis and managements, survival of grafts were retrospectively analysed.
Results: Transplantation succeeded in 55 patients (58 eyes) and failed in 2. For donor veins, 42 were facial veins, 14 were venae comitantes of facial artery, 2 were veins near the duct. For recipient veins, 44 were superficial temporary veins, 7 were deep temporary veins and 7 were veins in the upper neck. For recipient vein, except superficial temporary vein, deep temporary vein is also a good selection. After surgery, 2/5 venous crisis cases were rescued by re-anastomosed. Technetium-99 m examination suggested that the 56 SMGs were survived, and the ducts were unobstructed. Follow up lasted for 6 months to 10 years, the symptoms of photophobia and anemophobia were alleviated, the symptoms of corneal xerosis disappeared. Good clinical efficacy was obtained after transplantation.
Conclusion: During SMGs transplantation, facial veins, venae comitantes of facial artery or vein near the duct can be used for donor vein. For recipient veins, except the superficial temporary veins as major, deep temporary veins or veins in the upper neck is also a section. Correct selection and microsurgical management of donor and recipient veins are keys to successful SMGs transplantation.

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Research and New Technologies

New strategy for benign parotid surgery

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Background: A bayonet-shaped incision called a Blair incision has been used widely for parotid grand surgery without reconstruction of the parotid-bed. However, this approach shows obvious cervical scar on the neck. Parotid gland surgery exposes patients to a variable risk of facial nerve palsy and gustatory sweating of the cheek (Frey syndrome).
Objectives: To achieve a better cosmetic result and preserve the facial nerve function. We used face-lift approach and the skin flap was elevated above superficial musculoaponeurotic system access to the parotid gland, then we performed continuous facial nerve monitoring provided by nerve integrity monitor (NIM) to avoid facial nerve complications.
Methods: We performed surgical treatment for the patient with Warthin's tumour at the deep lobe of parotid grand under general anaesthesia. The modified facelift incision was started from preauricular to infra-earlobe, and the retroauricular region then extended to postauricular hair parallel to the hairline. The skin flap was raised with subcutaneous fat prior to parotidectomy. The parotidectomy was performed with NIM® 3.0 and 2 detection channels were used with the electrodes placed into the orbicularis oculi and orbicularis oris muscles. We appropriately used a stimulation probe was used during surgery to explore the facial nerve branches.
Findings: There was no complication during this operation or after surgery including facial nerve palsy and Frey's syndrome. Also, the patient satisfied with the aesthetic outcome.
Conclusion: Using a combination of the face-lift approach and facial nerve identification with NIM represents a cosmetic and safe strategy for parotid gland surgery.

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Three-dimensional printing in oral and maxillofacial surgery

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Background: The use of three-dimensional printing (3D) application technology continues to shine in oral and maxillofacial surgery. Current applications of in maxillofacial surgery include trauma surgery, pathology induced defects, tissue engineering, complex temporomandibular joint reconstruction and correction of complicated facial asymmetry.
Objective: The aims of this study were to review the current methods of 3D printing in the literature and explore their application in oral and maxillofacial surgery.
Methods: A PubMed search was performed to review current methods of 3D printing within surgery and to look at their merits and pitfalls. Their use within facial surgery was then noted.
Findings: We found there were three types of technology mainly used in surgical 3D printing. The main use within facial surgery included 3D reconstruction planning, custom implants and novel tissue engineering.
Conclusion: 3D printing technology in surgery has advanced greatly since its infancy in 1994. Its use within maxillofacial surgery continues to show growth and exciting prospect.

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Predicting temporal artery biopsy results . . . offering insights into temporal arteritis

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Background: Besides a significant false negative rate, temporal artery biopsy has a small risk of significant complications including facial nerve injury, scalp necrosis and stroke. The procedure may be contraindicated by patient's wishes or bleeding diathesis.
Objectives: To study the incidence of biopsy-proven temporal arteritis in the population surrounding Chesterfield Royal Hospital, United Kingdom.
Methods: A retrospective review of 235 consecutive patients who underwent a temporal artery biopsy from 2009 to 2015. Study variables included age at diagnosis, gender, C-reactive protein, erythrocyte sedimentation rate (ESR) and alkaline phosphatase results prior to treatment.
Results: Among the 235 patients who underwent temporal artery biopsy, the mean age of those in the biopsy-positive group, 76.4 years (95% CI 73.8, 79.0), was higher than that of those in the biopsy-negative group, 70.4 (95% CI 69.0, 71.8). A logistic regression model showed there is a statistically significant increase in the odds of a positive temporal artery biopsy of 1.072487 (CI, 1.03045–1.116238) for every year increase of age, in addition to an odds increase of 1.022069 (CI 1.011327–1.032925) for every 1 mm/h increase in ESR.
Conclusions: Our results show there is a significant increase of likelihood of a positive temporal artery biopsy as the patient's age increases and the higher the value of ESR. Given a large enough sample, these results suggest that a scoring system may be created which can attempt to predict the likelihood of a positive temporal artery biopsy. This may be useful for patients in which temporal arteritis is suspected and biopsy is precluded.

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Cultured human periosteum-derived cells can differentiate into osteoblasts in a peroxisome proliferator-activated receptor gamma-mediated fashion via bone morphogenetic protein signalling

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Background: Peroxisome proliferator-activated receptor gamma (PPARγ) is very specific to adipogenic differentiation and is induced before transcriptional activation of most adipocyte genes. PPARγ is, therefore, well established as a prime regulator that stimulates adipogenesis in multipotent mesenchymal stem cells. However, the effects of PPARγ agonists on the differentiation of cultured osteoprecursor cells are still controversial.

Objectives: The purpose of this study was to examine whether BMP signalling is involved in the effects of PPARγ agonists on osteogenic phenotypes of cultured human periosteum-derived cells.
Methods: Transcriptional activity of Runt-related transcription factor 2, alkaline phosphatase (ALP) activity, mineralisation, quantitative reverse transcriptase-polymerase chain reaction, immunoblotting and immunocytochemical analysis of bone morphogenetic protein 2 were examined in the periosteum-derived osteoblasts treated with PPARγ agonist and/or dorsomorphin.
Findings and conclusion: Treatment with the PPARγ agonist caused increases in ALP activity and mineralisation in the periosteum-derived osteoblasts. In contrast, dorsomorphin markedly decreased ALP activity and mineralisation in the cells treated with PPARγ agonist. In addition, BMP-2 was strongly expressed in the periosteum-derived osteoblastic cells treated with PPARγ agonist. Our results suggest that the positive effects of a PPARγ agonist on the osteogenic phenotypes of cultured human periosteum-derived cells seem to be dependent on BMP signalling.

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Applied hypnotherapy in oral surgery

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Background: Nowadays, many people mistakenly believe that hypnosis in the medical field is something unusual, because of theatrical hypnosis or myths about it.
Objectives: Find out the use and effectiveness of hypnosis to reduce dental phobia and cause local anaesthesia effect during an oral surgery.
Methods: Having had a previous session of trance, hypnotic analgesia was performed using the tree metaphor, once the subject is in a medium trance the gloved hand technique is practiced to three patients.
Findings: Clinical hypnosis during surgical procedures, in the group of hypnotic analgesia combined with local anaesthesia, resulted in the diminish of the amount of local anaesthetic required, in average 1.39 cartridges of local anaesthesia, for each extraction of a dental organ, in comparison with the control group in which 2.86 cartridges of local anaesthesia were required for each extraction.
Conclusion: We often underestimate the anxiety, pain and phobia experienced by patients before and during dental procedures, the use of hypnotherapy can simplify the dental field environment by reducing the use of local anaesthetic. It is important to know all possible methods to provide the best clinical setting for patients.

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The use of TissuePatch™, a self-adhesive sealant film to prevent postoperative vascular leakage after thyroid surgery

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Background: Meticulous haemostasis is required during thyroid surgery to minimise the potentially devastating sequelae of postoperative bleeding. Its mainstay has been sound surgical technique and the use of haemostatic agents such as Surgicel®. TissuePatch™ is a self-adhesive, absorbable surgical sealant which has been used to minimise leakage in neurosurgery and thoracic surgery. We present a case series demonstrating its use in thyroid surgery.
Method: A retrospective case note review was conducted of all patients undergoing thyroid surgery under a single surgeon in whom TissuePatch™ was used. Patient demographics, nature of surgery and the type of patch were noted. Pre- and postoperative haemoglobin (Hb) levels, postoperative drain output and complications were recorded.
Results: 54 patients received the patch. 91% were female. 74.1% underwent hemithyroidectomies followed by total thyroidectomies (18.5%), thyroglossal cyst excision (5.6%) and isthmusectomy (1.9%). Patches were applied to thyroid poles, beds and cut ends of thyroid tissue. The mean preoperative Hb was 12.7 with a mean postoperative drop of 0.94. Length of hospital stay was 1.6 days. Drains were removed 1.25 postoperative days with an average drainage of 39.2 mL. No patients required blood transfusion or suffered postoperative haematoma.
Conclusion: We have found that the use of the TissuePatch™ was a safe adjunct to ensure an effective seal to potential sources of oozing or bleeding from the operative site. The single sided patch was particularly easy to handle and apply, adapting easily to vascular beds on which it was placed.

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Video telescopic operating microscope in craniomaxillofacial surgery

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Background: The most common needs for all surgical procedures are illumination, exposure and magnification. In such settings, the new compact exoscope system (VITOM® [video telescopic operating microscope]) helps in creating new opportunities to improve safety, accuracy, contort and ease.
Objectives: The aim of our study was to assess the VITOM system as a valid vision tool during craniomaxillofacial procedures. We also describe the applications of this system for surgical operations and discuss its advantages and pitfalls. It also allows the opportunity to gather intraoperative patient documentation giving great education possibilities at low cost.
Methods: We performed a surgical procedure of an orbital maxillary zygomatic fracture with the aid of VITOM, to provide

illumination and magnification of the surgical field (exoscope-controlled surgery).
Findings and Conclusion: The illumination of the surgical field was judged excellent by the surgical team. The surgeons had the opportunity to operate with an unprecedented magnified vision, which helped in reducing and fixing the fracture in the most desirable fashion. All the members of the operating theatre, including the anaesthesiologists and the rotating nurses, were able to follow each step of the operation as they were scrubbed in. We foresee that the VITOM technology for maxillofacial surgery may become a diffuse method and that its cost will be covered by gains in terms of surgical time, surgical outcome, and educational scopes.

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Pharyngeal airspace of asthmatic individuals and those suffering from obstructive sleep apnoea syndrome: study by cone-beam computed tomography

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The objective of the study was to comparatively evaluate the oropharyngeal space of patients with obstructive sleep apnoea (OSA) syndrome and asthma by means of cone-beam computed tomography images. The study was done with individuals with OSA and asthma ($n = 10$), with OSA and without asthma ($n = 6$), asthmatics without OSA ($n = 6$) and healthy individuals ($n = 25$). Cephalometric measurements were taken, as well as measurements of length, volume, sagittal area and minimum cross-sectional area; evaluation was made of the format and contour of the upper airway in three dimensions, with $P < 0.05$ being considered significant. The association of OSA and asthma substantially reduced the measurements of the upper airway in this subgroup of patients.

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Effect of novalgin, ibuprofen and therapeutic jaw exercises on patients with facial arthromyalgia

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Objectives: A diverse group of therapeutic modalities have been advocated for the management of chronic facial pain based on varying clinical opinions of the aetiology of this disorder. This study investigated the clinical efficacy of Novalgin, ibuprofen, and therapeutic jaw exercises in the treatment of facial arthromyalgia (temporomandibular joint pain dysfunction syndrome).
Methods: After obtaining informed consent, 30 patients were randomly assigned to one of the three treatment groups for a period of 4 weeks. Diagnoses were made largely on clinical findings. Pain was estimated with the visual analogue scale (VAS), McGill Pain Questionnaire (MPQ), and finally, the Verbal Rating Scale (VRS). Depression and anxiety were quantified with the Hospital Anxiety and Depression Scale (HAD). The Eastman Dental Hospital Facial Pain Proforma (EDPP) assessed the patients throughout the study.
Results: Generally there was no improvement found in patients following four weeks of treatment with either ibuprofen or therapeutic jaw exercises. On the other hand, Novalgin did produce a significant improvement in pain scores as measured by the VAS and VRS.
Conclusions: The present study indicates that Novalgin is, by far, more effective than therapeutic jaw exercises and the non-steroidal anti-inflammatory ibuprofen, in relieving chronic facial pain. This supports our hypothesis of pain production and indicates that 15-HPETE (15-hydroperoxyeicosatetraenoic acid) is an important algesic agent in chronic myofascial pain.

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The use of audit in the diagnosis of oral leishmaniasis

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Background: Oral leishmaniasis is a new diagnostic challenge both globally and nationally. Once thought to be a part of mucocutaneous leishmaniasis, oral leishmaniasis can be defined as a distinct form of leishmaniasis. We present the audit: "Oral leishmaniasis identification audit" in an attempt to improve the early diagnosis of oral leishmaniasis by dental practitioners.
Methods: Three hundred questionnaires were distributed of which 267 were returned. These included undergraduate students (90), postgraduate students (37) and junior and senior dental practitioners (140). Intervention was executed between the first and second audit cycle.
Results: Pre-audit questionnaires returned by dental practitioners (140/267) in particular highlighted both poor undergraduate and postgraduate training standards for oral leishmaniasis. There was a significant improvement in the early diagnosis of oral leishmaniasis between the first and second audit cycles (P value <0.05). The final audit cycle results showed a 33% rise in the early identification of oral leishmaniasis.
Conclusion: The early identification of oral leishmaniasis was significantly improved after the use of audit. 65% of patients were diagnosed within three months of initial presentation in the second audit compared to 32% in the first audit. Audit planning and implementation is a useful component in achieving optimum clinical standards. It has succeeded in improving the early diagnosis of oral leishmaniasis at National Ribat University Hospital. Both practitioners and patients were upgraded in knowledge regards leishmaniasis in general and oral leishmaniasis specifically in terms of diagnosis, prevention of spread and contraction and treatment.

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The presence of stromal fibroblasts affect on the collective cellular migration of tumour cells in ameloblastoma

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Background: Ameloblastoma is classified in several histological types, and all types present the collective cellular migration. It

is not clearly about the factor to result in variety of the invasive growth.
Objective: We elucidated the effect of the interaction between ameloblastoma cells and stromal fibroblasts on the collective cellular migration using double-layered collagen gel hemisphere (DL-CGH) culture.
Method: We performed DL-CGH culture using ameloblastoma cell lines (AM-1 derived from plexiform type, AM-3 derived from follicular type) expressed green fluorescence protein and fibroblasts cell line (HFF-2) expressed DsRED to evaluate the collective cellular migration of ameloblastoma cells with/without fibroblasts in the collagen gel.
Findings: Without fibroblasts, AM-3 (follicular type) invaded smoothly and collectively whereas AM-1 formed invasive processes positively remaining cell adhesion. In the presence of fibroblasts, the tumour cells formed invasive processes collectively and invaded more conspicuously, and it was particularly strong in AM-3. Moreover, fibroblasts were located at the tip of the invasive process which tumour cells formed, and it was predicted that fibroblasts induce the invasion of tumour cells. We found the proliferative form similar to histology of the follicular type ameloblastoma in the centre area of AM-3/HFF-2 co-cultivation.
Conclusions: We evaluated the effect of the interaction between tumour cells and fibroblasts on collective cellular migration of tumour cells by the DL-CGH culture. As a result, we found that different types of tumour cells show different invasion form, and the presence of fibroblasts affect on the form of collective cellular migration of ameloblastoma cells.

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Three-dimensional printing for high definition imaging

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Background: The production of dental restorations such as veneers and inlays using dental computer-aided design/computer-aided manufacturing systems marked the beginning of the first digital dental revolution several years ago. Further research and innovation led to new improving systems appearing in the market with great regularity and rapidity. In the field of oral and maxillofacial surgery, the issue of surgical planning and prosthesis manufacturing is currently dominated by subtractive machining technology, but recent advancements such as fused deposition modelling, stereolithography and inkjet printing have started to make an impact.
Objectives: The poster is aimed to discuss how three-dimensional (3D) models can be used very effectively in oral and maxillofacial surgery for multiple indications and in diverse clinical scenarios.
Methods: Comprehensive review of existing literature.
Conclusion: The highly complex structure of the skull necessitates significant levels of planning for associated surgical procedures. The use of 3D models in oral and maxillofacial surgery significantly improves clinical outcome predictability when compared to similar treatments without its use. It helps reduce the total operating time, the duration of general anaesthesia and wound exposure time. Prior to surgical reconstruction, the models allow for assessment of extensive traumatic and pathologic defects in all three-dimensions. They are also useful in the design and fabrication of custom prostheses, bone graft sizing and allow for manufacturing of scaffolds for bone regeneration. Successful incorporation of this technology for jaw bone regeneration using tissue engineering techniques offers exciting new prospects for the future.

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Changes of the masseter muscle thickness and masticatory efficiencies following injection of the Botox type A, 4-hexylresorcinol, silk fibroin on the masseter muscle of a rat

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The purpose of this study was to evaluate the changes of the masseter muscle thickness and the masticatory efficiency after Botox A, 4-hexylresorsinol, silk fibroin, mixture of 4HR and Botox A injection on the masseter muscle of rats.

Total 25 rats were used. All rats were 12 weeks and weighing 250–300 g. Five groups were developed for this experiment. Group 1: Botox 5 units, Group 2: 4HR, Group 3: Silk, Group 4: mixture of 4HR and Botox 2 unit, Group 5: saline. Every 0.1 cc solution were injected into the both masseter muscle of rats. Using ultrasonography, we measure the masseter muscle thickness before and after 10 days from injection. And we also measure the amount of feedings till 3 days before injection to 10 days after injection. Histologic analysis was performed.

The result from analysis of the amount of feeding, Group 1 shows the least feeding, and group 4 shows second least feeding. Group 2 and group 3 also showed transitional reduced feeding. The time for recovery was 10 days within both group 1 and group 4 equally. The changes of the thickness of masseter muscle were most thin in Group 4 and second most thin in Group 1. Group 2 and Group 3 also showed slightly reduced masseter muscle thickness.

The results show that combination of 4HR and Botox A (2 units) have similar effect with Botox A (5 units). The further evaluations were recommended for developing more appropriate concentrate of the mixture of Botox A and 4HR.

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Orbit segmentation by surface reconstruction with vertex screening

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Background: The dimensional quantifications of eye and orbit are demanding in (i) orbital trauma management and reconstruction (ii) design of orbital implant and fixation device, and (iii) assessment of the treatment outcome. However, segmentation of the orbit is challenging. It usually results in broken surfaces due to the thin orbital walls, large gaps, fissures and the spongy ethmoid bones. Currently, orbit segmentation is performed by slice-by-slice manual segmentation or interactive user guided interpolation. It is not only time consuming, but also inefficient, exhibits inter-operator variability and repeatability problems. Moreover, there is no validation on these methods so far.
Objectives: To develop a computational approach to the segmentation of orbits and to build reference orbit validation models with dried skulls and clinical CT images.

Methods: From the computed tomography (CT) scan of subjects, orbital bone segmentation using Hounsfield unit thresholding is firstly applied. Then automatic vertex screening is applied on the corresponding three-dimensional (3D) mesh models with our self-developed simulation program. The final segmentation is reconstructed from the selected vertices automatically which eliminates inter-operator variability problem. To enable validation of the proposed computational method, we developed validation models (3D printed) with dried skulls and clinical CT images (11 subjects). They are used as gold standard for the performance measures.
Findings and conclusion: Validations on the proposed algorithm were performed with the validation models and verified by experienced radiographer. The volume differences are less than 0.83%. Surface differences are within 0.3 mm of root mean square. Both differences are not clinically significant.

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An extra tablet for safety

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Background and Objective: This project proposes the introduction of a patient issued computer tablet for acute hospital admissions in oral and maxillofacial surgery, with the aim of keeping patients safe and informed throughout their stay.

Patients are admitted to hospital as a result of ill health; in the majority of acute cases this is an unexpected and unnerving experience. Though every effort is made to support and inform patients of their progress, through physiological processes associated with stress, information explained may not always be recalled. The result of this loss in communication may resurface as an inability to appropriately access services available as an inpatient. This may range from tasks such as summoning help, contacting relatives, requesting medication or nutritional support or using the restroom.
Proposed Intervention: The authors speculate the need for a patient specific welcome pack, in the form of a tablet computer. The prototype software platform would contain information pertinent to the patient's admission, such as current status, (e.g. awaiting investigation, senior review or effect of treatment) as well as details of overseeing staff, how to summon assistance, and local services available to them. The information would be displayed in a welcoming and normalising manner, with an option for headphones and auditory support.
Conclusion: We believe the introduction of an inpatient issued tablet computer to inform patients of their status and local hospital protocol, would be advantageous to their care, ultimately leading to a happier and safer stay in hospital.

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Sialic acid-binding immunoglobulin-like lectin-9 and monocyte chemoattractant protein-1 accelerate bone regeneration through altering macrophage polarity in the rat calvarial defects

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Background: Congenital and acquired cranial bone defects occur all over the world, of which treatment is challenging. Although the treatment using autografts or allografts is the main stream, those are limited because of donor site damage, insufficient sources or host rejection, infection, disease transmission. Recent studies suggest that macrophages are associated with bone healing, and especially the switching from the proinflammatory M1 macrophage to the anti-inflammatory M2 phenotype is a key element in successful bone regeneration. We previously indicated that the sialic acid-binding immunoglobulin-like lectin-9 (Siglec-9) and monocyte chemoattractant protein-1 (MCP-1) [Sig9/MCP-1] are capable of inducing M2, subsequently prevent bone destruction in the rheumatoid arthritis model. However, the roles of Sig9/MCP-1 in bone regeneration have been unclear.
Objectives: The development of novel materials for bone regeneration using Sig9/MCP-1.
Methods: 5 mm circular bone defects were prepared in rat calvarial bones, then Sig9/MCP-1 in collagen sponge was implanted. After 2 days or 6 weeks, immunostaining for M2 or computed tomography (CT) analysis was carried out. *In vitro*, rat bone marrow cells were induced to M2 by Sig9/MCP-1. The gene expressions of osteogenic markers were evaluated by quantitative polymerase chain reaction.
Findings and conclusion: In the CT analysis, new bone area in Sig9/MCP-1 was significantly larger. In immunohistological analysis, the accumulation of M2 in the bone defects was more increased in Sig9/MCP-1. *In vitro*, M2 induced by Sig9/MCP-1 expressed a variety of osteogenic marker genes. Taken together, it was suggested that Sig9/MCP-1 are promising candidates for bone regeneration.

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Smad4 in osteoclats reduce bone mass by inhibiting osteoclast differentiation

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Background: Bone is constantly resorbed and formed by coordinated actions of osteoclasts and osteoblasts. There are many factors that balance between bone formation and bone resorption, and transforming growth factor beta (TGF-β) and bone morphogenetic protein-2 (BMP-2), which is categorised in TGF-β superfamily, are also cytokine of those factors. Smad4 is a transcriptional factor and downstream of TGF-β and BMP pathway. Smad4 was reportedly played pivotal roles for mesenchymal stem cell migration and bone formation, however, roles of Smad4 on osteoclasts remain largely unknown.

Objectives: Objects of our study is to clarify the roles of Smad4 on osteoclasts.
Methods: Osteoclast specific Smad4 conditional knockout mice (CtskCre/+/Smad4f/f) and control littermates were necropsied. Bones were collected from female 8 weeks of age.
Findings: We found that osteoclast-specific Smad4 conditional knockout mice exhibited significant reduction of bone mass with elevated osteoclast formation compared to controls. TGF-β1 inhibits osteoclastogenesis *in vitro*. Expression of the Ctsk and NFATc1 was significantly inhibited, and Bcl6 and Irf8 was upregulated following stimulation of wild-type osteoclasts with TGF-β1. Bcl6 and Irf8 upregulation was significantly blocked in Smad4 cKO cells. Bcl6-deficient and Irf8-deficient cells were resistant to inhibition of osteoclastogenesis by TGF-β1. Inhibition of Prdm1, which is upstream of Bcl6 and Irf8, was abrogated in Smad4 cKO cells. When we generated osteoclast-specific Smad4/Prdm1 double knockout (DcKO: CtskCre/+/Smad4f/fPrdm1f/f) mice, we found that the significantly decreased bone mass seen in Smad4 cKO mice was reversed.

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Usefulness of new method using absorbable sealing materials and fibrin glue to wound of partial glossectomy

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Background: Polyglycolic acid (PGA) felt is a bioabsorbable suture reinforcement consisting of polyglycolide, and nonwoven fabric with some elasticity by the special manufacturing process. There are many methods to cover wound on partial glossectomy, for example, suture only and covering by other materials. But we experienced they were difficult to cover the wound for a given period of time or we were difficult to check the patients after surgery.
Methods: We report the new method of partial glossectomy for the patients with tongue cancer. This method is using PGA felt and fibrin glue. The subjects were 40 patients, aged 38–87 years with tongue cancer. In all cases we treated by partial glossectomy and covered wounds by new method. As compared, in 31 patients wounds were covered by artificial dermis, and in 24 patients suturing was performed. All of 95 patients were diagnosed squamous cell carcinoma, T1N0M0 or T2N0M0.
Results: The results of this study indicated this method was very useful after partial glossectomy. We covered the wounds of operation region for a long time, and avoided the indurations after operation and we were easy to check the progress of patients. This method was useful for prevention of postoperative bleeding, relief from postoperative pain, and reduction of postoperative scar contracture.
Conclusions: The new surgical treatment – using PGA felt and fibrin glue – for the patients with glossectomy is useful. In particularly, this method is very useful for postoperative scar constriction.

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Functional analysis of nectins in mouse submandibular glands

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Background: The epithelial cells are linked to each other by cell adhesion molecules that form cell–cell junctions, such as adherens junctions (AJs) and tight junctions (TJs). Functional deficiency of several cell adhesion molecules is associated with the onset of the inflammatory disease or histological abnormalities. However, the localisation of AJs components at the salivary glands is still remains elusive. In this study, we systematically investigated the expression and localisation of the AJs and TJs components, especially focused on the localisation and roles of nectin family members in the submandibular glands.
Methods: Expression and localisation of nectins and other components of AJs and TJs in the epithelium of the submandibular glands was examined by immunohistochemistry by comparing with the nectin-1-knockout mice. We measured the protein components of saliva, such as amylase, for functional analysis of submandibular glands.
Results: E-cadherin was observed throughout the plasma membrane of the luminal cells. Nectin-1, nectin-2, nectin-3 and afadin were localised at the apical side of the lateral plasma membrane, presumably at the AJs, of the luminal cells. Although nectin-1-knockout submandibular glands were morphologically diminished, there is no significant alteration of the localisation of AJs and TJs molecules in nectin-1-knockout submandibular glands. The expression level of amylase in the nectin-1-knockout submandibular glands was lower than that of wild-type.
Conclusion: Our results suggest that nectins are involved in the maintenance and development of the salivary glands.

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The osteogenic potential of recombinant human bone morphogenetic protein-9 compared to recombinant human bone morphogenetic protein-2 for bone regeneration

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Background: Recently recombinant human bone morphogenetic protein-9 (rhBMP-9) has been characterised as one of the most osteogenic growth factors amongst the 15 human BMPs.
Objectives: The aim of the present study was to investigate its osteopromotive potential versus rhBMP-2 utilising both *in vitro* and *in vivo* models.
Methods: First, osteogenic potential of ST2 bone marrow cells seeded onto (1) control; (2) rhBMP-2 low (10 ng/mL); (3) rhBMP-2 high (100 ng/mL); (4) rhBMP-9 low (10 ng/mL); and (5) rhBMP-9 high (100 ng/mL) onto porcine collagen membranes or deproteinised bovine bone mineral (DBBM) were investigated. Furthermore, calvarial defect assays were performed in rabbits with loaded with rhBMP-2 and rhBMP-9 at both low (5 μg) and high (20 μg) per defect loaded with DBBM particles and

investigated for new bone formation via micro-CT and histomorphometry.
Findings and Conclusion: It was first observed that rhBMP-9 high significantly increased alkaline phosphatase (ALP) activity (five-fold increase) and alizarin red staining (3-fold increase) when compared to rhBMP-2. In addition, real-time polymerase chain reaction results of collagen1a1, osteocalcin and ALP demonstrated similar up-regulations consistently favouring rhBMP-9. The results from the animal model demonstrated that rhBMP-9 significantly promoted new bone formation as assessed by microcomputed tomography and histomorphometry. rhBMP-9 significantly induced higher bone-inducing cell activity *in vitro* and new bone formation *in vivo* when compared to rhBMP-2. Furthermore, lower doses of rhBMP-9 could be utilised when compared to rhBMP-2 to reach a similar bone-inducing response (10× *in vitro*, and 4× *in vivo*). These results indicate that rhBMP-9 may be a suitable growth factor for future bone regenerative procedures.

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Clinical evaluations of complete autologous fibrin glue, produced by the CryoSeal® FS System, and polyglycolic acid sheets as wound coverings after oral surgery

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Background: The CryoSeal® FS System has been recently introduced as an automated device for the production of complete fibrin glue from autologous plasma, rather than from pool allogeneic or cattle blood, to prevent viral infection and allergic reaction.
Objectives: We evaluated the effectiveness of complete autologous fibrin glue and polyglycolic acid (PGA) sheet wound coverings in mucosa defect oral surgery.
Methods: Postoperative pain, scar contracture, ingestion, tongue dyskinesia, and postoperative bleeding were evaluated in 12 patients who underwent oral (including the tongue) mucosa excision, and received a PGA sheet and an autologous fibrin glue covering. They were compared with 12 patients who received a PGA sheet and commercial allogeneic fibrin glue.
Findings and Conclusion: All cases in the complete autologous fibrin glue group demonstrated good wound healing without complications such as local infection or incomplete cure. All evaluated clinical measures in this group were similar or superior to the commercial allogeneic fibrin glue group.

Coagulation and adhesion quality achieved with this method was comparable to that with a PGA sheet and commercial fibrin glue. Covering oral surgery wounds with complete autologous fibrin glue produced by an automated device was convenient, safe, and reduced the risk of viral infection and allergic reaction associated with conventional techniques.

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In vivo biodegradation of magnesium alloys screws in rabbit tibia: influence on bone healing

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Background: Bioresorbable metal alloys are frequently studied in present time. Magnesium alloys show the most suitable mechanical, corrosion and biologic properties, even for eventual use in orofacial skeletal fixation.
Objectives: Aim of this *in vivo* study was to evaluate degradation of screws from degradable magnesium alloy and evaluate the bone healing and bone quality after insertion of magnesium alloy compared to controlled group.
Methods: Study includes 16 rabbits, randomly divided into two groups. A screw was placed into each artificially drilled bone defect in the tibia (group A received screws from magnesium alloy, group B as a control group received Titanium screws). Animals were euthanised in 4 weeks' interval, then underwent microfocus computed tomography scanning and bone samples with screws were histologically examined.
Findings and Conclusions: At the point 16 weeks the magnesium alloy screws were resorbed. Bone healing around screws in group A showed initial inflammation with minimum foreign body granulomas. Magnesium alloy showed acceptable biologic properties.

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In vitro investigation on the mechanism of spleen tyrosine kinase-nuclear factor kappa B signalling inducing cyclooxygenase-2 up-regulation in cancer pain caused by oral cancer associated macrophage

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Background: The mechanism of oral cancer related pain is still unclear.
Objectives: To explore the mechanism of cyclooxygenase-2 (COX-2) up-regulation in oral cancers associated macrophage via molecular biology techniques and primary culture of murine macrophage; and find a new way for cancer pain control.
Methods: Murine macrophage was induced by M-CSF and Cal27 conditional medium. Purity of the macrophage was detected by CD68 immunofluorescence staining. Inhibitors of spleen tyrosine kinase (Syk) and nuclear factor kappa B (NFκB) were adopted to inhibit these pathways. Real-time polymerase chain reaction and western blot was adopted to detect the alterations on COX-2 and pathway related proteins.
Findings and Conclusion: All the induced cells specifically express CD68. Cal27 conditional medium could significantly induce COX-2 expression ($P < 0.001$). Inhibition of Syk pathway attenuated the phosphorylation of NFκB-P65 and reduce COX-2 expression ($P < 0.01$); and inhibition of NFκB pathway had no effects on Syk phosphorylation but significantly inhibit COX-2 up-regulation ($P < 0.01$). Syk-NFκB is responsible for COX-2 overexpression in oral cancer associated macrophages. Targeting

this pathway might be a new way for oral cancer related cancer pain control.

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Three-dimensional printing of anthropomorphic phantoms for medical imaging and radiation therapy applications

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Background and Objectives: In healthcare, objects that to a greater or lesser extent resemble the human body or any of its parts are often known as phantoms. Imaging phantoms, for example, are widely used to provide a ground truth for testing of imaging devices, registration algorithms, segmentation algorithms, reconstruction techniques, and to assess image quality, without needing to expose humans to radiation. Commercially available phantoms are commonly manufactured in generic forms and do not resemble real patients, which can make it difficult to extrapolate the performance of an imaging system in a phantom to a patient. More human-like phantoms are still sought. In this presentation we report on the feasibility of using patient-specific three-dimensional (3D) printed phantoms for the assessment of X-ray images of the airway space and lungs.
Methods: A total of two phantoms were 3D printed using an anonymised computed tomography (CT) scan of a patient with cancer in the lung area and the upper airway of a healthy female subject. We investigated the similarity of CT images of the phantom with the patient images. In order to determine the spatial accuracy of the printed "soft tissue", "bone", "airways" and "blood vessels/outer lung structure", and "tumours", a surface comparison was performed between the virtual 3D models obtained from the phantom and the virtual 3D models used for printing.
Findings and Conclusions: This study demonstrated that the dimensional accuracy of the two printed phantoms was high and therefore such models can be used for wide range of ex vivo applications.

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Outcomes with ambulatory anaesthesia delivered in an oral and maxillofacial surgery training program

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Background: Oral and maxillofacial surgeons (OMFS) in the United States have the ability to provide intravenous anaesthesia while simultaneously performing the surgical procedure in a clinic setting.
Objectives: The objective of this study is to examine the anaesthesia techniques utilised in an OMFS program and assess both intra- and postoperative adverse events and/or complications.
Methods: Trainees in the OMFS program at the University of Minnesota will perform intravenous anaesthesia and demographics, medications, and intra- and postoperative complications information are collected. The patient is asked to fill out a survey 2 and 14 days after with questions about his/her postoperative condition and complications experienced.
Findings: Of the patients sedated, mean age of patient is 24.8 years old who had no to mild systemic medical conditions. All patients received midazolam during the sedation with an average dose of 4.01 mg. Most patients (87.65%) received fentanyl with an average dose of 46.20 mcg. Propofol (42% with mean dose of 57.65 mg) and/or ketamine (60.5% with a mean dose of 27.14 mg) were used. The only reported adverse events intra and postoperatively by the surgeon was nausea and vomiting. To date, patients have not reported complications.
Conclusion: There is a variety of intravenous anaesthesia techniques being delivered by OMFS residents. There appears to be very little to no intraoperative nor acute postoperative complications associated with providing intravenous anaesthesia while performing surgical procedure simultaneously by the same provider. This may be associated to the patient risk assessment and selection process for safe delivery of intravenous anaesthesia prior to the procedure.

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Retrograde endodontic treatment in patients receiving high dose antiresorptive medication – an alternative treatment to surgical removal due to apical periodontitis in orthograde endodontic treated teeth

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Background: Root resection and retrograde root filling on an endodontic treated tooth is a well-documented treatment. Oral surgery and/or periapical infection has been regarded a possible risk factor for precipitating osteonecrosis of the jaws in patients on antiresorptive treatment (ART). The possible effect of periapical surgery and/or the possible risk has not yet been described in the literature.
Objectives: Present three patients on high-dose ART receiving root resection due to apical periodontitis as an alternative to surgical removal.
Methods: Case series, short-term follow-up. Medical history, clinical and radiological findings, surgery procedure and images are presented.
Findings: Three patients referred for apical periodontitis where previous orthograde endodontic treatment had a negative outcome. The patients signed an informed consent. During local anaesthesia apicoectomy and retrograde root filling with zinc oxide eugenol was performed. All patients received prophylactic antibiotic, Amoxicillin 500 mg + clavulanic acid 125 mg × 3 starting one day preoperative and seven days postoperative. The patients were examined clinical and radiographically at one, three and six months postoperatively.
Conclusions: Patients on high-dose ART with apical periodontitis are usually having revision of orthograde root canal filling or surgically removal. Retrograde root resection might be a possibility, which may save the tooth. So far we treated three patients with successful healing. There is a need to perform a larger systematic study.

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Pin1 and Par14 prolyl isomerase inhibitors block oral cancer cell proliferation

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Background: A central common signalling mechanism in activations of heterogeneous oncogenic pathways are often largely cause of ineffectiveness against cancer treatment. One of them is proline-directed phosphorylation, and phosphorylated proteins are controlled by a single proline isomerase: Pin1. Pin1 regulates cell cycle progression, and has been reported as a regulator of p53 in genotoxic response. In human cancer, Pin1 is overactivated and it promotes cancer and cancer stem cells by disrupting the balance of oncogenes and tumour suppressors.
Objectives: Since Pin1 inhibitor would be expected to block cell proliferation, the objectives of this study are to identify such inhibitors.
Methods: We screened a chemical compound library for molecules that inhibited human Pin1 PPIase activity *in vitro*. We found a set of compounds that inhibited Pin1 PPIase activity *in vitro* with low μM IC50s and inhibited the growth of oral cancer cell lines.
Findings: Among the inhibitors, PiB, had the least nonspecific toxicity.
Conclusion: These results suggest that Pin1 inhibitors could be used as a novel type of anticancer drug that acts by blocking cell cycle progression.

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Effect on surface character and mechanical property of unsintered hydroxyapatite/poly-L-lactic acid material by ultraviolet treatment

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Background: Materials fabricated with unsintered hydroxyapatite/poly-L-lactic acid (uHA/PLLA) exhibit hydrophobic. This hydrophilicity limits the ability of cells or tissues to adhere to the surface of the material and thereby prevents the materials from exhibiting effective biological activity.
Objectives: In this study, we examined the effects of ultraviolet (UV) treatment on the hydrophobicity of uHA/PLLA.
Methods: The plate and membrane contained a 40 wt% fraction of raw uHA particles in PLLA (uHA/PLLA; Super-FIXSORB-MX; Takiron Co. Ltd., Osaka, Japan). Materials were treated with UV light (172 nm wavelength, 13 mW/cm^2) for 8 min; control materials were not treated. The hydrophilic properties were evaluated by measuring the contact angle after dropping the water on the material surface. Bending strength was measured by the three-point bending test. Evaluating cell attachment ability, cells were seeded in six-well tissue plates. The treated and untreated membranes were placed in the wells 2 h after seeding. Attachment of cells was determined based on crystal violet assays.
Findings and Conclusion: The contact angle of UV-treated uHA/PLLA was significantly reduced compared with that of untreated uHA/PLLA. However, there were no differences in mechanical strength. Notably, the ability of cells to adhere to UV-treated uHA/PLLA was significantly increased compared with that of untreated uHA/PLLA. These findings demonstrated that UV irradiation of uHA/PLLA was improved the surface hydrophilicity without changing the mechanical strength of the material; thus, UV treatment of uHA/PLLA may facilitate the use of this material in biomedical applications.

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Third molar position on panoramic radiographs and its location perioperatively

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Background: The Pell and Gregory and Winter classifications in panoramic radiographs are routinely used to determine the position of third molars and to plan surgical procedures.
Objectives: This study aimed to relate the position of upper and lower third molars evaluated by panoramic radiographs using the Pell and Gregory and Winter classifications to their position during extraction surgery.
Methods: The placement of 123 upper and lower third molars was assessed radiographically and perioperatively. The data were tabulated and the association of variables was tested by the Kappa (κ) index for an error probability of 5%.
Findings: By comparing the correlation between the position on the radiographs and perioperatively, it was observed that for the lower third molars, using the Pell and Gregory classification in relation to the mandibular, and cervical versus the occlusal plane of the second molar and the Winter classification, agreement was acceptable ($\kappa = 0.54$, $\kappa = 0.49$, $\kappa = 0.41$ respectively), and statistically significant ($P < 0$).
Conclusion: Even with an acceptable degree of agreement between the position of third molars on panoramic radiographs using the Pell and Gregory and Winter classifications and perioperatively, the possibility of error in evaluating the spatial position exists. The difficulty of the procedure may be underestimated or surgically overestimated, leading to the need for changes in the surgical plan during the procedure.

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High-fat diet and progression of temporomandibular joint osteoarthritis in mice

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Background: Obesity is a risk factor for osteoarthritis even in non-weight-bearing joints. However, the effects of body-fat factors on progression of temporomandibular joint (TMJ) osteoarthritis have not been investigated. In the current study, TMJ osteoarthritis was experimentally induced with discectomy in mice and compared based on a normal or a high-fat diet.
Objectives: We examined association of high-fat diet with progression of TMJ osteoarthritis in mice.
Methods: Male C57BL/6j mice at four weeks of age were placed on a normal diet or high-fat diet. Body weight and blood glucose of all the mice were recorded every month. At 12 weeks of age, unilateral discs of TMJ were removed under the stereomicroscope.

At 16 weeks post-discectomy, the animals were killed and TMJ were taken out en bloc. TMJ osteoarthritis was evaluated by cartilage histology. The experimental procedures and protocol were approved by the University Ethical Committee.
Findings: TMJ of mice fed the high-fat diet showed increased osteoarthritis degeneration compared to mice fed the normal diet. High-fat diet group significantly gained weight more than the normal diet group. There were hyperglycosemia during feeding period in the high-fat diet group. Articular cartilage degeneration was seen in both groups. Articular cartilage thickness became thinner in the high-fat diet group than in the normal diet group. The high-fat diet group tended to exhibit prominent disturbance of chondrocytes and reduction of Safranin-O staining.
Conclusion: These results suggest that the obesity induced by high-fat diet increases the severity of cartilage degeneration in the TMJ osteoarthritis model.

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Comparative analysis of regenerative potential of dental pulp and dental follicle derived stem cells cultured on polycaprolactone scaffolds for bone tissue engineering approaches

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Background and Objectives: Effects of dental pulp (DPSC) and dental follicle (DFSC) derived stem cells on bone regeneration are in focus of maxillofacial tissue engineering due to elimination of donor site morbidity and promising osteogenic profile. In this study, we aimed to compare the osteogenic potential of DPSC and DFSCs on nano mesh containing (nmPCL) and plain (PCL) polycaprolactone scaffolds *in vitro*.
Methods: DPSCs and DFSCs were osteogenically differentiated on PCL and nmPCL scaffolds and four groups were examined for cell proliferation and type I collagen formation rates after 2 weeks of culture. Following immunofluorescence labelling, Non-parametric (Kruskal Wallis) and multiple comparison tests were used to compare the four groups.
Findings: Among all groups, mean cell counts on scaffolds ranged from 30.8 to 82.6 cells/0.0915 mm^2, and total collagen formation ranged from 2.79% to 17.9%. DFSC and nmPCL complex showed significantly higher cell counts ($P < 0.01$) and collagen formation rates ($P < 0.01$) in comparison to other groups.
Conclusion: DFSC/nmPCL group is found to show superior properties on cell proliferation and bone matrix formation. This complex is a promising tool for maxillofacial tissue engineering applications.

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Evaluation of user impressions, micromorphological bone surface properties and material attrition by three generations of osteotomy methods

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Background: Ultrasonic-driven osteotomy is associated with a safe processing method and has broadened the daily used armamentarium of maxillofacial surgeons. As further development, sonic-based osteotomy method was newly introduced.
Objectives: To analyse user impressions micromorphological bone changes and material attrition by sound-, ultrasound and conventionally driven osteotomy.
Methods: In fresh bovine ribs conventional – (Lindemann-drill H254E, Brasseler GmbH and Co. KG, Lemgo, Germany), sound – (saw SFS 101 Brasseler GmbH and Co. KG, Lemgo, Germany) and ultrasound (saw OT7S-4, Piezosurgery, Mectron Medical Technology, Carasco, Italy) guided osteotomies were performed by novice (N) and expert (E) practitioners with different irrigation volumes. Bone surfaces were analysed by (environmental) scanning electron microscopy. Energy dispersive spectroscopy was carried out to detect possible material attrition.
Findings: Sonic system was significantly slowest with worst noise impact subjectively (N: 2.9, E: 3.2) and objectively (92.9 dB; SD 7.1). However, both user groups improved significantly in a second run (N: 7.9, E: 7.6). Bone structure was mostly preserved after sonic and ultrasonic assisted preparation. By contrast, using the conventional technique showed significant changes especially with regard to the cancellous layer of the bone with incorporation of abundant bone debris. None of the tested treatment procedures resulted in relevant attrition of drill materials.
Conclusion: The practitioners had a promising experience with ultrasonic and specially the sonic system. In contrast to conventional osteotomy, osseous micromorphology was mostly preserved by sonic and the piezoelectric method. This could have a positive effect on bone healing and osseointegration and should be investigated in future studies.

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Multi-criteria based evaluation of treatment design options for large polymethylmethacrylate-based skull reconstruction: finite element analysis study of six cases

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Background: Currently cranioplasty treatment planning involves several steps. It starts with three-dimensional tomographic imaging of the trauma site followed by computer modelling of the corresponding implant. Besides biological factors, fixation device arrangement and osteotomy geometry influence the quality and stability of the cranial implant assembly.
Objectives: In this study 6 preoperative designs for polymethylmethacrylate-based reconstructions of cranial defects were evaluated for their mechanical robustness using finite element analysis.

Methods: Clinical experience and engineering principles were employed to create multiple plan options, which were subsequently computationally analysed for mechanically relevant parameters under 50 N loads: stress, strain and deformation in various components of the assembly. The factors assessed were: defect size, location and shape.
Findings: The major variable in the cranioplasty assembly design was the arrangement of the fixation plates. An additional study variable introduced was the location of the 50 N load within the implant area. It was found that in smaller defects, it was simpler to design a symmetric distribution of plates and under limited variability in load location it was possible to design an optimal for expected loads. However, for very large defects with complex shapes, the variability in the load locations introduces complications in intuitively design the optimal.
Conclusion: The study shows that it can be beneficial to incorporate multi-design computational analyses to decide upon the most optimal plan for a clinical case.

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Enhancing the University College London Hospital enhanced recovery program in head and neck oncology—is there an app for that?

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Background: The enhanced recovery after surgery program (ERAS) has been shown to be a powerful platform to improve patient experience and outcomes. This process aims to educate patients and health care providers on their milestones, tracks compliance with ERAS care processes and generates reports for quality improvement. As in any quality improvement initiative data recording tools are essential to measure and improve performance.
Objectives and Methods: The authors aimed to streamline the implementation of ERAS pathway and design a bespoke program suitable for the scope of practice and patient population. We developed and evaluated a digital application installed on a tablet device that was utilised to collect ERAS related data.
Results and Conclusions: Generally, the app worked effectively in collecting perioperative information for patients having free flap surgery. Distortions in milestones and inaccuracy in calculating compliance in current version of the app were highlighted. Both the accuracy and flexibility of the care pathway in information recording can be improved by multiple measures. Compliance with the care pathway and the outcome of patients varied significantly in the patient sample. The authors will discuss the challenges and solutions in the ERAS pathway and associated human and technological factors.

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Effect of tetanus-diphtheria vaccine on immune response to hepatitis B vaccine in healthy individuals with insufficient immune response

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Background: Hepatitis B virus (HBV) fails to produce appropriate immune responses in some healthy individuals; thus, different strategies have been adopted to promote immune responses. The current study aimed at evaluating the efficacy of HBV vaccine co-administered with tetanus-diphtheria (Td) vaccine compared with HBV vaccine in healthy individuals through measuring hepatitis B surface antibody (HBsAb) levels.
Methods: This was a randomised controlled clinical trial, which was implemented in Isfahan, Isfahan Province (Iran) in 2013. 140 healthy individuals, whose HBsAb titres were less than 10 IU/L were recruited. The subjects were randomly assigned to either in intervention or control trials. The control group received 40 μg of recombinant HBV vaccines intramuscularly injected at 0, 1, and 6 months; however, the intervention group was simultaneously vaccinated by Td with the first dose of HBV vaccine. HBV antibody levels (titre) were measured before the vaccination and 6 months after the last vaccination.
Results: Antibody titres of the subjects in the intervention and control groups increased from 5.07 ± 2.9 IU/L to 744.45 ± 353.07 IU/L and from 4.45 ± 3.4 IU/L to 589.94 ± 353 IU/L, respectively (both $P < 0.001$). Also, the mean difference of antibody titre was significantly different between the two groups ($P = 0.011$).
Conclusion: Td vaccination can be applied as a feasible approach to promote efficient and persistent immunity in healthy individuals with insufficient HBsAb titres.

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Experimental miniature swine for facial nerve reconstructive research using dental pulp cells

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Background: The authors previously have reported that nerve guide with dental pulp cells (DPCs) promote facial nerve regeneration in rats.[1,2] Whereas the validation of animal model closely related to humans is needed in translational research. Objective: In order to develop the facial nerve reconstructive research with DPCs in miniature pigs, a harvesting procedure of the DPCs, and the surgical anatomy of the sural nerve of miniature pigs were investigated.
Methods: (1) Two mandibular deciduous incisors (Di1 and Di2) were extracted in miniature pigs. DPCs were harvested by a previously reported method for preparing periodontal ligament cells. (2) The sural nerve was dissected in cadavers and anaesthetised miniature pigs.
Findings and conclusions: In this procedure, $9.8 \pm 2.5 \times 105$ DPCs were obtained from Di1 and Di2. The sural nerve was found to branch from the sciatic nerve under the biceps femoris

muscle and run along the dorsal saphenous vein. The sural nerve innervated no muscles and tissues in the leg. The sural nerve (14.5 ± 0.5 cm) was obtained from between the sciatic nerve and peripheral branches in miniature pigs. The numbers of myelinated fibres of sural nerve was 2639 ± 622. In conclude, DPCs could be obtained form swine teeth, and the sural nerve could be an autologous nerve graft donor with no functional defect in miniature pigs.

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Positive sentinel lymph nodes biopsy on promotion of cancer metastasis: a negligent effect?

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Traditionally, the paradigm of most cancer metastasis was interpreted as an orderly spread pattern from the primary tumour to the sentinel lymph nodes (SLNs). Sentinel lymph nodes biopsy (SLNB) have long been considered to be the standard of care for malignancy staging and treatment guidance. However, in the process of SLNB, the early anchored tumour foci in the regional or distant sites were potentially wakened or unwittingly provided with more "seeds" and/or "soil" from the "perturbed" SLNs. Moreover, when we removed the tumour positive SLNs, the angiogenesis inhibition of distant metastasis dormancy foci would be attenuated by the termination of antiangiogenic ECM proteins releasing from the tumour foci in SLNs.

We present hypothesis that the tumour positive SLNB risks promoting cancer metastasis. To testify, animal studies are warranted to evaluate metastasis effects of tumour positive SLNs resection. Moreover, prospective cohort study or random clinical controlled trials are absolutely necessary. The potent correlation between positive SLNB and the consequent metastasis is negligent but fatal, verification of the phenomenon and exploration of the mechanism are essential to take steps to offset the iatrogenic complication.

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Biothermal plasma system: an advanced technique for preparation of barrier membrane and bone-graft replacing material

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Background: Sticky bone (SB) and the platelet-rich fibrin (PRF) were developed as an advanced form of platelet-rich plasma to eliminate xenografts (such as bovine thrombin) and allografts which are mainly used as a source of growth factors for tissue regeneration and also as a substitute for commercially available barrier-membranes and grafts in guided-tissue regeneration (GTR) treatment. However, the PRF membrane is resorbed within two weeks at implantation sites; therefore, it can barely maintain sufficient space for bone regeneration.
Objectives: Testing of the usefulness on the new optimised heating system (with/without using of microwave and ultrasound) for producing of fully autologous barrier membrane and replacing bone-graft material.
Methods: The biodegradability of a new material was microscopically examined *in vitro* by treatment with plasmin at 37 °C and *in vivo* by subcutaneous implantation in Wistar rats.
Results: The biothermal plasma (BTP) material appeared plasmin-resistant and stable for 30 days *in vitro* and it functioned as excellent scaffolding material for periosteal cells *in vitro*. In animal implantation studies, BTP material was observed at least for 35 days post implantation *in vivo* while the control PRF was completely resorbed within 10 days.
Conclusion: These findings suggest that BTP materials possess longer rate of biodegradation without sacrificing its biocompatibility and that BTP material could easily be prepared friendly from a clinical perspective and widely applied as a barrier membrane and/or for replacing bone graft materials in the GTR treatment and in other types of oral surgeries.

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Effect of platelet-rich fibrin in healing socket using cone beam compute tomography analysis

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Background: Platelet-rich fibrin (PRF) has been recognized as a reservoir of growth factors which facilitates wound healing.
Objectives: To evaluate the effect of PRF in healing socket using cone-beam computed tomography (CBCT) analysis.
Methods: 32 extraction sockets from 19 participants were included in this study. Sockets in one group were filled with PRF by random assignment while those in control group were filled with blood clot. Afterwards, CBCT scanning was taken at T1 (1–2 weeks), T2 (4 weeks) and T3 (12 weeks). Bone density was measured using ITK-SNAP software. Changes in alveolar bone height and width postextraction defined as AL, PL, AB, PB, WA and WP distances were monitored using superimposition of three-dimensional models obtained from GOM Inspect program. Statistical analysis was performed using *t* test and repeated measure analysis of variance. The level of statistical significance was set at 0.05.
Findings: Bone density was not significant difference between groups at all times and it significantly increased from T1 to T2 only in PRF group. Alveolar bone dimension revealed comparable between groups at all times, except AL. Dimensional changes over time demonstrated a stable bone width in PRF and stable bone height in control group.
Conclusions: Bone density was not statistically significant difference, but it showed more intense in PRF group. No obvious bone dimensional changes were detected between groups, but PRF group demonstrated superiority in maintaining bone width. How-

ever, a larger sample size may be required in order to yield an accurate result.

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Psychological evaluation of the patient treated for skeletal disharmony of the jaws corrected with orthognathic surgery: an assessment tool

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Background: The motivation for orthognathic surgery can vary from functional corrections to aesthetics improvement. There is a high prevalence of psychological disturbances in patient's seeking aesthetic alteration through plastic surgery. Currently, the Oral Surgeons are limited in the psychological assessment of orthognathic patient due to lack of a validated system for psychological analysis.
Objective: Our goal was to develop a patient reported survey to assess patient's perspective about their appearance prior to and after the surgery.
Methods: The survey was developed at Tufts University School of Dental Medicine. Face validity was established by incorporating questions from validated instruments in measuring dimensions of personality like Big Five Personality, Dr. Cash's Body image and Rosenberg Self-Esteem Scale. A discussion group of the investigators including a psychologist was convened to enumerate the list of possible questions aimed at assessing the patient's perspective about their appearance prior to and after orthognathic surgery. Item relevance was established by consensus of the investigators and 35 questions were included in the preliminary version of the survey instrument. Finally a focus group session was conducted with 4 patients who recently underwent orthognathic surgery to seek patients opinion.
Results: Participants were generally in agreement that the questionnaire tool was appropriate. Responses varied based on anecdotal experiences and individual level of experience with statistics and survey design.
Conclusion: This newly validated survey tool specifically for orthognathic surgery can be used to evaluate patients' perception about their appearance prior to and after surgery.

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A simple, novel and safe alternative to the drain stitch

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Background: The use of drains is widespread after oral and maxillofacial surgery (OMFS). Standard practice to secure these drains involves a silk suture fastened to skin, laddered along the drain and tied. This time-honoured technique works well, but is user-dependent, usually requires an assistant and carries the risk of sharps injuries. We describe the first use of a novel device in OMFS, based on the concept of the Chinese finger trap, to simplify drain fixation.
Methods: A prospective analysis was conducted, across multiple centres, of all patients in which this device was used to secure drainage tubes. All patients were under the care of a single surgeon. Patients were monitored for postoperative drain complications. Staff using the device were surveyed regarding its acceptability and ease of use.
Findings: The device was used in 46 patients over a five-year study period in a range of head and neck procedures. No patient suffered early drain loss or displacement. No patient found the device unacceptable. Junior staff, after a period of training, found the device simple to apply and remove.
Discussion: The range of sizes of this device allows fixation of numerous drain sizes, nasogastric tubes and urinary catheters. This flexibility may allow and aid its wider dissemination amongst the OMFS community.
Conclusion: This device offers an acceptable and reliable alternative to the standard suture fixation—thereby eliminating the need for an assistant and the risk of sharps injury. Furthermore evidence suggests it is cost-effective when compared to standard fixation.

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Oncofoetal trophoblast glycoprotein 5T4 is involved in the maintenance of mouse taste bud cells

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Background: The sense of taste is mediated by multicellular taste buds (TBs) located within taste papilla on the tongue. In the TB, taste receptor cells and supporting cells are maintained by continuous proliferation and differentiation of the stem cells throughout the life, yet, a molecular mechanism that regulates this process remains unknown. Since we recently found that oncofoetal trophoblast glycoprotein gene, 5T4, is expressed in the tongue except for the retina, olfactory bulb, etc., we analysed in detail in this study.
Results: Immunohistochemistry revealed that 5T4 was significantly expressed in the basal part of circumvallate papillae at the developing and adult stages. Furthermore, proliferation markers such as Ki67 and PCNA (proliferation cell nuclear antigen) were co-immunostained with 5T4. These results suggest that 5T4 positive cells are at least one of taste stem cells. Interestingly, in 5T4-knockout mice, the proliferating cells were increased in the basal circumvallate papillae, while the number and morphology of TBs were not altered.
Conclusions: We found that 5T4 is expressed in the basal part of circumvallate papillae and represses the cell proliferation. These results suggest that 5T4 is involved in the maintenance of taste receptor cells comprising the TB. Because overexpression of 5T4 is linked with a malignancy in the colon or stomach cancer, to investigate how 5T4 regulates the cell proliferation in the TB may lead to understanding the mechanism of cancer development.

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Our liaison clinic: comparison of oral psychosomatic disorders at an interval of 10 years

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Background: Oral psychosomatic disorders occur with a close connection with psychosocial factors. Based on such situation, a Liaison Psychiatric Clinic Group was established in Aichi Gakuin University Hospital for diagnosis and treatment of oral psychological disorders with both dentists and psychologists in 1999.
Objectives: During the decade to 2015, outpatient attendances have more than doubled. The objective of this report is to provide an analysis to the change of oral psychosomatic disorders by performing comparison of statistics between 2005 and 2015.
Methods: First visit patients in 2005 and 2015 were examined. Age, gender, referral source, disease duration, and diagnosis of oral psychosomatic disorders and psychiatric disease were compared. Psychiatric diagnosis was based on Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR).
Findings and Conclusion: The number of first visit patients in 2005 and 2015 was 53 and 114 respectively. The percentage of disease duration less than 6 months in 2015 was 1.4 times larger than that in 2005. This reveals a significant increase of cases diagnosed as oral psychosomatic disorders. Burning mouth syndrome (BMS) was 43% and 36%, respectively and idiopathic odontalgia (IO) was 12% and 36% respectively. Seven-fold increase in patients referred from internal hospital. This explains the decrease in continuous treatment in non-abnormal cases. Psychiatric diagnosis revealed that 77.4% and 84.2%, respectively suffered from somatoform disorder, and 18.9% and 21.1% suffered from major depressive disorder. Patients with psychiatric disorders were increasing. Accordingly, the importance of consultative liaison clinic has been confirmed.

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Application of smart watch in navigation system for oral implant surgery

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Background: Complications of the oral implant surgery have been induced problems like nerve palsy and vascular injury.
Objectives: To solve these problems, surgical navigation systems have being developed. The surgeon can get the position information during surgery form navigation monitor installed outside. However, it is an inefficient method because that surgeon must look the monitor many times and it makes surgeon tired.

In this study, we utilised a smart watch as an efficient information transfer method.
Methods: This system consists of a smart watch (or, smart phone, tablet computer) that displays the distance to the target position graphically, and a three-axis robot manipulator, which measures the potion. 20 times of experiment was conducted to evaluate the time and accuracy using each device.
Findings and Conclusion: The experimental results show that there were no differences in accuracy between smart watch, smart phone, and tablet computer. However, there were significant differences ($P < 0.01$) that smart watch requires more time than other two devices. The difference was caused by the slow update rate (30 ms) of the smart watch that does not use Wi-Fi but use Bluetooth connection. On the other hand, the impression from use of smart watch was better than other two devices because it has closer focal distance and it appears to be a superior method for the information transfer. On the future work, the improvement of the update rate and the GUI system will be conducted.

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Head and neck dermal neurofibroma contains distinctive mesenchymal-like tumour stem cells governed by neurotrophin microenvironment

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Background: Dermal neurofibroma is a challenging genetic disease resulting in severe facial disfigurement, without satisfactory treatments. Therefore, it is urgently needed to develop a cure based on novel stem cell-level mechanisms of neurofibroma.
Objectives: To determine whether dermal neurofibroma contains tumour stem cells and their potential differences derived from head and neck versus trunk, and to clarify their stem cell microenvironment.
Methods: Immunohistochemistry was used to evaluate the proportion of CD44, CD146 or Nestin positive cells in neurofibroma tissues. Head and neck dermal neurofibroma tissues were harvested from patients for isolation and culture of tumour stem cells. Tumour stem cells were characterised by flow cytometry, osteogenic/adipogenic induction and subcutaneous implantation to immunocompromised mice. Non-head and neck neurofibroma and normal facial skin were used as controls.
Findings: Head and neck dermal neurofibroma showed abundant CD44, CD146 or Nestin positive cells. Colony-forming tumour stem cells were successfully isolated and cultured from dermal neurofibroma. Stem cells derived from head and neck neurofibroma showed the highest capabilities of multilineaged differentiation and forming neurofibroma-like tissues. NF mesenchymal-like stem cells generate a tumour microenvironment via autocrine loop of BDNF/TrkB.
Conclusion: A new subgroup of NF mesenchymal-like tumour stem cells was discovered and characterised. Different origins of NF stem cells generate different levels of BDNF microenvironment, thus determining different tumour phenotypes. These distinctive tumour stem cells in head and neck neurofibroma are very likely to be a novel target for treating this challenging disease.

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The role of melanoma differentiation-associated gene-7/interleukin-24 in epithelial differentiation

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Background: Epithelial differentiation is one of the key factors during epithelial homeostasis. The Disruption of this process was

strongly related to many diseases, including tumourigenesis. In our previous study, we have demonstrated an association of melanoma differentiation-associated gene-7 (MDA-7)/interleukin-24 (IL-24) expression with the pathologic grade of 131 head and neck squamous cell carcinoma (HNSCC) specimens. However, its epithelial differentiation regulatory role still remains unclear.
Objectives: To investigate the role of MDA-7/IL-24 expression in epithelial differentiation.
Methods: Three-dimensional epithelial culture was constructed using a human immortalised epithelial cell line HaCaT. IL20R2 gene was transfected into WSU-HN6 cells to obtain a new stable expression cell line HN6-IL20R2. Epithelial differentiation markers and key factors in signalling pathway were detected by reverse transcriptase-polymerase chain reaction, western blot in above two cell lines, in order to evaluate the epithelial differentiation status and investigate the mechanism.
Results and Conclusion: Recombinant human IL-24 (rhIL24) treated three-dimensional epithelial culture has shown more layers of epithelium and arrangement disorders. Higher differentiation was observed in HaCaT cells compared to transfected cell line HN6-IL20R2. Down-regulation of epithelial terminal differentiation markers (loricrin and filaggrin) and up-regulation of early epithelial differentiation markers (integrin β4) were found in rhIL24 treated HaCaT cells. However, in HN6-IL20R2 cell, opposite results were detected. rhIL24 could down-regulate Notch1 expression in HaCaT, but in HN6-IL20R2 cells, we proved contrast founding. By conclusion, our results suggested that MDA-7/IL-24 was an important regulator of epithelial differentiation and maintenance during epithelial homeostasis. Furthermore, Notch1 could be involved in this process.

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Risk of postextraction bleeding after receiving novel oral anticoagulants

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Background: It is unclear how the use of direct oral anticoagulants can affect the risk of bleeding after tooth extraction.
Objectives: This retrospective cohort study was performed to evaluate the incidences of postextraction bleeding among patients who were receiving novel oral anticoagulants or warfarin, and to quantify the predictive value of various bleeding risk scores (HAS-BLED [Pisters et al., 2010], ATRIA [Fang et al., 2011], and ORBIT scores [O'Brien et al., 2015]).
Methods: Incidence rates and propensity score-matched regression models were used to compare the risks of postextraction bleeding for extractions that involved novel oral anticoagulants and warfarin. The relative predictive values of the three bleeding risk scores were compared for postextraction bleeding.
Findings and Conclusion: A total of 1100 extractions fulfilled the study criteria, with 70 extractions involving novel oral anticoagulants, 90 extractions involving warfarin, and 940 extractions involving no anticoagulants. The incidences of postextraction bleeding were 10%, 12%, and 0.9%, respectively. The propensity score-matched models revealed that the risk of postextraction bleeding for novel oral anticoagulants was similar to that for warfarin (odds ratio: 0.6; 95% confidence interval: 0.2–1.9; $P < 0.05$). All three risk scores were useful for predicting postextraction bleeding. The risks of postextraction bleeding were similar for novel oral anticoagulants and warfarin. The three bleeding risk scores exhibited modest abilities to predict postextraction bleeding.

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A new method for tooth generation with hydroxyapatite scaffold combined with progenitor cells

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Objectives: Currently, oral regenerative medicine strategies are unpredictable for repair of tooth supporting tissues destroyed as a consequence of trauma, chronic infection or surgical resection. Hydroxyapatite (HA) is widely accepted as a bioactive material for guided bone and tooth regeneration. In this study, HA's porous scaffold preparation, characterisation and evaluation of structural and chemical properties were reported.
Methods: Here, this study shows mimicking immature tooth at late bell stage design and construction of HA scaffolds for cell transplantation of human adipose stem cells (hASCs), human bone marrow stem cells (hBMSCs) and gingival epitelial cells for the formation of human tooth dentin-pulp-enamel complexes *in vitro*. The scaffolds were prepared using agarose with HA. This is a new method that integrates gel-casting and salt-dissolving methods. Constructs were prepared in the shape of human molars at late bell stage. The pore morphology, size, distribution and density measurements of scaffolds were depicted by scanning electron microscopy (SEM) and infrared spectroscopy (FTIR).
Results: The tooth shaped constructs with a pore size ranging between 150–300 μm arranged by gathering right amounts of materials provide interconnected macro-porous structure. The newly formed tissue-like structures grow and integrate within the HA-designed constructs forming tooth cementum-like tissue, pulp and bone structures. These findings are important as they emphasize the potential biological effect of the hybrid scaffold system. This method also suggests potential for the clinical application of personalised tooth constructs that may allow regeneration of multi tissue lines essential for oral, dental and craniofacial engineering applications.

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In vitro dissolution of carotid atherosclerotic plaques with bile

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Incidence of carotid occlusive disease has increased gradually, creating a healthcare burden. This study aimed to evaluate the effectiveness of *in vitro* dissolution of carotid atherosclerotic plaques with bile to provide a new method for treating carotid atherosclerosis. We obtained vulnerable and stable plaques by carotid endarterectomy. Three plaque groups were formed in which fresh bile, dilute hydrochloric acid, or saline was added.

Dissolution status was observed in each group and dissolution times were measured. Significant dissolution was observed in vulnerable plaque and poorer dissolution in stable plaque, both with added bile. No dissolution was observed in vulnerable and stable plaque groups with added dilute hydrochloric acid or normal saline. The lipid-rich necrotic core within vulnerable or stable plaques is dissolved quickly by bile, while other components, including the fibrous cap, cannot be dissolved. The large lipid-rich core of vulnerable plaque accounts for more significant dissolution than in stable plaque.

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Temporomandibular Joint Disorders and Surgery

Beyond diversity in temporomandibular joint reconstruction

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Reconstruction of the temporomandibular joint (TMJ) presents a major challenge for maxillofacial surgeons. Various conditions are responsible for the development of TMJ defects these include congenital deformities as in hemifacial microsomia and acquired deformities like TMJ ankylosis. Various methods have been used for TMJ reconstruction including free grafts (costochondral, sternoclavicular, iliac), distraction osteogenesis, free flaps and alloplastic TMJ prosthesis. These diverse methods and their outcomes will be presented in a way that reflects the uniqueness of each TMJ deformity we found in each one of our unique patients.

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Novel indication of surgical correction of mandibular retrognathia as a treatment for temporomandibular joint disorders: a pilot study

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Background: Temporomandibular joint disorders (TMD) can be defined as pain and dysfunction of the temporomandibular joint (TMJ). There is increasing evidence with comparative studies showing that 30–60% of patients with dentofacial deformity will have clinical TMD. More than 53% of class II in comparison to less than 10% of class I and class III, will have computed tomography and magnetic resonance imaging evidence of TMD.
Objectives: Correction of mandibular retrognathia to help alleviating excessive forces on the joint, hence reducing TMJ pain and improving jaw function.
Methods: 22 female patients (age 20–35 years) with mandibular retrognathia and associated severe TMJ dysfunction, who are not improving with minimally invasive TMJ arthrocentesis, were recruited for the study. All patients were assessed subjectively and objectively (visual analogue scale, Helkimo index, and Research Diagnostic Criteria for TMD). 11 patients underwent bilateral sagittal split osteotomy using standard Obwegeser procedure; while the other 11 patients did not undergo any surgical intervention. All patients were followed up for at least one year.
Findings: In the operated group, 10 out of 11 patients had successful outcome with significant improvement of pain and jaw dysfunction, while in the non-operated group only two out of 11 patients improved within the same follow up period.
Conclusion: Larger scale study is encouraged to confirm positive outcome of surgical correction of mandibular retrognathia in patients with coexisting TMD found in this pilot study.

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Comparison of vertical ramus osteotomy and l osteotomy for ramus condyle unit reconstruction in temporomandibular joint ankylosis

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Background: The traditional approach for temporomandibular joint (TMJ) ankylosis is interpositional arthroplasty and reconstruction of the condyle using costochondral, coronoid grafts, etc. As these are non-pedicled grafts, there may be eventual resorption with subsequent decrease in height of the ramus, facial asymmetry and deviated mouth opening. The authors' objective is to compare total and partial sliding vertical ramus osteotomy (VRO) for reconstruction of the ramus condyle unit (RCU).
Methods: 16 patients with TMJ ankylosis along with resection of the ankylosed condyle, underwent two different procedures, VRO and L osteotomy (LO), each group having 8 patients. Patients were followed up for an average of 12 months (range, 9–36 months).
Results: In all patients in both groups, no bone resorption was observed after superiorly advancing the posterior border of the ramus as these were pedicled movements. This led to minimal decrease in height of the mandible, deviation on mouth opening, with no cases of re-ankylosis and hence, successful reconstruction of the RCU.
Conclusions: The results showed that both are promising methods for RCU reconstruction in patients with TMJ ankylosis. The only major advantage the authors found in the LO technique was that no bone needed to be sacrificed, unlike VRO where some bone near the angle needed to be cut off to bring proper shape to the angle of the mandible.

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Surgical management of a patient with triad of temporomandibular joint ankylosis, retrognathia and severe obstructive sleep apnoea

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The surgical management of patients with a triad of temporomandibular joint ankylosis, retrognathia and severe obstructive sleep apnoea (OSA) syndrome presents a huge challenge to oral and maxillofacial surgeons. Successful management entails release of ankylosis, correction of micrognathia and relieving the obstructed airway.

In this poster, we present a case of a 9-year-old boy with a triad of unilateral temporomandibular joint ankylosis, retrognathia and severe OSA. Preoperatively, the patient had a maximum

mouth opening of 10 mm, polysomnography study showed AHI 77 indicating a severe OSA and cardiac assessment indicated mild pulmonary hypertension. The surgical management was planned in two stages—stage 1 involved mandibular distraction osteogenesis to correct the retrognathia and relieve the OSA, and stage 2 was conducted at same setting of removing the distraction devices and involved the release of ankylosis and reconstruction with costochondral rib graft. The surgical outcome was successful and resulted in cure of the OSA and pulmonary hypertension, and achieving adequate mouth opening of 40 mm.

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Benefit of preoperative angiographic study in evaluating the risk of haemorrhage in the treatment of temporomandibular joint ankylosis

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Temporomandibular joint (TMJ) ankylosis is a debilitating condition which decreases quality of life and can result, when occurs in children, in severe facial deformity due to impact on mandibular growth resulting in micrognathia. Surgery to remove the ankylotic mass poses great risk to important vascular structures, especially the internal maxillary artery and blood transfusion may be required due to major bleeding.

A clean operative field is important to ensure adequate visualisation and so all the ankylotic bone can be removed, consequently reducing the risk of. Preoperative angiographic analysis is important to visualise proximity of the ankylosis near to major vessels and embolisation may be planned for selected patients and so, significantly reduction in intraoperative bleeding may be achieved, especially in bilateral cases.

We describe a case of a 16-year-old girl suffering from TMJ ankylosis due to fractures of both condyles in childhood and the benefit of a preoperative angiographic study to evaluate the risk of a major haemorrhage. We also describe the role of less expensive reconstruction alternatives, such as the use of acrylic resin TMJ prosthesis, an alternative for those patients that need urgent treatment but joint reconstruction with a titanium prosthesis is not possible due financial reasons.

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A systematic review of the scientific evidence for nonsurgical treatment and arthrocentesis for temporomandibular disorders

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Background: Temporomandibular disorder (TMD) is the general term used to describe the manifestation of pain and/or dysfunction of the temporomandibular joint and its associated structures. Currently it is thought that TMD prevalence stands at 5% of the general population, with 2% of the population seeking treatment for symptoms. We aim to review the available scientific evidence for nonsurgical management and arthrocentesis to manage TMD.

Methods: We undertook a systematic review using explicit and transparent methods that are accountable, replicable and updateable. We searched the Cochrane Controlled Trials Register (CCTR) and the Centre for Reviews and Dissemination, University of York (CRD).

Results: We used as search terms temporomandibular disorder (TMD) and temporomandibular joint dysfunction syndrome (TJDS). Our inclusion criteria focussed on selection of high quality systematic reviews meeting PRISMA standards. The CCTR found 12 systematic reviews for the term TMD and 2 systematic reviews for the term TJDS. The CRD found 34 systematic reviews between 1997 and 2014 using the search term TMD and 9 systematic reviews using the term TJDS.

Conclusion: The challenge for the clinician managing TMD is how to appropriately incorporate differing treatment modalities. Fundamentally management is a decision of nonsurgical versus surgical options. It is often inappropriate to consider simply surgery. Nonsurgical therapy can precede and almost always follows surgical intervention. For ongoing research purposes—there is insufficient, consistent evidence for treating patients with temporomandibular joint disorders. Further high quality randomised controlled trials need to be conducted before firm conclusions can be drawn.

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Management of condylar fractures in young patients

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Mandibular condylar fractures (MCF) are a type of facial bone fractures in children. About 14.8% of all facial fractures and 24–72% of all mandibular fractures are fractures of the mandibular condyle in children. MCFs are those most commonly missed by the parents and may not be treated promptly, so all kinds of complications have been associated with previous MCFs, such as pain, restricted mandibular movement, muscle spasm and deviation of the mandible, malocclusion, pathological changes in the temporomandibular joint (TMJ), osteonecrosis, facial asymmetry, retrognathism and TMJ ankylosis. The management of mandibular condylar fractures in children is different from that in adults because of mandible growth and mixed dentition.

Treatment options for mandibular condylar fractures vary from open reduction to closed reduction. Treatment for the mandibular condylar fracture depends on clinical and radiologic evidence for the presence of the fracture; extent of the injury, which can be unilateral or bilateral; level of the fracture; and degree of displacement or dislocation. Conservative/functional treatment is recommended as the first choice for paediatric condylar fracture, because of the high capacity for fracture remodelling. In any case, the need for rigid fixation of the fracture must be balanced against the risks of disturbance of bone growth and soft tissue scarring.

In this case, we present six children with severely (the condyle dislocated from the glenoid fossa) dislocated fractures of the condylar neck, their surgical treatments with miniplates and screws and one-year postoperative follow-up.

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Prosthesis loading, biomaterials and surgical workflow in temporomandibular replacement

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Objectives: The aim of this study is to evaluate biomaterials, procedures and complications associated with temporomandibular reconstruction and to outline a computer-aided surgical workflow for use in these cases, with an emphasis on engineering concepts and future improvements. This work has been carried out within the framework of a collaborative study between the School of Engineering and one of the main teaching hospitals of the University of Seville.
Methods: Temporomandibular reconstruction presents the surgeon with a biomechanical problem, the primary function of the procedure being to restore function, which includes transmitting functional loads and providing a physiological range of movement with minimum friction and wear. It has been demonstrated that the use of appropriate biomaterials and engineering design parameters can decrease material wear and increase the longevity of craniomaxillofacial devices. Therefore, as with any implanted functioning biomechanical device, periodic follow-up may be necessary to remove and/or replace components due to material failure.
Findings: The design and development of temporomandibular reconstruction is a highly interdisciplinary activity, calling for an understanding of mechanical engineering principles, a detailed knowledge of anatomy, and surgical experience. It is therefore surgical teams to be aided by materials engineering experts so that the design and performance of prostheses can be predicted with accuracy and precision.
Conclusion: The process associated with fabricating a temporomandibular device based on computer-aided design/computer-aided manufacturing in association with three-dimensional computed-tomography is highly promising. Such an approach permits the fabrication of a customised prosthesis that provides a perfect fit for the patient.

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Clinical results after deep dry needling versus intratissue percutaneous electrolysis technique for the treatment of temporomandibular myofascial pain

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Background: Temporomandibular myofascial pain is a disabling condition characterised by painful trigger points on palpation of masticatory muscles, being the lateral pterygoid muscle one of the most frequently affected. Clinical guidelines and protocols about temporomandibular disorders recommend the management of myofascial pain from a multidisciplinary approach. Deep dry needling (DDN) and intratissue percutaneous electrolysis (IPE) are minimally invasive techniques that produces a non-thermal electrochemical changes of the damaged tissue in the affected area, and it has been used successfully in the treatment of various muscle and tendon pathologies. Within available treatments for myofascial pain, there are no studies about the effectiveness of DDN versus IPE in masticatory muscles.
Objectives: To analyse the effect of DDN versus IPE in the treatment of myofascial trigger points in the masticatory muscles.
Methods: It was prospectively selected a group of patients with myofascial pain in the lateral pterygoid muscle. The treatment was performed using DDN versus IPE, and a total of three sessions were performed at an interval of one week. Pain, range of mandibular movements, and functionality questionnaire were evaluated.
Findings: The present study provides the first analysis of the results of DDN versus IPE in the treatment of temporomandibular myofascial pain.
Conclusion: DDN and IPE are effective minimally-invasive therapeutic options, and it has been used successfully in the treatment of various muscle and tendon pathologies. Treatment with these techniques in myofascial pain resulted in a significant pain reduction and return to the previous range of motion and functionality after three sessions.

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Efficacy and safety of botulinum toxin in treating chronic myofascial pain associated with masticatory hyperactivity

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Background: Chronic myofascial pain (CMP) is a common functional disorder often associated with masticatory hyperactivity. Botulinum toxin type A (BTA) is a neurotoxin produced by the *Clostridium botulinum*, and has been reported in the treatment of many orofacial conditions.
Objectives: The aim of this study is to evaluate efficacy and safety of BTA in treating patients with CMP associated with masticatory hyperactivity.
Methods: 25 patients with CMP caused by masticatory hyperactivity of more than two years' duration were treated in an open, randomised, single centre clinical trial. All patients had previously received conservative treatment without significant improvement. Undefined pain syndromes with unclear patterns of radiation were excluded.
Findings: Of the 25 patients studied (BTA test group, $n = 18$; drug-treated control group, $n = 7$), 20 were women and five men. We found a statistically significant relationship ($P < 0.01$) between therapeutic intervention and the improvement of pain, which continued up to six months after treatment. The results show that there was an improvement in the myofascial pain symptoms in 16 cases (90%) in the BTA group. The overall results show an average improvement of 4.2 points on the visual analogue scale. Pain reduction was greater the higher was the intensity of pain at baseline. In the control group there was no improvement. In four cases similar symptoms recurred after the effect of BTA had subsided, thus necessitating a repeat injection.
Conclusion: The results of our study suggest that the use of BTA may have optimistic results for the treatment of CMP associated with masticatory hyperactivity.

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Comparative efficacy of total joint replacement for management of irreversible temporomandibular joint disease: a prospective study with two different types of prostheses

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Objectives: To evaluate outcomes achieved in patients with two different temporomandibular joint (TMJ) prostheses.
Methods: All patients who had a TMJ replacement (TMJR) implanted from 2006 through 2012 were included in this three-year prospective study. All procedures involved replacing both the skull base component and the mandibular condyle.
Findings: 57 patients (38 females and 19 males), involving 75 TMJs with severe disease requiring reconstruction (39 unilateral, 18 bilateral) were operated on consecutively, and 68 stock prostheses and seven custom-made prostheses were implanted. The mean age at surgery was 52.6 ± 11.5 years in the stock group and 51.8 ± 11.7 years in the custom-made group. In the stock group, after three years of TMJR, results showed a reduction in pain intensity from 6.4 ± 1.4 to 1.6 ± 1.2 ($P < 0.001$), and an improvement in jaw opening from 2.7 ± 0.9 cm to 4.2 ± 0.7 cm ($P < 0.001$). In the custom-made group, after three years of TMJR, results showed a reduction in pain intensity from 6.0 ± 1.6 to 2.2 ± 0.4 ($P < 0.001$), and an improvement in jaw opening from 1.5 ± 0.5 cm to 4.3 ± 0.6 cm ($P < 0.001$). No statistically significant differences between two groups were detected.
Conclusion: The results of this prospective study support the surgical placement of TMJ prostheses, and show that the approach is efficacious and safe, reduces pain, and improves maximum mouth opening movement. As such, TMJR represents a viable technique and a stable long-term solution in patients with irreversible end-stage TMJ disease. Comparing stock and custom-made groups, no statistically significant differences were detected with respect to pain intensity reduction and maximum mouth opening improvement.

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Role of pro-inflammation factors in the pathogenesis of temporomandibular joint ankylosed bone mass formation

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Background: Temporomandibular joint ankylosis (TMJA) is a severe TMJ disease which leads to progressive mouth-opening inability while the pathological mechanisms of TMJ ankylosed bone mass formation are not fully clear. Previous studies had shown that pro-inflammation factors-induced osteoclastogenesis played important roles during bone healing and the inhibition of osteoclastogenesis during fracture healing will lead to hypertrophy callus formation. Our previous results had suggested that osteoclasts deficiency might contribute to hypertrophy TMJA bone mass formation. However, the mechanisms of osteoclast decreased in TMJA bone mass, and how pro-inflammation factors involved was not clear.
Objectives: To explore the role of pro-inflammation factors in the pathogenesis of TMJA bone mass formation.
Methods: 14 TMJA patients were recruited in this study and classified into four groups according to the Sawhney classification. The healthy mandibles were considered as control group. The pro-inflammation factors expressions *in vivo* and *in vitro* and the effects of pro-inflammation factors deficiency on osteoclastogenesis were assessed.
Results: The pro-inflammation factors, tumour necrosis factor-alpha (TNF-α), interleukin (IL)-6 and IL-17 were dramatically decreased while anti-inflammation factors, IL-10 and transforming growth factor-beta 1, were increased in TMJA bone mass. The histological results showed that TNF-α and IL-17 were abundant in early-progressed TMJA bone mass and decreased with the TMJA severity accompanied with reduced osteoclastogenesis. The osteoclast differentiation ability was impaired in bone marrow monocytes derived from TMJA bone mass and TNF-α partially rescued the osteoclast differentiation inhibition of TMJA bone marrow monocytes.
Conclusion: Decreased pro-inflammation factors might inhibit osteoclast-mediated bone resorption and progressively contribute to TMJ ankylosed bone formation.

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Minimally invasive surgery in the management of submandibular sialolithiasis: an audit between 1997 and 2015

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Background: We present a single surgeon, 18-year retrospective experience of minimally invasive gland sparing techniques.
Objectives: Review of treatment outcomes.
Methods: Between 1997 and 2015 patients with submandibular sialoliths were assessed using ultrasonography, sialography and plain radiography to identify stone size, location, number and strictures. Mobile stones under 5 mm were retrieved endoscopically or radiographically. Stones between 5–7 mm were considered for lithotripsy, unless they had strictures, recurrent infections or previously failed lithotripsy. Those unsuitable or greater than 7 mm were treated surgically under general anaesthesia as day-case procedures. If the stone was within the gland then submandibular gland excision was performed, otherwise a minimally invasive gland sparing technique was used. Data was collected retrospectively from surgical databases and patient records, all patients were followed up in clinic and further reviewed with postal and telephone questionnaires.
Results: 378 patients had 434 stones removed, with a 94% ($n = 356$) successful retrieval rate. Mean stone size was 8.5 mm (range, 1–32). Of those successfully removed 92 were with endoscopy, 256 had minimally invasive gland sparing surgery, and 12 had submandibular gland excision. Average inpatient stay was 0.9 days. Mean follow up was 12.8 months. Three had intra-operative lingual nerve injury with paraesthesia. Postoperative complications occurred in 85 patients; 59 experienced paraesthesia, 11 infections, 9 pain, and 7 developed Ranula. 20 had recurrent symptoms following surgery. Complications were associated with stones >9 mm, previous infection or pre-existing strictures.

Conclusion: Minimally invasive procedures have high success rate for cure, avoiding morbidity of gland removal with low risk of complications or recurrence.

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Algorithm of diagnostic measures in patients with temporomandibular joint disorders and bruxism

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Background: The prevalence of temporomandibular joint (TMJ) disorders, according to some authors, occurs in 27.5–56% of people, mostly in young age, and dysfunction of the musculoarticular complex occupies 95.3% and is combined with bruxism in 25–30%.
Objectives: To develop the algorithm of diagnostic measures in patients with TMJ disorder and bruxism to improve the quality of diagnosis.
Methods: We examined 219 patients, aged 20–29 years for determining occlusal relationship using carbon paper (20–200 microns), clasp wax, computer device "T-Scan 8" and electromyography.
Findings: Clinical, functional and radiological examination of patients can detect the influence of the muscle factor on TMJ (asymmetric arrangement of the articular head and joint gaps, limitation of motion in the joints with the dislocation of the disc, excessive excursion of articular heads at the usual subluxation and dislocation of the lower jaw, as well as structural changes therein).
Conclusion: Creation of a single algorithm of diagnosis of bruxism and temporomandibular disorders in the early stages of their development will facilitate diagnosis for dentists and radiologists.

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Diagnosis and prognosis of development of bruxism

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Background: According to some sources, temporomandibular joint (TMJ) disorders occur in over 50% of patients, mostly in young age, and together with musculoarticular complex dysfunction it occupies over 90% of patients.
Objectives: To develop the algorithm of forecasting of risk, development and progression of disease in patients with TMJ disorder to improve the quality of diagnosis.
Methods: To improve the results of treatment of patients with bruxism we developed a method of risk forecasting of development and progression of the disease. This allowed both qualitatively and quantitatively determine the forecast for disease development and for frequency of patient visits. Depending on the resulting ratio of prognostic criteria, it was possible to distinguish the areas of low, medium and high risk of disease progression.
Findings: Continuous monitoring of prognostic signs of the disease in patients with bruxism, allows for the necessary medical and diagnostic activities, to determine preventive measures to improve the prognosis and disease outcome, and clearly inform the patient about the level of development and progression of bruxism.
Conclusion: Performed studies have identified the need to include the proposed method of "bruxism development prognosis" in the treatment and follow-up of patients with bruxism.

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Modelling of surgical method of endoscopic temporomandibular joint disc fixation using harpoon thread

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Background: Currently, the treatment of temporomandibular joint disorder (TMD) patients carried out with a combination of conservative and surgical methods. With the progression of TMD stage role of surgical treatment increases. In the later stages of the disease (3–4 Wilkes stage) the most promising methods of surgical treatment are temporomandibular joint (TMJ) arthroscopic procedures. In the study, we carry out experimental work aimed at the development and improvement of articular disc reposition and fixation methods during TMJ arthroscopic surgery in cases of disc stand ventral dislocation.
Objectives: Improvement of arthroscopic procedures efficiency in patients with TMJ articular disc stand ventral dislocation.
Methods: In the study method of endoscopic fixation of the TMJ articular disc using harpoon thread V-loc was modelled and implemented on five well-saved corpses.
Results: The physiological position of TMJ articular disc during mandibular movements was recorded during surgery simulation in all five cases.
Conclusion: Endoscopic fixation of the TMJ articular disc harpoon thread V-loc is a promising method of surgical treatment of TMD patients with persistent ventral articular disc dislocation and requires further clinical testing.

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Electromyographic and ultrasonographic analysis before and after infiltration with botulinum toxin for myofascial syndrome – a prospective study

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Background: Myofascial syndrome of the masticatory muscles is present in most of patients with alterations in the temporomandibular complex, and is defined by muscular pain. Treatment is initially conservative, but in some cases refractory to these measures, and intramuscular injection with botulinum toxin is presented as a therapeutic option for eliminating contracture and for pain relief.
Objective: The objective prospective study is to assess the subjective pain perceived by the patient and an electromyographic and ultrasonographic analysis pre- and post-infiltration of botulinum toxin in patients with myofascial syndrome of the masticatory muscles.

Methods: All selected patients presented predominant muscle pain clinic without response to conservative treatment. Oral opening rang and degree of pain by visual analogue scale (VAS), and masseter electromyography and ultrasound studies were performed before and after infiltration of botulinum toxin into the masseter muscle.
Findings: In a significant proportion of patients during the first week presented aggravation of pain and contracture. However, posterior controls showed significant improvement in subjective pain evidenced with decrease in the level of the VAS in all the patients studied, and slight increase of oral opening.

Electromyographic studies suggests that some myopathic features can improve with Botox therapy but the neuropathic findings are refractory, and ultrasound studies showed a slightly increased masseteric thickness in prior ultrasound, and a normalisation of these values after infiltration.
Conclusion: Botulinum toxin is presented as an effective alternative in principle the short term, primarily for the improvement of subjective pain and mandibular mobility as clinically and objectively evidenced.

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Resorbable pin effectively maintains disc repositioned in arthroscopy of the temporomandibular joint, two years later. A case report

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Background: Many procedures can be used to reposition the disc using arthroscopic approach, but they are technically complex and offer questionable results due to their fixation to soft tissues. A technique consisting of disc fixation to the mandibular condyle with a resorbable pin by an arthroscopic approach has been developed with good results.
Objective: The aim of this paper is describe the findings in a bilateral arthroscopy two years later the placement of this pin.
Methods: A 21-year-old female consulted for a two months lock, presenting temporomandibular joint (TMJ) disc anterior displacement without reduction in left side. A bilateral arthroscopy was performed in July 2011, when a resorbable pin was placed in the left TMJ. In March 2013 the patient presents a new luxation in the right side, so she went through a new arthroscopy in June 2014. In this procedure a new pin was located in the right condyle, and an exploration of the left side was performed.
Findings: We could find a slight synovial inflammation, with a grade I synovitis, with a 100% roofing and disc remained in its normal position. We could not find the head of the pin previously placed as it is supposed that was completely resorbed.
Conclusion: Arthroscopic implant of a resorbable pin appears an alternative to other treatments for anterior luxation of the TMJ disc with doubtful results. In the case we present we could verify in a direct way how the pin was complete reabsorbed and the disc kept the same position.

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Diffuse tenosynovial giant cell tumours in the temporomandibular joints

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Background Diffuse tenosynovial giant cell tumours (DTSGCT) arising from the temporomandibular joint (TMJ) are very rare.
Objectives: To provide a reference for the early diagnosis and treatment of DTSGCT in TMJ.
Methods: A retrospective investigation was performed on 16 patients diagnosed as DTSGCT of TMJ histologically. Their clinical characteristics, imaging and histological findings were summarised. The differential diagnoses, treatment methods and follow-ups were discussed.
Findings: DTSGCT of TMJ show obvious female predominance (13/16), the main symptoms include painful preauricular swelling or mass, mouth-opening limitation and mandibular deviation. DTSGCT on computed tomography (CT) scan often manifested as ill-defined soft tissue masses around TMJ, usually accompanied by destruction of the condyle or fossa, even the skull base. On magnetic resonance imaging (MRI) images, the majority of lesions on T1- and T2-weighted sequences showed very low signals diffusely throughout the lesion. Some of the lesions can extend into the middle-cranial fossa. Surgical resection was performed in 15 cases and biopsy in one case. Postoperative supplementary radiotherapy was performed in three cases. On follow-up, three cases recurred after operation, but there is no malignant manifestation until now.
Conclusion: DTSGCT of TMJ should be differentiated with parotid neoplasm and other tumours or pseudotumours in TMJ. CT and MRI examinations are valuable to the diagnosis and treatment design of DTSGCT in TMJ. Complete resection of the lesions and the affected synovium should be performed. Postoperative radiotherapy was helpful for the extensive lesions, especially for the intracranial involvement. Long-term follow-up was suggested.

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Total temporomandibular joint reconstruction in patient victim of injury by firearm: case report

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Injuries caused by firearms are ranked second as causes of death within the segment of trauma in the maxillofacial region, thus constituting a public health problem in many countries. Firearm injuries may have devastating consequences, making treatment difficult or limited in specific cases of trauma in the maxillofacial region. Total alloplastic reconstruction of the temporomandibular joint (TMJ) is a surgical technique indicated for condylar fracture with extensive comminution or loss of substance resulting in functional failure of the joint.

The aim of this article was to relate a case of alloplastic reconstruction of the TMJ with a customised prosthesis, due to

complication of comminuted fracture of the mandibular condyle, with loss of substance caused by firearm injury.

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Outcome of eminectomy in elderly patients with long-standing/habitual dislocation of temporomandibular joint

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Background: Temporomandibular joint (TMJ) luxation is such a distressing condition with pain at TMJ and difficulties in closing their month. The dislocation of the mandibular condyle in elderly people and patients with psychic and cerebral diseases frequently become long-standing or habitual, which may make treatment difficult. Conservative treatment to this condition often results in failure. Therefore, sometimes, surgical intervention is applied to TMJ dislocation.
Objectives: The aim of this study was to investigate the treatment outcomes of eminectomy in patients with forward TMJ dislocation.
Methods: Medical records were reviewed and treatment outcomes of eminectomy were investigated retrospectively.
Findings: 19 patients (6 males and 13 females; mean age, 73.6 years) were treated with eminectomy. 14 patients had cerebral infarction, three had dementia, and two had both. 15 patients were treated effectively with eminectomy, while four patients presented recurrence of TMJ luxation. Of these, three had cerebral infarction and one suffered with multiple system atrophy. Facial nerve paralysis was observed in one case postoperatively.
Conclusion: Although the patients had been treated with eminectomy effectively, three suffered from recurrence of TMJ dislocation. It is known that cerebral infarction and multiple system atrophy cause unbalanced muscle contraction and a loose capsule and ligament system. In addition, occlusal disturbances are also related with them. These factors may influence the treatment outcomes of eminectomy in elderly patients with TMJ dislocation.

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Temporomandibular joint fossa difference according to the skeletal malocclusion

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Background: The influence of occlusion on temporomandibular joint (TMJ) and adjacent structure is still controversial. This study aimed to determine and compare temporomandibular joint fossa morphology between groups of Class I, Class II, and Class III skeletal malformation subjects.
Methods: Cone-beam computed tomographic images were used for the analysis in 20 subjects in each group of Class I, II and III malocclusion, respectively. The computed tomography images were three-dimensionally reconstructed with Simplant OMS (Materialise Dental, Belgium). Bilateral TMJs were evaluated on three-dimensional volumetric image and two-dimensional sectional image. 14 measurements of (1) mandibular fossa morphology and thickness, (2) distance and angle with adjacent structure, and (3) articular eminence inclination were obtained.
Results: Distance from anterior fossa point to posterior fossa point, thickness of external auditory canal wall, and articular eminence height and inclination were significantly different ($P < 0.05$). Measurement figures were generally higher in males than in females. Eight measurements were significantly higher on male group than female group ($P < 0.05$). Statistically significant difference between the right and left side were not existed.
Conclusion: Anteroposterior fossa width and external auditory canal thickness were significantly different according to the classification. Class III group showed the lowest figure on articular eminence height and inclination. Several measurements were significantly higher on male group than female group. Bilateral symmetry between right and left side TMJ was shown among all groups.

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Efficacy of hyaluronic acid injection in superior joint space for the treatment of temporomandibular disorder in Taiwan

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Background: Hyaluronic acid (HA) injections are gaining attention as a treatment option to manage symptoms of temporomandibular joint (TMJ) disorders, but updated evidence-based data on their effectiveness are actually lacking.
Objectives: To analyse the effect of superior space injection of HA in patients diagnosed with temporomandibular joint (TMJ) disorders by magnetic resonance imaging study and clinical examination.
Methods: 46 patients with unilateral or bilateral osteoarthritis were included. The patients were evaluated before the procedures and at the first and third month after three times of HA injection. To evaluate clinical success at the third month after therapy, the criteria included in the study were: maximal mouth opening (MMO) 35 mm or more; no more tenderness over TMJ area or masticatory muscles. Magnetic resonance imaging (MRI) was also performed at pre-treatment and the third month after therapy.
Findings: In most of cases, MMO was significantly increased and no more tenderness over bilateral joint area after 3 times of HA injection. The ratios of the postoperative condyle head degenerative changes in MRI studies were also decreased after the therapy.
Conclusion: It is sufficient to use HA injection in patients with osteoarthritis or disc without reduction and result in better condylar reparative remodelling and improvement in jaw function.

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Quality of life in patients after temporomandibular joint ankylosis release

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Background: Temporomandibular joint (TMJ) ankylosis is a physically debilitating condition with a strong psychosocial influence, adversely affecting the overall Quality of Life (QoL). There is no study available in the literature that presents the impact of TMJ ankylosis on the QoL and changes after the surgical treatment thus making such a study necessary. Objectives: The main objective of the study was to evaluate the functional and psychosocial impact of TMJ ankylosis related problems on QoL in patients assessed preoperatively and at three months postoperatively following surgery.
Methods: 15 patients of TMJ ankylosis (14–35 years, nine males and six females) seeking treatment at Unit of Oral and Maxillofacial Surgery, Postgraduate Institute of Medical Education and Research, Chandigarh were evaluated with Oral Health Impact Profile (OHIP-14) questionnaire preoperatively and three months postoperatively. OHIP-14 has well documented psychometric properties, covering specific aspects of oral health (domains): functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap. All participants were operated for TMJ ankylosis with interpositional arthroplasty using buccal pad of fat.
Findings: TMJ ankylosis significantly affects QoL. There was significant drop in total OHIP scores indicating overall improved QoL after surgery. Amongst the domains, the most significant changes were observed in psychological discomfort, physical incapacity and psychological incapacity ($P < 0.01$) and physical pain and social incapacity ($P < 0.05$).
Conclusion: TMJ interpositional arthroplasty significantly improves the QoL.

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Jaw claudication is the only clinical predictor of giant-cell arteritis

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Objective: Giant-cell arteritis (GCA), commonly known as temporal arteritis, is a chronic granulomatous vasculitis that affects predominantly the extracranial branches of the carotid artery. Although an algorithm for diagnosing GCA that includes both biopsy and imaging examinations has been recently proposed, it harbours the possibility of false negatives. Hence, jaw claudication caused by ischaemia of the masticatory muscles is one of the important clinical predictors for implementation of temporal artery biopsy (TAB). We describe a case of GCA in which jaw claudication was the only clinical predictor for implementation of TAB.
Case: A 78-year-old male was referred to our department with facial pain associated with mastication. He had been admitted three weeks previously to another department to investigate an unidentified fever. A blood test revealed an elevated C-reactive protein level and a high erythrocyte sedimentation rate (70 mm/h). Although ultrasonography and computed tomography angiography of the temporal region showed no findings specific for GCA, based on our examinations we determined that his facial pain arose from jaw claudication rather than temporomandibular disorder. Histopathological examination by temporal artery biopsy showed intima thickening with disruption of elastic lamina and inflammatory cell infiltration, and we consequently diagnosed GCA.
Results: Clinical symptoms immediately resolved after prescription of prednisolone 40 mg/day for two days.
Conclusion: In this case of GCA the imaging examinations of the superficial temporal artery were false-negative, and jaw claudication was the most important predictor of GCA.

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Evaluation of new concept of platelet-rich plasma periarticular injections for pain reduction in patients with temporomandibular joint dysfunctions: a pilot study

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Background: A number of conservative methods are used in the treatment of temporomandibular joint (TMJ) dysfunction pain syndrome. Platelet-rich plasma (PRP) is a natural concentrate of autologous blood growth factor. Periarticular application of PRP and creating of oedema around the TMJ can be very simple approach for treating of TMJ pain instead of intraarticular application.
Objectives: The aim of this study was to analyse the reduction of pain in patients with temporomandibular joint dysfunction using novel PRP periarticular injections around TMJ.
Methods: In the study were included 120 patients, both males and females, aged 32–62 years, assessed with a painful temporomandibular joint dysfunction using the latest version of the RDC/TMD questionnaire axes I and II. Application of PRP was conducted using new principle based on creating of periarticular oedema around the TMJ with a PRP prepared with patented Plasmolifting tubes. PRP was injected three times on seven days intervals.
Results: The comparison of the intensity of pain during three examinations suggests a favourable effects of the procedure being performed, as the mean visual analogue scale score was 7.1 at examination I, 5.4 at examination II, and 0.5 at examination III.
Conclusion: The preliminary results indicate that the periarticular application of PRP with creating of oedema provide positive results of the pain reduction in TMJ dysfunction and it might be reasonable to investigate the efficacy of this technique in other TMJ disorders.

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Aseptic osteomyelitis of the temporomandibular joint – a case study

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Osteomyelitis of the temporomandibular joint (TMJ) is a very uncommon disease and can be associated with trauma, an odontogenic source or extension of a location infection. Previous reports identify a bacterial pathogen as a cause of the condition, however aseptic osteomyelitis of the TMJ has not yet been reported in the literature.

This poster presents a case of a 41-year-old male who presented with unilateral pain, decreased range of movement of the jaw without malocclusion, with radiological and clinical evidence of osteomyelitis of the condyle, glenoid fossa and adjacent temporal bone without a bacterial pathogen. After extensive reviews, radiological and pathological investigations, he ultimately underwent unilateral glenoid fossa debridement with clinical improvement.

The management, progression and clinical features of this case will be discussed. This report serves to remind surgeons and radiologists of the seriousness of this infection, while also reporting this case and providing a review of the literature on osteomyelitis of the temporomandibular joint.

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Others

Complications of sialoendoscopy: experience, literature analysis and suggestions

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Objectives: This article describes our experience combined with analysis of the emerging literature, presenting suggestions of how to avoid the complications that may arise during or after endoscopic or endoscopy-assisted surgery of the salivary glands.
Methods: In a retrospective study, the surgical data of 498 consecutive patients who underwent surgery for calculus removal from the parotid, submandibular, and sublingual glands from 2010 to 2012 were collected and analysed. The analysis was concentrated on specific complications of endoscopic or endoscopy-assisted operations.
Results: The patients were operated on by various sialendoscopy-involved techniques that included intraductal endoscopy and an endoscopy-assisted extraductal approach. The total percentage of complications associated with endoscopy was 3.23% ($n = 17$). In one case (0.2%; submandibular gland surgery), severe bleeding occurred that required immediate gland resection.
Conclusions: At present, sialendoscopic and endoscopy-assisted techniques produce a minimal number of postsurgical endoscopy-related complications, but they are not complication-free operations. Strictures, ranulas, and lingual nerve paraesthesia are the most frequent of these complications. Further reduction of the number of complications is possible with careful pre-procedural imaging analysis and correct endoscopic techniques.

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Familial ankyloglossia

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Ankyloglossia, is a congenital anomaly characterised by an abnormally short lingual frenulum. Usually, ankyloglossia is seen as an isolated phenomenon in an otherwise normal child. In this article, we report a family with isolated ankyloglossia inherited as an autosomal dominant trait in two generations.

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Inferior alveolar nerve injuries in bilateral sagittal split osteotomy: a literature review

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Background: Bilateral sagittal split osteotomy (BSSO) is a common and effective procedure used for treatment and correction of mandibular deformity. Inferior alveolar nerve (IAN) injury and neurosensory disturbance (NSD) are the most common complications of this surgery.
Objective: The aim of this review is to describe the effect and the relationship between BSSO and IAN disturbance.
Methods: Electronic search of English scientific papers published between 1 January 2010 and 31 August 2016 was accomplished using PubMed, Cochrane Library and Google Scholar search engines. The following keywords were used: bilateral sagittal split osteotomy, inferior alveolar nerve injuries, orthognathic surgery and neurosensory disturbance. Clinical non-experimental studies on humans recently published from 2010 to 2016 were included. Studies that used cadavers or animals were excluded.
Findings: The search identified 203 papers, 31 studies were accessed through the PubMed database, 5 studies were obtained from the Cochrane Library, and 167 articles from Google Scholar database. After omitting the duplicates/repetitions, 19 clinical studies fulfilling the inclusion criteria were selected.
Conclusion: Based on the articles reviewed, it can be concluded that there are variations in incidence that reported IAN injury during BSSO. These variations are due to use different methods for assessing NSD and lack of standardised assessment methods.

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Million views YouTube is after all not nice—a qualitative study of mandibular third molars on YouTube

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Background: Removal of third molars is one of the most common surgical procedures performed worldwide. Yet, according to NICE guidelines, there are certain considerations to remove the third molars or not. YouTube, ranking second globally in popularity, can possibly be a useful platform for the public to raise awareness on third molars.

Objectives: To assess the accuracy of YouTube videos for dissemination of mandibular third molars information.
Methods: YouTube videos on mandibular third molars were viewed and evaluated their efficiency in promoting third molars removal when compared with information stated in the NICE guidelines. YouTube videos were searched using the keywords 'Impacted teeth'; 'Impacted tooth'; 'Impacted wisdoms'; 'Third molar'; 'Third molar impacted'; 'Third molar teeth'; 'Third molar tooth'; 'Wisdom teeth' and 'Wisdom tooth'. Only videos with over a million views are included. Two researchers independently assessed the videos. A score based on NICE guidelines — 'Wisdom Teeth Removal — Patient Notes' was given (NICE score). Characteristics of the videos were also compared.
Findings: A total of 79 YouTube videos were analysed. The overall score ranged from zero to five out of 24. There was no significant correlation between video usefulness and viewing rate, viewer's interaction and video length. The quality of the videos uploaded by the general public was comparatively inferior to those uploaded by the healthcare units.
Conclusion: YouTube videos concerning third molars currently available are lack of accurate information and cannot be deemed as a source for general public to raise awareness on mandibular third molars issues.

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Comparison of tooth derived hydroxyapatite with commercially pure hydroxyapatite

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Background: There has been a constant search for an ideal bone graft in dentoalveolar surgery. Tooth derived hydroxyapatite has been proposed as a Autogenous tooth derived bone graft material (Auto BT) was proven to show the osteoinductive, osteoconductive and osteogenesis properties.[1,2]
Objective: To assess the efficiency of tooth derived hydroxyapatite (Auto BT) as a bone graft material by comparing it with commercially available hydroxyapatite (SYBOGRAFT).
Methods: The study was designed as a randomised controlled trial with 30 patients. The patients who had a distoangularly impacted third molar were included in the study. Case group were grafted with the tooth derived hydroxyapatite and a control group had SYBOGRAFT placed in their socket.

Radiographs were done following extraction and following grafting. After a week the wound healing was evaluated and six weeks later the quality of bone was assessed using a computed tomography scan.
Findings: There was no significant different in the postoperative complication and healing of the wound. The mean radiodensity of Auto BT was 943.34 HU with a standard deviation of 157.82 HU and the mean radio density of the control group was 973.94 HU with a standard deviation of 153.18 HU.
Conclusion: Though there is no statistical significance between SYBOGRAFT and tooth derived hydroxyapatite. But the organic substances like the bone morphogenetic protein (BMP) and proteins with osteoinductive capacity as well as type I collagen that is similar to alveolar bone is present in tooth derived HA.[2] Therefore, it may have the same bone remodelling capacity as autogenous bone.

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Educational philosophies within medical graduates undertaking a dental degree when compared with other non-medical graduates

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Background: Kings College offers the only three-year dental programme for medical graduates within Europe. Dual qualification in medicine and dentistry is a requirement for training in maxillofacial surgery. On the tenth year running, we conducted a study looking at the differences in various parameters relating to educational philosophy.
Objective: The aims of this study were to identify the variance in the ways specific student groups approached their undergraduate training. The areas included: learning methodology, attendance, self-directed techniques, career motivation, stress levels and coping strategies, time management and time spent in paid employment.
Methods: Questionnaires were used to evaluate how medical graduates on the three-year dental programme compared with university graduates on the four-year programme and school leavers on the five-year programme.
Findings: Medical graduates came across as highly motivated self-directed learners with excellent time management skills. Attendance at lectures was poor owing to time spent in paid employment and the basis of previous studies. School leavers on the five-year programme demonstrated grossly contrasting study methodology where the majority attended lectures regularly. Their stress levels were higher when compared to medical graduates despite spending a longer duration on the programme. Graduates on the four-year programme demonstrated a mixture of attributes.
Conclusion: Students on different dental programmes within Kings College exhibit an array of different study techniques. Career motivation, past learning experiences, extracurricular commitments and differences in stress coping mechanisms were all thought to be key factors in explaining these differences.

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Analysis masticatory function of influence in complications of patients submitted to bariatric surgery

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Objective: The aim of this study was to analyse the influence of masticatory performance in patients undergoing gastric bypass Roux-Y with and without the use of the ring and to identify factors correlating with postoperative complications.

Methods: This was a retrospective and cross-sectional analytical, independent samples. We evaluated 50 patients after bariatric surgery were divided into two groups, 25 patients with the placement of the ring and 25 patients without placing the ring and analysed in the period October 2011 to November 2012. The masticatory performance was evaluated by the colorimetric method, where the colour intensity of the solution of beads stained by fuccina was measured by a spectrophotometer.
Results: The used analysis of variance and Pearson correlation coefficient (r) to perform the statistical analysis ($P < 0.05$). It was found that patients with the presence of the ring in their DGYR and postoperative complications were influenced by poor masticatory performance ($P < 0.05$); body mass index did not correlate with the study ($P > 0.05$); the number of occlusal contacts influenced masticatory performance and therefore the complications of patients in mastication ($P = 0.04$) and left-sided chewing ($P < 0.01$).
Conclusion: The postoperative complications of patients undergoing gastric bypass Roux-Y, are higher in patients with poor masticatory performance.

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Facial soft tissue course for trainees in oral and maxillofacial surgery

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Background: Facial soft tissue surgery is a key part of Oral and Maxillofacial Surgery (OMFS). Junior trainees in OMFS are usually dentally qualified and have had minimal facial soft tissue surgical training. Induction courses (e.g. basic surgical skills or 'Dentist on the Ward') can only provide basic and limited theoretical and practical hands-on training. The dedicated facial soft tissue course has become popular among OMFS trainees in United Kingdom (UK).
Facial Soft Tissue Course: Theories and principles on facial anatomy, incision lines and cosmetic units, access surgery, wound debridement and closure, randomised pattern local flap design, management of benign and malignant facial skin conditions and reconstruction ladder are taught. Pigs' belly skin and trotters are used in practical hands-on sessions. Apart from basic and advanced suturing techniques, participants learned skin incisions, design and raising of local flaps including rhomboid, rotation, bilobed (finger), standard advancement and vertical subcutaneous advancement local flaps, and scar revision (e.g. Z-plasty).
Feedback: In the last 16 year, many trainees have provided helpful and positive feedback in >25 courses. This course has not only attracted OMFS junior trainees in the UK but also overseas OMFS trainees, UK trainees in Plastic Surgery, and specialist accident and emergency nurses. This course has also benefitted postgraduate OMFS students when it was exported to Hong Kong.
Conclusions: Facial Soft Tissue Course is valuable to junior OMFS trainees as it empowers and encourages trainees to learn new skills in a relaxed learning environment supported by animal model closest to human skin.

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Preparation and training of staff in providing a cuff inflated tracheostomy service outside intensive care unit in a district general hospital in the United Kingdom

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Background: Open surgical tracheostomy has been performed by Maxillofacial Surgeons while percutaneous tracheostomy by intensivists in order to secure patients' airway. These patients are admitted to intensive care unit (ICU) prior to tracheostomy. Tracheostomy weaning process can be prolonged due to inability to deflate the cuff without risks of aspiration in patients with neurological injuries, upper airway obstructions or pre-existing respiratory disorders. With the increase in ICU bed occupancy caused by enhanced pressure on ICU admission, a new cuff inflated tracheostomy tube service was created to care for tracheostomy patients in non-ICU clinical areas.
The New Cuff Inflated Tracheostomy Tube Service: A multidisciplinary team was created to educate and train ward nurses and doctors in the knowledge and practical skills for the care of patients with cuff inflated tracheostomy tube in ward environment.
Results: The first full day course trained 62 nurses and one medical doctor with good feedback. The practical skills gained by the participants include emergency bedside checks, suctioning, humidification, weaning from cuff inflation, waveform capnography and emergency algorithms. Simulation scenarios were also used to enhance practical skills in blocked and partially dislodged tracheostomy tubes.
Conclusion: Training of nursing and medical staff in the care of patients with cuff inflated tracheostomy tube can equip health care professionals with essential skills for safe management and daily care of these patients outside ICU. The reduction in ICU expenditure and bed occupancy by this group of patients will benefit other patients who require urgent level two and three ICU care.

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Removal of root from maxillary antrum using minimal access sinuscopy and functional endoscopic sinus surgery

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Background: The most common foreign body in the maxillary antrum is caused by unintentional dislodgement of upper molar root during exodontia. Classical alveolar and Caldwell-Luc approach to remove displaced roots are associated with restricted access and nerve injuries. We report a case of maxillary sinoscopy through canine fossa and functional endoscopic sinus surgery (FESS) to remove a hidden and dislodged root from maxillary antrum.
Case Report: A 77-year-old lady suffered two years of persistent discharge and pain from her right maxillary sinus caused by dislodged root after a difficult extraction of her upper right second molar tooth. Computed tomography confirmed soft tissue and fluid in her right paranasal sinuses with a dislodged root in the right maxillary sinus.

FESS was performed by reducing middle turbinate, anterior and posterior ethmoidectomy to open into sphenoid sinus and antrostomy. After irrigation and removal of the secretion from the paranasal sinuses, maxillary sinus sinoscopy through a small canine fossa opening allowed direct vision of the dislodged root. The root fragment was removed by a curved rigid suction catheter via FESS approach.
Discussion: FESS treats paranasal sinusitis without risks of root and nerve injury with Caldwell Luc approach. Maxillary sinus sinoscopy via a minimal access through the canine fossa facilitated direct visualisation and removal of dislodged molar root within the maxillary antrum.
Conclusion: Endoscopically assisted minimal access approach with the aid of FESS allowed the direct visualisation and removal of the dislodged root fragment. The multidisciplinary approach showed improved outcome with minimal morbidity.

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The evolution of decompression splint for extensive odontogenic cysts

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Background: For decompression of extensive odontogenic cyst after marsupialisation, the head of soft nasopharyngeal tube has been used to decompress extensive odontogenic cysts after marsupialisation. Maintaining good cystic cavity hygiene will facilitate good bone healing. In order to avoid mucosal ulcerations or occlusal interference experienced by some patients using the head of nasopharyngeal tube, we have constructed decompression stents using different soft denture reline materials.
Methods: Among various soft and permanent denture reline materials, we have used silicone, Monoplast B and Dentusil to make decompression stents with different internal diameters, lengths and retention sleeves.
Results: Silicone material was too soft which made the curing process difficult to maintain even thickness of the stent. The uneven wall of the stent created cracks on the thinner side of the stent. Molloplast B material was strong and yet soft which has provided less mucosal ulceration or occlusal interference. The delivery system is basic and heat cure cycle is lengthy. Dentusil is a cartridge dispensed silicone soft lining material which has an improved delivery system with chemically (cold) cured and does not required lengthy heat cure cycle.
Discussion: Patients experienced greater comfort and ease in irrigating the diminishing cyst after marsupialisation using either Molloplast B or Dentusil decompression stents.
Conclusions: Customised soft decompression stents using either Molloplast B or Dentusil, with different diameters and lengths have assisted surgeons to use the most appropriate decompression stent to maintain patency of jaw cysts opening for regular irrigation after marsupialisation.

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The appropriateness of preoperative bloods for patients with fractured mandibles

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Background: The majority of patients who are admitted with fractured mandibles appear to be young and medically healthy.
Objective: The objective of this audit was to assess the appropriateness of preoperative bloods for patients undergoing open reduction internal fixation (ORIF) of the mandible. This was compared to the recently updated (April 2016) National Institute for Health and Care Excellence (NICE) guideline on preoperative tests for elective surgery. Subsequently the costs of unnecessary blood tests were calculated.
Method: 132 patients were included in this audit, which looked at all fractured mandibles operated on at Northwick Park Hospital over a one-year period from 28 February 2015 to 28 February 2016. The data was collected from the results and clinician's workspace tab on the intranet. This included the patient's American Society of Anesthesiologists grade, whether they had preoperative bloods, which blood tests were carried out, whether they were indicated and what the total cost of unnecessary blood tests were.
Findings: The results showed that only 2.3% met the standards, this meant we are over-investigating considerably and costing the trust thousands of pounds in the process. This audit highlights a major deficiency in clinical practice.
Conclusion: This audit has the potential to make an enormous change in clinical practice and consequently directly improve the quality of care patients' receive- by reducing unnecessary blood tests and costs in the process. Furthermore, by following the NICE guidance on preoperative bloods for patients undergoing ORIF mandible, we are encouraged to use our resources more efficiently.

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Treatment of excessive gingival display with lip repositioning technique

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Excessive gingival display (EGD) is a condition in which an overexposure of the maxillary gingiva (>3 mm) is present during smiling. Patients with excessive gingival display, also known as "gummy smile," usually experience dissatisfaction with their clinical appearance.

The aetiology of EGD is various: plaque- or drug-induced gingival enlargement, altered or delayed passive eruption, anterior dentoalveolar extrusion, vertical maxillary excess, short upper lip, a hyperactive upper lip, or a combination of these causes.

In the literature, different techniques have been reported for the treatment of the hyperactive upper lip: injections of botulinum toxin, lip elongation associated with rhinoplasty, detachment of lip muscles, myotomy and partial removal and lip repositioning.

This case report demonstrates the successful management of EGD with a lip-repositioning procedure in 27 patients with incompetent short upper lip except one case that is planned to hide the reflection of wrongly placed dental implant

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Occupational risk of HIV exposure during oral and maxillofacial procedures

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Background: Oral and maxillofacial procedures involve a wide variety of intra- and extraoral approaches and their respective exposures. Like other specialties, they can also be stratified according to urgency and necessity. In the acute setting, given the prevalence of human immunodeficiency virus (HIV) there is inevitable exposure to the infection perhaps unwittingly so given that approximately 18,100 (17%) people living with HIV in the United Kingdom (UK) are unaware of their HIV positive status. There is therefore a need for guidance specific to oral and maxillofacial surgery (OMFS) procedures to establish an acceptable threshold of known and unknown risk to both the patient and OMFS personnel with regard to HIV infection, both diagnosed and undiagnosed.
Objectives: We explore the surgical opinion of OMFS surgeons within the UK on managing the HIV positive OMFS patient.
Methods: An online questionnaire was performed to assess the current awareness of HIV and its management, establish opinions, concerns and the incumbent challenges involved in managing such patients in the context of OMFS.
Findings: The majority of clinicians felt they had limited knowledge on the complexities involved in managing such patients and sort clearer additional guidance on how to best optimise this patient group.
Conclusion: Clearer guidance is required in the management of the HIV positive OMFS patient and this study will help to inform this.

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Sialoendoscopy for treatment of obstructive sialadenitis

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Background: Salivary duct obstruction is a common disease of the major salivary glands. Sialolithiasis and other aetiologies including inflammation, strictures, mucous plugs, foreign bodies, kinks are possible causes of obstructive salivary gland diseases. Traditional diagnostic imaging, plain radiography, ultrasonography, computed tomography (CT) and others cannot identify the aetiology and location of obstruction. Sialoendoscopy is a relatively new minimally invasive method that enables direct visualisation of the ducts of the major salivary glands. Besides the diagnostic options, interventional sialoendoscopy allows therapeutical intervention. Present analysis was performed to assess the effectiveness of interventional sialoendoscopic treatment of obstructive sialadenitis of major salivary glands.
Methods: This is a retrospective study of 41 patients with obstructive sialadenitis of submandibular and parotid glands who underwent sialoendoscopy between 2010 and 2015. The symptoms and clinical findings were confirmed by plain radiographs, CT scans and ultrasonography. Various interventional sialoendoscopic techniques were used, dilation of strictures and irrigation, stone retrieval by basket and stone removal by endoscopic-assisted transmucosal incision.
Results: Symptomatic relief was achieved in 39 patients. Dilatation and lavage of the duct system without stone was accomplished in 17 patients. Sialoliths were removed in 24 patients.
Conclusion: Sialoendoscopy is a useful minimally invasive interventional technique for direct visual detection of cause of obstruction and enables us for therapeutic options.

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Maxillomandibular-chin surgical advancement for patients with obstructive sleep apnoea — review of 13 patients

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Background and Objectives: This is to share our experience in the management of patients with obstructive sleep apnoea via the maxillomandibular-chin surgical advancement and to review the treatment outcomes.
Methods: Patients with obstructive sleep apnoea underwent maxillomandibular advancement between 2011 and 2016 were included. No pre- and postoperative orthodontics treatment was performed in all patients. Maxillomandibular advancement of 1 cm with or without advancement genioplasty in trapezoid mortised design and concomitant intrapharyngeal soft tissue surgery were performed dictated by the preoperative polysomnography and drug-induced sleep endoscopy. Surgical cure was defined as postoperative apnoea-hypopnoea index (AHI) of fewer than 5 events/h.

Surgical success was defined as postoperative AHI with more than 50% reduction to fewer than 20 events/h.
Findings: A total of 13 male patients with age ranging from 32–67 years (mean, 51 years) were included. 12 patients had maxillomandibular-chin advancement. The remaining patient had maxillomandibular advancement as he had genioplasty done earlier. Six patients had concomitant intrapharyngeal soft tissue surgery. Mean reduction of AHI was 85.5%. The mean lowest oxygen saturation was improved from 71.4% to 86.5% postoperatively. Eight patients achieved surgical cure and four patients achieved surgical success. The remaining patient, though not achieving surgical success, had significant reduction of AI to AHI ratio. All patients had subjective improvement in daytime performance. Complications encountered were regarded as minor, including transient nerve injury, minor occlusal change and infection of plates.
Conclusion: Maxillomandibular-chin surgical advancement showed a promising treatment outcomes in the management of patients with obstructive sleep apnoea.

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Nitrous oxide laughing matter

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Background: We present the case of a young male who presented to the emergency department of our hospital complaining of gross swelling of his right face. He reported no causative history for this presentation. A computed tomography head and neck was completed which revealed significant air emphysema in the soft tissues in the absence of bony trauma. On follow-up examination some days later, the patient disclosed the cause of the incident to be associated with the recreational use of nitrous oxide (N_2O) gas.
Discussion: N_2O is increasingly being used as the drug of choice amongst rave and festival goers. It is reported to create a transient sensation of relaxation, euphoria and hallucination amongst users. It is widely available and laws on restriction are difficult to enforce owing to its myriad of commercial and medical uses. In recent years a number of case reports have been published, highlighting complications associated with its illegitimate use.
Conclusion: Much study has been completed, investigating the side effects and complications of inhaled N_2O when used in a controlled healthcare setting. This case demonstrates a previously unpublished presentation of emphysema within the facial tissues as a result of its recreational use. Given the increased usage of illicit gaseous drugs, it is likely further complications will present in the future.

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Regeneration of knee meniscus damages by transplanting adipose tissue-derived regenerative cells

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Background: Knee meniscus and temporomandibular joint (TMJ) disc are composed of fibrocartilages, lack intrinsic healing capacity following damages due to low vascularisation. Recent reports indicated that adipose tissue-derived regenerative cells (ADRCs) have an ability to regenerate various damaged tissues.
Objectives: In this study the regenerative potential of ADRCs on knee meniscus was investigated.
Methods: ADRCs were isolated from the inguinal region of Sprague-Dawley rats. We removed the anterior half of the medial meniscus and transplanted the atelocollagen scaffolds with or without ADRCs. ADRCs from green fluorescent protein (GFP)-transgenic rats were transplanted into the meniscal defect in nude rats. Chondrogenic, osteogenic differentiation and frequency of ADRCs derived from the inguinal region of rat were also demonstrated.
Findings: The area of the regenerated meniscus was appreciably larger in the scaffolds with ADRCs groups than in the scaffolds without ADRCs groups at 12 weeks. In the scaffolds with ADRCs groups, type II collagen expression was clearly observed in areas of regeneration. Using GFP-transgenic rats, we observed that the regeneration of the meniscus resulted from contribution from donor cells of ADRCs. ADRCs had a small fraction of adipose-derived stem cells (CD31−/CD34+/CD45−). ADRCs were also able to differentiate into chondrocyte-like and osteoblast-like cells *in vitro*.
Conclusion: ADRCs is useful for regeneration of meniscus tissue. Furthermore, it might become possible to provide novel cell-based therapy for TMJ disc damages by utilising ADRCs for knee meniscus damages.

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Oral syphilis seen at the lateral surface of the tongue: a case report with literature review

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Background: The incidence of syphilis has been rising worldwide, including in Japan, where the number of registered cases is the highest since the survey by National Institute of Infectious Diseases, Japan began in 1999. Oral manifestations are uncommon and may represent a diagnostic challenge because of its wide spectrum of clinical appearances.
Objectives: To cultivate a better understanding of the oral manifestations of syphilis. Methods: A case of secondary syphilis revealed by manifestation at the lateral surface of the tongue was reported. Case reports of oral syphilis in Japan over the past 30 years were reviewed.
Finding: A 39-year-old female was referred for diagnosis of soreness of her tongue continuing for approximately one month. On extraoral examination, multiple erythema lesions were observed on her palms. Painlessly swollen cervical lymph nodes with a diameter of 20 mm were felt at both sides of the cervical region. Intraoral examination revealed multiple indeterminately formed slightly raised greyish-white lesions on both sides of the tongue. In serologic tests, fluorescent treponemal antibody absorption (FTA-ABS) immunoglobulin G resulted positive; rapid plasma reagin (RPR) titer, 1:128 and treponema pallidum haemagglutination (TPHA) 1: 40,960. A diagnosis of secondary syphilis was established. In the Japanese literature, 52 cases were reported from 1986 to 2015. 13 cases were diagnosed as primary syphilis, 30 cases, secondary, 3 cases latent, and 2 cases tertiary. The remaining cases were not documented the disease stage classification. Various manifestations were listed among these reports.
Conclusion: Dental surgeons should keep in mind the various manifestations of syphilis in the oral cavity.

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The difficulties of diagnosis of extracranial head and neck schwannomas: two case reports

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Background: Schwannomas are benign tumours of the nerve sheath. It is reported that 25–45% of all schwannomas occur in the head and neck region (extracranial). Head and neck schwannomas (HNS) are slow growing and clinical manifestations depend on the tumour location, size and the nerve of origin, but a schwannoma may be found incidentally.

Case Reports: We describe two different cases of facial and vagus schwannomas. The first case is an intraparotid schwannoma (IS) in a 57-year-old male complaining of a painless parotid mass mimicking a pleomorphic adenoma according to the ultrasound and magnetic resonance imaging (MRI) findings preoperatively. The second case is a 44-year-old male with a mass in the anterior compartment of the neck. The MRI results showed a tumour located between the carotid artery and the internal jugular vein, suggesting a schwannoma arising from the vagus nerve. Both patients were operated. The diagnosis of facial nerve schwannoma was made by frozen section and the tumour was not completely resected; the vagus nerve schwannoma was completely resected. Nerve palsy was postoperatively present in both cases with a slow recovery.
Discussion: Extracranial schwannomas are rare with about 170 cases of IS reported in the literature. Preoperative diagnosis is difficult and is improved by MRI and the dynamic contrast enhanced perfusion. Definitive diagnostic is given by the histopathologic examination.
Conclusion: The preoperative diagnosis is essential for the preservation of the nerve and avoidance of nerve palsies. Diagnosis and treatment of extracranial HNS are difficult and will be discussed with a literature review.

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Association between vitamin d receptor BsmI gene polymorphism and periodontitis: a meta-analysis in a single ethnic group

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Although a number of studies have been conducted on the association between vitamin D receptor (VDR) BsmI polymorphism and periodontitis, this association remains elusive. To further assess the effects of VDR BsmI polymorphism on the risk of periodontitis, a meta-analysis was performed in a single ethnic group. PubMed and Chinese databases were searched for relevant studies through July 2016. Pooled odds ratios and 95% confidence intervals were used to assess the strength of the associations.

This meta-analysis identified six studies, including 757 periodontitis cases and 670 controls. In the total analyses, VDR BsmI polymorphism was not associated with the risk of periodontitis in all models. The subgroup analyses suggested a significantly reduced risk of periodontitis in South China. In conclusion, our meta-analysis showed that VDR BsmI polymorphism was associated with the decreased risk of periodontitis in Chinese individuals from South China, and further studies in other ethic groups are required for definite conclusions.

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Clinical treatment of venous and microcystic lymphatic malformation on oral mucosa by diode laser

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Background: Intraoral venous malformations always involve mucosa. Those superficial lesions are not suitable for sclerotherapy, which is applicable for deep lesions, because the treatment may cause serve ulcer. Intraoral microcystic lymphatic malformations with pink or purple vesicles on the tongue can causes infection or bleeding. They are not amenable to sclerotherapy or surgery. We report a series of patients with venous and microcystic lymphatic malformation on oral mucosa treated by diode laser.
Objectives: To evaluate the efficiency and safety of diode laser in treating superficial intraoral venous and microcystic lymphatic malformations.
Methods: 30 patients diagnosed with venous malformations on oral mucosa were treated by 980 nm diode laser with a 600 μm diameter fibre, non-contact irradiation and 10 J/cm^2 energy density. A 400 μm diameter fibre were used to treat 15 patients with microcystic lymphatic malformations involved in tongue. The superficial layer of lesions were removed by low fluence (1–3 J/cm^2), contact-irradiation. All patients received 1–3 times with an interval of one months depending on the lesion size. The following up period was 1–1.5 years.
Findings and Conclusion: All superficial mucosa lesions disappeared completely or mostly with slight postoperative swelling and pain. No serve complication happened. None required post-procedure intubation for swelling. The volume of server lesions reduced more than 75% immediately after laser irradiation. Diode laser is a safe, effective method for treating venous and microcystic lymphatic malformations on oral mucosa.

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Evaluation of stress and well-being of oral and maxillofacial surgery residents

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Background: Multiple studies suggest residency may be the time when burnout is at its highest and wellness at its lowest, with statistical correlation of fatigue and distress to self-reported medical errors. Also, there is improvement in resident performance (didactic scores and clinical aptitude) with implementation of stress management and mental health support in training programs. There are no such studies evaluating stress and well being in oral and maxillofacial surgery residents in the United States of America.
Objectives: The objective of this study is to evaluate current stress and well being of oral and maxillofacial surgery residents in the United States. This could provide valuable information regarding residency training programs and quality of life of residents.
Methods: A survey completed anonymously and voluntarily, will be distributed to all residents in oral and maxillofacial surgery training programs in the United States. The survey will include questions regarding demographics of the resident and the training program as well as questions regarding stress level, workload, physical and mental health, and overall well-being.

Findings and Conclusion: We have not completed this project but the survey will be distributed and collected with results in time for ICOMS meeting.

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A case series of xerostomia treated with Kampo medicines: assessment of health-related quality of life based on the Japanese version of the short form-8 health survey

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Background: Kampo medicines (KMs), that is, Japanese herbal medicines, are widely used in the treatment of various diseases. The KMs are thought to be helpful in the treatment of xerostomia, and the domestic healthcare insurance system has permitted Japanese dentists to prescribe Goreisan and Byakkokaninjinto to relieve thirst since 2012. However, most dentists at present have inadequate knowledge or experience to use these medicines because their efficacy has not yet been thoroughly examined. Xerostomia is not a life-threatening disease but often has a significant effect on the daily life of sufferers, as well as a serious negative influence on health-related quality of life (HRQoL). The Japanese version of the Short Form-8 (SF-8) health survey is the Japanese and miniature version of the MOS 36-Item Short-Form Health Survey version 2 (SF-36v2) and is a questionnaire used to measure the HRQoL in various diseases.
Objectives: This study investigates how Goreisan and Byakkokaninjinto affect the HRQoL of xerostomia patients.
Methods: Several cases of xerostomia were treated with Goreisan (TJ-17; Tsumura Co., Tokyo, Japan) or Byakkokaninjinto (TJ-34; Tsumura Co.). The patients' HRQoL based on the Japanese SF-8 was measured.
Finding: Goreisan and Byakkokaninjinto showed inhibitory effects on xerostomia and were effective in improving the HRQoL of xerostomia patients, even though xerostomia patients had a high disease burden both physically and psychosocially. No adverse events caused by Goreisan or Byakkokaninjinto were seen.
Conclusions: The Japanese SF-8 was an effective tool for measuring the HRQoL of xerostomia patients.

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Severe tongue oedema as a complication of prolonged prone position in a patient with Chiari malformation treated with posterior fossa decompression

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We describe a case of a 60-year-old obese male patient diagnosed with Chiari malformation, a condition that involves the herniation of the cerebellar structures into the medullary canal. In order to improve neurological symptoms, he was submitted to posterior fossa decompression by the Neurosurgery team; a surgery that involves the patient in the prone position for extended time. At the end of the procedure and in the awakening from anaesthesia, the patient's tongue was noted to be large and swollen and protruded out of the oral cavity causing an airway obstruction. Tracheostomy was performed after several attempts to intubate and the patient was sent to the intensive care unit. The patient was medicated with steroids and the tongue was wrapped with a wet bandage to prevent desiccation. Extraction of the few mandibular teeth was required due to local trauma and possibly causing the oedema to increase. The tongue swelling regressed in approximately thirty days.

Macroglossia is a rare complication of prolonged surgery in the prone position and is possibly caused by regional venous obstruction due to excessive neck flexion further leading to a reperfusion injury. The patient is also obese and has a short neck inherent to his malformation, factors that are also described to cause venous congestion.

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A rare allergic reaction to Surgicel (oxidised cellulose) in head and neck surgery

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Background: Surgicel is generally used for intraoperative haemostasis and adhesion prevention. In oral and maxillofacial surgery, Surgicel is frequently used as a dressing post exdontia in patients with bleeding tendencies. Local tissue reactions to oxidised cellulose are widely reported at many surgical sites, however there has only been one isolated report of such reaction in the head and neck region.
Case History: A 64-year old gentleman presented to our department with a four-centimetre diameter swelling in the central forehead region. Clinical and radiological examinations of the lesion were suggestive of a lipoma. Surgical excision was performed under local anaesthesia via a horizontal incision along a natural skin crease. Surgicel was inserted into the cavity post excision to ensure haemostasis. Unfortunately, the patient presented to the emergency department with a fluctuant swelling at the surgical site, coryzal symptoms and bilateral periorbital oedema four days after surgery. On assessment, he did not demonstrate any clinical signs of surgical site infection. Surgical exploration with wound washout resulted in prompt resolution of all symptoms. In the absence of evidence of wound infection and systemic symptoms, we can only attribute this incident to a rare type 4 hypersensitivity reaction to oxidised cellulose.
Conclusion: We present this rare case of reaction to Surgicel in the head and neck region that has only been previously described in one post thyroidectomy patient in the literature. This presentation serves to remind head and neck surgeons of the potential for local tissue reactions to this material.

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A case of pleomorphic adenoma arising from heterotopic salivary glands of submandibular region

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We report a rare case of pleomorphic adenoma arising from heterotopic salivary glands of the submandibular area. The patient was a 55-year-old male who visited our hospital with chief complaint of the mass localised in the submandibular area.

MRI showed a well-defined and isolated mass at the posterior portion of the submandibular gland. It was surgically excised under general anaesthesia, which was encapsulated and isolated from the submandibular gland. Pleomorphic adenoma was diagnosed by histological examination. The intraoperative and histological findings suggested that this tumour was arising from heterotopic salivary glands.

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Application of digital techniques in oral and maxillofacial surgery at UKM Medical Centre—a case series

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Background: Digital techniques have emerged as promising concepts in many surgical areas. We present the use of digital techniques in oral and maxillofacial surgery consisting of three-dimensional (3D) printing (3DP), computer-assisted planning (CAP), navigation-assisted surgery (NAS) and its combination to facilitate our surgical procedure.
Methods: A total of 44 patients who underwent surgery at the UKM Medical Centre using either 3DP, CAP, NAS or a combination of these digital techniques were included within this study.
Results: 26 patients (59%) were treated with the use of 3DP, 24 patients (54%) with CAP and 21 patients (48%) with NAS. Maxillofacial trauma comprised the largest number of cases ($n = 26$, 59%) treated with digital techniques, followed by benign and malignant lesions. Within this subset, four patients who underwent orthognathic surgery and reconstruction by using 3D-printed implantable materials were treated with the combination of 3DP and CAP. 18 cases (41%) involving the zygomatic complex and orbital fracture reconstruction cases were treated with a combination of CAP and NAS. The combination of all 3DP, CAP and NAS techniques were used for fibula flap in mandibular reconstruction.
Conclusions: Within the limited number of cases illustrated in this series, it is shown that the numerous applications of digital techniques and their combinations could serve as a powerful tool for maxillofacial surgical procedures. Not only providing a diagnostic function, the functionality of the readily available digital data can be further utilised to facilitate and enhance surgical outcomes. The technology potentially ease the treatment rendered and may serve as an indispensable aspect of maxillofacial surgery.

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Structuring a basic surgical skills course in oral and maxillofacial surgery for low income countries

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Acquisition of basic surgical skills is fundamental to achievement of safety and proficiency in the practice of all surgical specialties. Despite the apparent benefits of basic surgical skills courses, these have not been incorporated into oral and maxillofacial training in low-income countries like ours due to the high cost of mannequins.
Objectives: This paper presents the structure of the first basic surgical skills course organised by the West African College of Surgeons at University College Hospital, Ibadan, Nigeria using locally adapted materials.
Methods: The course was a two-day programme with seven sessions: theatre room decorum, surgical knot tying, wiring techniques, osteosynthesis, suturing techniques, third molar surgery and vessel ligation procedure. Each of the sessions consisted of a short instructional lecture and a practical session. The course was assessed based on pre- and post-tests and participants' perception of the course. Mean scores were compared using Student *t*-test. Statistical significance was set at $P < 0.05$.
Findings: 20 junior residents in participated in the course, 10 males and 10 females with mean age of 34.4 (SD + 3.717) years. The mean scores of the pre- and post-tests were statistically significant with $P = 0.000$ and 0.014 for the theory and practical sessions respectively. The course was given an overall mean score of 8.68 (SD ± 0.820) out of a maximum of 10 points.
Conclusion: It is recommended that this course should be incorporated into the training of residents in oral and maxillofacial surgery in Nigeria.

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Infratemporal surgery for oral cancer invaded to masticator space

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Background and Objectives: The prognosis of advanced oral cancer invaded to masticator space is very poor. The principal reason is difficulty of complete resection of tumour invading masticator space. We have been performing infratemporal surgery for complete resection. The usefulness of this surgical procedure will be reported.
Methods: The subjects were 73 patients who underwent infratemporal fossa surgery in Tokai University Hospital, from 1994 to 2009, and whose postoperative course could be observed for 5 years or longer. They were 35–84 years of age, and included 48 males and 25 females. Surgery was performed using a lateral temporal approach; and complete resection of the pterygoid muscle together with that of the region of primary onset of tumour was performed. Resected specimens were examined histopathologically. Survival rate was calculated by the Kaplan-Meier method, and prognostic factors were examined by the log-rank test.
Results: Five-year disease specific survival rate was 58.3% and local control rate was 69.4%. Significant difference was found

between cases with and without metastasis to cervical lymph nodes on histopathological examination, negative node 71.7% and positive node 42.6% ($P < 0.01$).
Conclusions: Infratemporal surgery is useful for the treatment of advanced oral cancer invaded to masticator space. In the absence of lymph node metastasis, in particular, the local control obtained with this procedure appears to provide a favourable prognosis.

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Rac1 is required for chondrogenesis during limb development

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Background: Rac1 is a member of the Rho family of small GTPases, which are known to regulate multiple cellular functions, including cytoskeletal organisation, proliferation, and apoptosis. Recently, the tissue-specific roles of Rac1, especially in mammalian limb development, were revealed in examinations of limb bud mesenchyme-specific inactivated Rac1 conditional knockout mice (Rac1fl/fl; Prx1-Cre; Rac1 cKO) (Suzuki D, et al. Dev Biol 335;2009:396–406), and those findings also demonstrated striking syndactyly of the fore- and hindlimbs. Syndactyly in Rac1 cKO mice is caused by a failure of inter-digital programmed cell death (ID-PCD), while expressions of BMPs and their target signalling molecules, known to have critical roles in limb development including skeletal formation and ID-PCD, are reduced in these mice. Those results showed that Rac1 has an essential mesenchymal function in limb bud morphogenesis, especially inter-digital programmed cell death.
Objectives: In the present study, we investigated the roles of Rac1 in chondrogenesis during limb development.
Methods, Findings and Conclusion: Our results showed that columnar organisation of chondrocytes in the proliferation zone was disrupted in the growth plates of cKO mice. Furthermore, findings of *in vitro* micromass culture assays of Rac1 cKO mice limbs, performed to further define the underlying chondrogenic defect identified in our *in vivo* analysis, showed a lack of chondrocyte proliferation as compared to those from control mice limbs. Together, our results indicate that Rac1 is required for proliferation of chondrocytes during limb development.

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Awareness of OMFS speciality among patients, dental students, medical students and medical specialists

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Background: Awareness of our specialty among people in our part of the world is very interesting. It is important for all the stakeholders (patients, medical community) to know the importance and various procedures that are done by our specialty.
Objectives: The objective of the study was to find out the familiarity of our specialty with respect to the various procedures performed by oral and maxillofacial surgeons.
Methods: Study included 917 patients visiting our institution, dental students from first to final year and interns, medical students of various years and medical specialists of our medical college.
Findings: It was found out during the study that most of the patients were not aware of the various procedures done by oral maxillofacial surgeons. It was same with the dental students with the awareness increasing as they reach their internship. The medical students also had the same opinion and medical colleagues expressed surprise about some of the procedures done by us.
Conclusion: This presentation will discuss various efforts taken by individual maxillofacial surgeons and our association to popularise our specialty among our medical colleagues and the general public.

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Public recognition of oral and maxillofacial surgery: are the public missing out

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Background: Oral and maxillofacial surgery (OMFS) over the past few decades has greatly increased its scope of practice. Originating from the treatment of lower and midfacial trauma in the military OMFS now encompasses the treatment of a wide range of pathological conditions. The scope of practice now includes all craniofacial trauma, head and neck cancer, facial aesthetics, temporomandibular joint surgery, craniofacial deformity and oral surgery.

In the United Kingdom OMFS is a smaller specialty in number compared with allied specialties that we share the facial surgical arena with. As well as this it is relatively new in comparison to Plastic and Ear, Nose and Throat surgery, having been included as a medical surgical specialty in 1994.
Objectives: To determine the perception of patients and the public of OMFS. To discuss strategies for better promotion of our specialty.
Methods: Interviews were conducted using questionnaires with members of the public asking whom they would present to or wish to be referred to for a given clinical problem. Comparison was made to historic studies from the last decade and the decade before.
Findings and conclusion: There has been improvement in recognition of the scope of our specialty by the public compared to the previous decade and before. However many were surprised to know that facial aesthetics, craniofacial deformity and head and neck cancer were included in the scope of OMFS with some who surprisingly had not heard of the specialty at all. More is needed if the specialty is to expand and progress.

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Perceptions of oral and maxillofacial surgery: do our colleagues even know what we can do?

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Background: In the United Kingdom (UK) oral and maxillofacial surgery (OMFS) originated as the surgical specialty of dentistry treating jaw injuries sustained by servicemen during the Second World War.

The specialty evolved to encompass the treatment of many pathological conditions of the face, jaws and teeth. To do justice to these varied conditions and to increase the scope of the specialty it became clear both a medical and dental qualification was necessary for OMFS to exist as a true hospital based surgical specialty in the UK. Dual qualification, basic general surgical training and a surgical fellowship exam became mandatory in the late 1980s. In 1994 the specialty was formally established as a medical surgical specialty overseen by the general medical council.

This is different to many of our colleagues around the world but was necessary for advancement of our specialty in this country.
Objectives: To ascertain recognition of the scope of OMFS amongst dental and medical students, dentists and doctors.
Methods: Interviews were conducted using questionnaires covering clinical scenarios. The interviewee had to correlate the scenario with the relevant speciality.
Findings and conclusion: With regard to facial trauma, jaw deformity, mandibular reconstruction most interviewees were able to correctly select OMFS as the relevant speciality. Head and cancer, salivary gland disease, facial reconstruction, cleft and cosmetic surgery scenarios showed a more variable response by interviewees. More is needed to educate our colleagues to make our patients are treated in the best way and for the continued expansion and promotion of our specialty.

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Crackling mumps

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Background: Presentation of an adult patient with acute bilateral parotitis symptoms is rather unusual. Most often the underlying pathology is systemic unless the patient has been exposed to a viral epidemic. Pneumoparotitis is a rare cause of parotid gland swelling and occurs when air is forced through the parotid duct from a pressurised oral cavity. It can be a unilateral or bilateral, usually non-tender swelling that resolves spontaneously. The condition is harmless unless bacteria from the mouth cause parotitis. It is commonly seen in wind instrument players, glass blowers and scuba divers. Diagnosis is based mainly on history, but is often missed.
Objective: The objective of this abstract is to draw the attention of the clinician towards a rather uncommon but entirely benign cause for bilateral parotid swelling in adults.
Method: We report an unusual case of a 50-year-old female patient presenting at our department with intermittent bilateral parotid swelling of unknown origin.
Finding: Clinical findings included subcutaneous emphysema in the bilateral parotid region. Bimanual palpation of the Stenson's duct revealed expulsion of air bubbles via the duct orifices. Ultra sound examination confirmed the presence of hyperechoic air bubbles within the ducts and the surrounding soft tissues.
Conclusion: Although rare, recurrent pneumoparotitis can predispose to sialectasis, recurrent parotitis and subcutaneous emphysema tracking to the neck, mediastinum and potentially pneumothorax.

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Novel perineural approach of platelet-rich plasma application in idiopathic trigeminal neuralgia treatment: a six-months follow-up pilot study

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Background: Trigeminal neuropathic pain (TNP) is treated with a variety of medicinal and surgical treatment modalities. Platelets-rich plasma (PRP) is recognised as a possible therapeutic option in various states of nerve damage throughout the body. PRP application near the nerves within facial or intraorally trigeminal territory through creating pressure/oedema around the nerves and around the most painful point can be beneficial treatment option.
Objectives: The aim of this study was to analyse the reduction of pain in patients with TNP using PRP perineural injections around the trigeminal branches.
Methods: A pilot sample cohort was comprised of 29 patients (males and females), aged above 35 years, with TNP were involved in this study. PRP was applied five times on seven days interval using Plasmolifting-PRP tubes. The patients were clinically prospectively evaluated before each application, and at two and six months of follow-up.
Results: The comparison of the intensity of pain during seven examinations suggests excellent effects of the procedure being performed as the mean visual analogue scale score was 9.1 before application I; 7.6 before application II; 3.0 before application III; 0.6 before application IV; 0.1 before application V, 0.0 at third month examination and 0.0 and at sixth month examination 0.0.
Conclusion: The significant reduction in pain suggests that future, larger and longer cohort studies in which will be used newest TNP pain scales are required to evaluate the effectiveness of the present methodology.

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Is centralisation of head and neck cancer services a cost effective option? The London experience

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Background: Centralisation of health care services has been one of the recent developments in the field of health policy. The aim of such projects is to improve the quality of the services provided to the patients and to achieve more efficient cost allocations.

Objectives: In this study we aim to examine the costs incurred by the centralisation of head and neck cancer surgery from a peripheral London Hospital (Chase Farm Hospital) to University College London Hospital (UCLH) Head and Neck Department. We then compare those with the costs incurred by Chase Farm prior to implementing the centralisation.
Methods: The costs are calculated using the Trust reference costing as published by the Department of Health, United Kingdom. A sensitivity analysis of the costs is performed.
Findings: The transfer of head and neck cancer surgery from a peripheral London Hospital to UCLH has been accompanied by cost savings on this study. The results suggest, though, that there is further space for improvement.
Conclusion: Our study has been performed in a difficult economic climate that every health authority is pursuing cost efficiencies and cost reductions. It is a positive signal that when costs can be identified and measured, then resources can be allocated more efficiently. Oral and maxillofacial surgery (OMFS) cannot stay outside these developments; it is imperative that OMFS doctors and nurses engage in cost evaluation processes in order to guarantee the future of the specialty.

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Dental and anaesthesiological care of a patient with Rett syndrome

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Rett syndrome (RS) is a neurological disease that occurs only in females and it manifests with mental retardation, seizures, movement disorders, autistic behaviour and abnormal breathing. Airway control is difficult due to limited mouth opening. Bruxism, oculogyric crises, parkinsonism and dystonia are also common, while myoclonus and choreoathetosis are seen infrequently. Respiratory and cardiac diseases, prolonged QT syndrome, diabetes mellitus and anaesthetic agent sensitivity are significant considerations for anaesthesiologist. These features lead to the need for special care. These children require a coordinated multi-specialist oriented health care.

We present a 12-year-old female with Rett syndrome who required extraction of impact right canine teeth. Teeth grinding – bruxism, difficulties in chewing and swallowing, poor oral cavity hygiene, oral inflammation with hypertrophic gingiva were observed in intraoral examination. She had loss of consciousness, movement disorders, mental retardation, screaming fits, irritation, anger, self-abusing behaviour and limited mouth opening. Therefore, sedation anaesthesia was planned for surgical procedures. After standard monitorisation, patient sedated only with propofol due to more sensitive to anaesthetics. There was no complication during sedation. After surgery, patient was awakened after applying analgesic and transferred to recovery room.

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To explore the role of sialography in the diagnosis of chronic parotitis

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Objectives: The aim of this study was to explore the role of sialography in the diagnosis of chronic parotitis.
Methods: 142 patients with chronic parotitis who underwent sialography from January 2014 to January 2016 at the Department of Oral and Maxillofacial Surgery, School of Stomatology, China Medical University were retrospectively reviewed. Among the cohort, 88 patients were chronic obstructive parotitis, 9 were children chronic recurrent parotitis, 21 were chronic obstructive parotitis related to Sjögren's syndrome, 11 were radioactive iodine (radioiodine) induced parotitis, 13 were chronic obstructive parotitis related to diabetes. All of them underwent sialendoscopy. The comparison between the sialography and the sialendoscopic findings was made to verify the significance of sialography in the diagnosis of chronic parotitis.
Results: Chronic obstructive parotitis—the sialography revealed irregular expansion within the ductal system. Children chronic recurrent parotitis—local twist was found by sialography. COP related to Sjögren's syndrome—the sialography indicated point expansion in the peripheral catheter ductal system. Radioiodine induced parotitis: the sialography revealed stricture in the main duct and expansion in the peripheral catheter. COP related to diabetes: the sialography indicated expansion in the main duct and dimness in the peripheral catheter.
Conclusions: The sialography has its specificity and could be an assistant in the diagnosis of chronic parotitis.

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Abnormal ossification of the hyoid bone in cleidocranial dysplasia rare case and literature review

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Background and Objectives: Cleidocranial dysplasia (CCD) is an autosomal-dominant hereditary skeletal disease caused by heterozygous mutations in the osteoblast-specific transcription factor Runt-related transcription factor 2 (core binding factor 1; RUNX2). CCD presents with skeletal defects of several bones. The most striking features are partial or complete absence of clavicles and patency of the cranial suture. In addition, multiple impacted teeth and developmental jaw deformity are common characteristics in the oral and maxillofacial region. However the abnormality of hyoid bone in CCD is very rare.[1]
Findings and Conclusion: We will present a rare case of abnormal ossification of the hyoid bone in 15-year-old boy CCD patient and

clinical procedures of orthognathic surgery. Recently, Funato et al reported that the loss of Tbx1 in mouse (Tbx12/2) results in skeletal abnormalities similar to those of CCD in humans and Tbx12/2 mice display short stature, absence of hyoid bone.[2] The new point of view about these literatures lead to find the pathogenesis of abnormal ossification of the hyoid bone CCD in humans.

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