261 – 276

~~235~~



## IMPLANT TREATMENT IN SEVERELY RESORBED EDENTULOUS MAXILLAE WITHOUT BONE GRAFTING: SURGICAL TECHNIQUE

*Gynther GW*, Mattsson T, Birring E, Hulterström M, Köndell P-Å, Fredholm U, Bolin A, Moberg L-E.*

*Departments of Oral & Maxillofacial Surgery, Oral Radiology & Prosthodontics, Visby Hospital, Huddinge University Hospital, Uppsala University Hospital, Karolinska Institute, Sweden*

**AIMS:**
To describe the surgical technique for implant treatment in severely resorbed edentulous maxillae without any alveolar reconstruction prior to or combined with implant placement.

**Material & methods:**
Fifteen patients with severely resorbed edentulous maxillae were treated with osseointegrated implants and fixed dental prostheses. All patients were initially considered for treatment with bone grafting due to lack of sufficient bone volume for conventional treatment. Preoperative radiographic examinations showed that the height of the alveolar crest was, on average, 7.4 mm at the 4 mm width level (Class V-VI according to Cawood & Howell 1988). By fenestration of the maxillary sinus and uncovering the nasal floor, the maxillary bone could be visualized and utilized maximally for installation of implants. By angulation of the implant and permitting 2-5 uncovered fixture threads on the palatal aspect, implants of optimal length could be installed. Eighty-six implants were installed (4-6 implants in every patient).

**Results:**
One implant was lost during the observation period (range 36-54 months, mean 45 months), giving a success rate of 99%. All patients had stable fixed prostheses at the end of the observation time. No major bone resorption (= mm) was observed.

**CONCLUSIONS:**
It is concluded that this surgical technique may be considered as an alternative to bone grafting in patients with severely resorbed edentulous maxillae. However, further prospective comparative studies are necessary for full evaluation.

## DENTAL IMPLANT INSTALLATION WITHOUT ANTIBIOTIC PROPHYLAXIS

*Gynther GW*, Köndell P-Å, Moberg L-E, Heimdahl A.*

*Departments of Oral & Maxillofacial Surgery & Prosthodontics, Visby Hospital, Huddinge University Hospital, Karolinska Institute, Sweden*

**AIMS:**
The objective of this study was to compare retrospectively the outcome of dental implant treatment with or without antibiotic prophylaxis.

**MATERIAL & METHODS:**
Two groups of patients with edentulous or partially edentulous maxillaes and/or mandibles, were treated using dental implants (Brånemark System®). One group, consisting of 147 patients (790 implants), was given prophylaxis with oral phenoxymethylpenicillin (pc-V) 1 g 1 hour preoperatively and 1 g every 8 hours for 10 days postoperatively. The other group, consisting of 132 patients (664 implants), was not given any antibiotics pre- or postoperatively.

**RESULTS:**
There was no significant difference regarding early or late postoperative infections and implant survival in the non-prophylaxis group compared well to the pc-V group.

**CONCLUSIONS:**
It appears that antibiotic prophylaxis for routine dental implant surgery offers no advantage for the patient.

## SYNOVIAL INFLAMMATION IN ARTHROSCOPICALLY OBTAINED BIOPSIES OF THE TMJ. A PROPOSED HISTOLOGICAL GRADING SYSTEM

*Gynther GW*, Dijkgraaf LC, Reinholt FP, Holmlund AB, Liem RSB, de Bont LGM.*

*Departments of Oral & Maxillofacial Surgery and Pathology, Visby Hospital, Huddinge University Hospital, Karolinska Institute, Sweden and Groningen University Hospital, The Netherlands*

**AIMS:**
To propose a system for histological grading of synovial inflammation in the temporo-mandibular joint (TMJ), to facilitate comparisons between studies from different centres.

**METHODS:**
The research into TMJ synovial inflammation was reviewed.

**RESULTS:**
Only a few histological studies have been published regarding synovial inflammation in the TMJ, and various grading systems have been used Our proposed grading system is based on semiquantitative evaluation of the following parameters: 1. Synovial lining cell layers; 2. Vascularity (number and/or size of vascular profiles) and 3. Inflammatory cell infiltrate (commonly lymphocytes).

**CONCLUSIONS:**
Data indicates that the synovial lining of the TMJ, in some respects, differs from other joints. The normal variation in morphology of the synovial lining of the TMJ is quite large, whereas the variation in pattern of pathological changes appears to be relatively small (i.e. synovial inflammation is not of the severity of that of other joints). We expect that the suggested histological grading system will facilitate that concensus exists regarding histological definitions and classifications of synovial inflammation in the TMJ.

~~235~~

## MAXILLARY OSTEOTOMIES IN UNILATERAL CLEFT DEFORMITY APPROACHED BY MINIMAL INCISIONS AND STABILISED BY PLATE OSTEOSYNTHESIS AND SPLINT WITHOUT IMF.

*Haers P.E.*, Ge Z.L., Zimmermann A.P., Sailer H.F.*

*Dept. of Cranio-Maxillofacial Surgery, University Hospital, Zurich, Switzerland*

261

melanoma was the uveal tract in 9 cases, the conjuctiva in 3 cases, the eyelids in 2 cases and the skin in one case. Treatment included surgery, radiotherapy, chemotherapy and immunotherapy.
**Results:** Twelve of the patients died from distant metastases and three are alive with no sign of disease. Of the patients who died the longest survival was 33 months and the mean survival was 15,9 months.
**Conclusions:** Our conclusion is that we should work towards earlier diagnosis so that fewer melanomas will reach such advanced stages where local tumour control and patients' prognosis become extremely poor.

## EVALUATION OF OCCLUSION AND FUNCTION AFTER LATERAL MANDIBULECTOMY DEFECTS WITH PECTORALIS MAJOR MYOCUTANEOUS FLAP RECONSTRUCTION

***Lindeboom, J.A.H*** [1], ***Ackerstaff, A.H*** [2], ***Kroon, F.H.M.*** [1], ***Balm, A.J.M.*** [2].

*Department of Oro- and Maxillofacial Surgery, Department of Head and Neck Oncology, Academic Medical Center Amsterdam, The Netherlands* [1] *and The Netherlands Cancer Institute. Plesmanlaan 121, 1066 CX Amsterdam, The Netherlands* [2].

**AIMS:**
To analyse dental occlusion and articulation in patients after ablative surgery for a oropharynxcarcinoma, who were reconstructed with a myocutaneous pectoralis major flap without bony reconstruction of the mandibular defect.

**METHOD:**
13 patients who were treated for an oropharynxcarcinoma with ablative surgery, a partial mandibulectomy, radiotherapy were reconstructed with a myocutaneous pedicle flap. All patients were analysed with regard to their dental occlusion, prosthetic rehabilitation and chewing abilities.

**RESULTS:**
On opening of the mouth there was an evident deviation of the mandible to the resected side; all patients had a limitation of laterotrusion. None of the patients were able to eat normally. The edentulous patients had problems wearing their prosthesis.

**CONCLUSION:**
Problems in proper prosthetic rehabilitation are mainly due to a lack of reconstruction of the bony continuity. Although complete restoration of all functions can not be guaranteed, reconstruction should preferable always include bony restoration.

## CREATE A REAL HARD PALATE IN CLEFT PALATE CASES BY USING DISTRACTION OSTEOGENESIS

***Eric JW Liou, DDS, MS, Kai-Fong Hung, MD, Sophia CN Chang, MD, Philip KT Chen, MD, C. Shing Huang, DDS, PhD, Y. Ray Chen, MD***

**Aims:** To evaluate the feasibility of repairing a cleft palate by using distraction osteogenesis to create a real hard palate, and avoid having raw surfaces and formation of scar tissues.
**Method:** Four adult cats were the subjects. Each cat had a surgically simulated unilateral palatal cleft, three months before distraction. The palatal shelves on the non-cleft side (not including the alveolar ridge) were osteotomized and distracted medially toward the other side with a custom-made distraction device. After the cleft edges have approximated, the distraction device was left for another 3 months for maintenance. Then the distraction device was removed, and musculature repositioning of soft palate and gingivoperiosteoplasty were performed to join both sides of the bony palatal shelves into one piece. The cats were sacrificed 3 months later. The results were evaluated grossly, radiographically, and histologically.
**Results:** The cats had no difficulty in eating during the experiment. Grossly, the simulated cleft palate was completely eliminated and well repaired with minimal scar tissue. Radiographically, the palatal shelves joined together and the cleft was filled by a radiopaque image. Histologically, the new bone formed by the distraction osteogenesis was non-lamellar and woven.
**Conclusions**: By using distraction osteogenesis, a wide cleft palate can be narrowed or completely eliminated before palatoplasty. This treatment modality can create soft and bony tissues needed for a cleft palate repair that is hardly accomplished by conventional treatment methods.

## $CO_2$ LASER APPLICATION IN APICAL SURGERY FOR ROOT-FILLED TEETH

***Loh H S,***

*Department of Oral and Maxillofacial Surgery National University of Singapore, Singapore*

**Aim** : To establish the effectiveness of the $CO_2$ laser in relation to failed root-filled teeth with apical infection.
**Materials**: Upper anteriors which were root-filled and apically infected (symptomatic with bone rarefaction) were selected, including those with recurrent infection, previous surgery, apicectomy and retrograde amalgam restoration.
**Method** : Under local anaesthesia, a standard flap was raised to expose the root apex and adjacent bone. Pulsed $CO_2$ laser beam (3 watts at 0.1 sec) was delivered via a 90° angled handpiece. Vaporization of infected tissues was effected with sterilization of the root apex, bone and amalgam.
**Results** : Healing occurred within expected periods with no complications. Infection was controlled with no further need for apicectomy and bone removal. X-rays showed normal bone regeneration.
**Conclusions** : The $CO_2$ laser was effective in the elimination of apical infection of root-filled teeth. Hand instrumentation was not necessary. It minimized the surgical destruction of the root and bone and provided a prosthodontic advantage.

## INTERACTIVE PRE-SURGICAL PLANNING AND INTRAOPERATIVE REAL-TIME NAVIGATION FOR IMPLANTATION

***Longerich U, Sailer H.F.***

*Department of Cranio-Maxillofacial Surgery, University Hospital Zurich, Switzerland*

**Introduction:** For greater surgeon confidence the interactive pre-surgical planning of implants with computed tomogra-

phy (CT) reconstruction arose increasingly. Dental image software provide submillimetric determination of the dental fixture within the cross-sectional and/or three-dimensional CT image data. However, the transfer of the precise image planning results to the patient works as usual with less accurate mechanical templates. This methodical contradiction could be solved by using instead an image-controlled procedure during implantation, which provide real-time co-ordinate navigation of the dental handpiece for a high accurate realisation of a preplanned milling bore.

**Material and methods:** Ten patients were planned a treatment of implants in compromised ridges, using cross-sectional and three-dimensional reconstructed image data by the same surgeon. Virtual implants were determined within the reconstructed CT image data sets in a way, that there was enough available bone for adequate implantation. A new intelligent dental handpiece with an integrated sensor was developed, which allowed tracking in the oral region of the oral patient for real-time navigation. The sensor assembly was connected to the image guided surgery software VPS™ (Virtual Patient System, ARTMA, Austria). At the time of surgery the implant planning results were carried out by real-time navigation of the intelligent dental handpiece. Postoperatively the post-surgical CT data set and the pre-surgical CT data set containing the implants were correlated. The centre point on the top and on the bottom of a virtual implant and its corresponding real implant was measured and the root mean square (rms) deviation in x-, y-, z-axis of these centre points was computed. The conformity in space positioning between the virtual implant and the real implant was statistically evaluated.

**Results:** There was no significant difference in space positioning between the pre-surgical planned implant and its surgical realisation. The pre-surgical planning results could realise with high accuracy in all cases.

**Conclusion:** The interactive pre-surgical planning and intraoperative real-time navigation for implantation is best justified in difficult situations with unusual anatomical topography and requiring multiple implants. It is useful, especially for patients, who may not be planned for advanced surgical procedures such as ridge-splitting, onlay grafting or nerve repositioning, and therefore, the implantologist has to be certain that there is enough available bone to adequately place an implant.

## USING THE DRUG 'WOBENZYM' IN BONE-GRAFTING OF CONGENITAL ALVEOLAR CLEFTS IN CHILDREN

***Prityko, A, Gonchakov, G, Lopatin, A***

*Moscow Scientific-Practical Paediatric Centre for Cranio-Facial Surgery and Neuropathology, Moscow, Russia*

**Aims:** The dispersal of tissue oedema in the zone of operation, to decrease pain during the postoperative period, accelerate bone formation.

**Method:** using the drug 'WOBENZYM' (MUCOS Pharma, Germany). This drug was used in 10 children aged between 12 and 15 years, with congenital alveolar clefts. The dose of 'WOBENZYM' is 1 tablet 3 times per day, 30 minutes before meals, starting 2 days before surgery and continuing 8 days thereafter. The control group consists of 20 children with alveolar clefts, in this age group

**Results:** in 10 children there was no tissue oedema in the zone of operation, this assisted faster wound healing. Pain was absent in 6 children and in 4 children it was weak and did not require analgesics. In the control group the tissues were oedemarous until the 6th day postoperatively and pain was present. In the study group, at the 3 months X-ray control there was final complete healing and living implanted tissues. In the control group such an effect was only at 6 months after surgery.

**Conclusion:** we recommend systemic enzymotherapy and particularly the drug 'WOBENZYM' to prevent tissue oedema and pain during the postoperative period in children with an alveolar cleft and also for stimulation of the reparatory processes.

## FLUOROQUINOLONES IN PROPHYLAXIS OF SUPPURATIVE COMPLICATIONS IN PAEDIATRIC CRANIOFACIAL SURGERY

***Lopatin A . Prityko A.. Mokhov O.***

*Moscow Paediatric Scientific-Practical Centre for Craniofacial Surgery and Neuropathology, Moscow, Russia*

**Aim:** to estimate the efficacy and safety of fluoroquinolone in the prevention of suppurative complications in the postoperative period in children, after craniofacial surgery.

**Method:** in 54 children (aged 10 to 15) with craniofacial deformities, bacterial cultures from the surface of the skin, nasal and oral cavities were obtained, susceptibility of the cultures were checked using antimicrobial test discs. In 11 samples (26%), S. aureus and P. aerugenosa were found resistant to the majority of cephalosporins. In these patients, Ciprobay (Bayer, FRG) ( 13.5 mg/kg) oral administration for 7-14 days was clinically highly effective as a prophylaxis against secondary infections. There was no evidence of any adverse events, including arthropathy or tendonitis. All patients were checked at follow-up visits using ultra-sound methods of arthroscopy.

**Results:** We did not observe any complications in the follow-up period. The microbiological response was determined on 50% of our patients

**Conclusion:** Cyprobay can probably be used in a child above 12 years of age, when bacteria to other antibiotics were cultured.

## FUNCTIONAL AND AESTHETIC STATUS IN PATIENTS RECONSTRUCTED WITH AN ILIAC CREST FREE FLAP.

***Lopez Atalaya, J.*; Navarro, C.; Perez, JE.; Salmeron, JI.; Concejo, C.; Molina, LF.***

*Department of Oral and Maxillofacial Surgery, Hospital General Universitario "Gregorio Marañon", Universidad Complutense de Madrid, Madrid, Spain.*

**Aim:** In this video we show the current status of several patients who underwent mandibular resections and were reconstructed with an iliac crest free flap. We will present, in an objective way, the analysis of the results obtained with regard to, basically, phonation, swallowing and mastication, the disabilities caused in the donor area and the adaptation to their occupational, social and familiar environment.

**M & Methods:** Mandibular repair has always raised serious problems, and to obtain a suitable facial harmony and dental-mandibular functional integrity, continues to be a chal-

...- and/or chemotherapy, implantation of biomaterials ...ansplantation of vascularized/ non-vascularized bone.

## ...ELAYED AND IMMEDIATE RECONSTRUCTION ...LLOWING HEAD AND NECK TUMOR EXCISION

*...rkus, T., Janužis, G., Aštrauskas, T., Vikšraitis, S.*

*...unas Medical Academy, Kaunas Academic Clinic*

**...IMS:**
...o estimate possibilities to cover defects following head and ...eck tumor excision by using various reconstructive meth...ds.

**METHOD:**
Vascularised bone or osteocutaneous iliac crest graft were used for the reconstruction of defects following excision of mandibular tumors in 3 patients. The 4th patient underwent microvascular transplantation of inversed myocutaneous latissimus dorsi flap for covering of extensive pharyngostoma following radiation and laryngectomy. Wide scalp defect after removing of neurofibroma was covered by expanded haired fasciocutaneous flap in the 5th patient.

**RESULTS:**
Immediate replacement of bone and soft tissues after hemimandibulectomy in osteosarcoma resulted in survival of the patient for 2 years without any threat in the nearest future. Delayed mandibular reconstruction has failed in one patient. Reconstruction of cervical oesophagus with simultaneous covering of adjacent neck tissues and replacement of scalp defect in another patient were successful as well in both patients.

**CONCLUSIONS:**
Various methods may be chosen for the covering of head and neck defects following cancer surgery. Immediate reconstruction after removing of mandibular osteosarcoma may result in remote good outcome.

## GROWTH INHIBITION IN SQUAMOUS CELLS INDUCED BY 5-FU, CBDCA, OR IFN-a

*[1]Noutomi, T.*, [1]Chiba, H., [1]Itoh, M., [2]Takada, E., [2]Mizuguchi J.*

*[1]Department of Oral and Maxillofacial Surgery, [2]Department of Immunology, Tokyo Medical College, Tokyo, Japan*

**Aims:** Cell lines from five squamous cell carcinoma (SCC) established for elucidating the molecular mechanism have been of varied sensitivity of to conventional chemotherapeutic drugs such as 5-FU, carboplatin(CBDCA), and interferon-alpha (IFN-a).
**Methods:** Cells were maintained in RPMI-1640 containing 15% fetal calf serum in the presence of 2 mM L-glutamine, 5μM mercaptoethanol and 100μg/ml of kanamycin at 37? in humidified air with 5% $CO_2$ . The sensitivity of the tumor cells to the drugs were determined in terms of both [$^3$H]-thymidine incorporation and cell cycle analysis using propidium iodide staining method.
**Results:** More than 80% inhibition by [$^3$H]-thymidine uptake was obtained in three cell lines to 100μg/ml 5-FU or CBDCA, in one line (TMC8T) with some resistance (50% inhibition) to both drugs. Interestingly, differential sensitivity to these drugs were observed in another cell line (TMC5L). Furthermore, IFN-a addition enhanced the inhibitory effect of 5-FU by [$^3$H]-thymidine uptake. The cooperative effect of 5-FU and IFN-a was accompanied by the increased induction of apoptosis.
**Conclusion:** Chemotherapeutic drugs such as 5-FU and CBDCA prevent tumor cell growth at least through the induction of apoptosis. Our cell lines would be valuable for analyzing the mechanism leading to apoptosis in squamous carcinoma cells.

266

## PHOTODYNAMIC DIAGNOSIS AND THERAPY

*M. Nübler-Moritz, H.F. Sailer, G. Eyrich, Ch. Oechslin*

Since the beginning of our century, certain dyes have been known to induce photosensitizing effects. Tumour treatment is the principle but not the only application field of photodynamic diagnosis (PDD) and therapy (PDT). Hematoporphyrin derivates (HpDs) are the most commonly used photosensitizers. Within a few hours after application HpDs are distributed. The basic characteristic of a photosensitizer is that it remains inactive until irradiated. HpDs are retained longer by malignant cells than by surrounding healthy cells and are detected by fluorescence. After resonant excitation by laser irradiation, the photosensitizer performs several simultaneous or sequential decays which results in intramolecular transfer reactions. At the end of these diverse reaction channels, highly cytotoxic reactants are released causing an irreversible oxidation of essential cell structures. Currently, further photosensitive compounds are under investigation concerning their applicability for PDD and PDT. One potential candidate is 5-aminolaevulinic acid (ALA) which itself is not even a photosensitizer but a precursor of the endogenous synthesis of porphyrins. It can be orally and topically administered rather than being injected like most of the porphyrins. First results seem promising, however, future routine clinical use also depends on further advancements in laser (e.g. diode lasers) and optical fibre technology, respectively.

## INFLUENCE OF FULL-FACE-TYPE HELMET ON MAXILLOFACIAL INJURIES AT TRAFFIC ACCIDENT OF MOTORCYCLISTS

*Nukata, J.*, Kano, Y., Michizawa, M., Sakuda, M.*

*Second Department of OMFS, Faculty of Dentistry, Osaka University, Osaka, Japan*

**AIMS:**
To clarify the characteristics of maxillofacial injuries at accidents of motorcyclists who have on full-face-type helmets (F-helmets).

**METHOD:**
A clinicostatistical study was performed in 50 motorcyclists who had suffered maxillofacial injuries and were treated at our department in the past 8 years.

## ALLOPLASTIC RECONSTRUCTION OF THE TEMPOROMANDIBULAR JOINT

*Peter D. Quinn, DMD, MD,*

*University of Pennsylvania, Philadelphia, PA*

**AIM:** Overview of six different alloplastic temporomandibular joint prostheses used over a fifteen year period.
**SUBJECT:** Theoretically, a successful alloplastic prosthesis for joint replacement would offer the following advantages in the adult patient:
Lack of donor-site morbidity
Occlusal stability (compared with autogenous grafts, which have variable resorption rates)
No need for intermaxillary fixation
Early range of motion with attendant dietary improvement
Decreased risk of ankylosis from heterotopic bone formation
Decreased surgical and anesthetic time

We will review our experience with the following prosthetic joint systems: Synthes, Kent-Vitek, Delrin-TiMesh, Christensen, Tech-Medica, and Biomet-Lorenz. Special emphasis will be placed on the bio-compatibility and wear care characteristics of the various biomaterials, surgical indications and techniques, complications and failure rates, and future direction of research in alloplastic implants. A total of 260 patients will be presented with long-term follow-up in pain levels, masticatory function, and life of the prosthesis.

## ORAL SURGERY TREATMENT NEED IN PATIENTS REFERRED FOR CORONARY ARTERY BYPASS SURGERY

*Qvarnström M[1,3]*, Meurman J. H. [2], Nuutinen P[5], Rehnberg S, Halonen P[4].*

*University of Kuopio, Faculty of Medicinel Department of Oral and Dental Diseases [1] and Kuopio University Hospital, Clinics of Otolaryngology / Clinics of Oral and Dental Diseases [3] Clinics of Surgery[5] and Internal Medicine[6], University of Kuopiol Department of Statistics, University of Helsinki, Institute of Dentistry[2], Finland*

**Aim:** to study oral surgery treatment needs in patients with cardio-vascular heart disease referred for coronary artery bypass surgery.
**Methods:** the patients were studied clinically and panoramic tomographs were taken. Signs of dental infectious foci were examined and recorded. The findings were summarized and expressed as the total panoramic risk index (Mattila 1989). All the x-rays (n=250 ) was examined twice by one investigator, ( MQ). The statistical difference between the two examinations was not significant as expressed by the kappa -value ( 0.90).
**Results:** the patient's heart disease was at least class II according to the New York Heart Association classification. The mean age of the patients was 60.3 " 9.3 years, men 58.8± 9.9 years and women 63.0± 7.5 (p<0.001) and 63.8% were men, 6.2 % women. In this group, 65 % were dentate and 35 % were edentulous (p< 0.0001). Of the men 73 % were dentate compared with 50.5 % in women (p<0.0001) The mean number of remaining teeth was 8.8± 9. 1 , men 9.9 ± 8.9 and women 7.0± 9.1 (p=0.17). The mean number of retained roots was 0.5± 1.5, 0.5 ± 1.7 in men and 0.4 ± 1.0 in women (n.s.). The mean number of periapical lesions was 0.6± 1.0, and 0.6 ± 1.1 in men and 0.4 ± 0.8 in women (p<0.001). Signs of pericoronitis were detected in 9.4 % of the patients, 63.7 % in men and 36.3% in women (p=0.2). When all the signs of infection foci recorded from the x-rays were summarized, the patients had a mean number of 3.2 lesions in comparison with 1.7 ± 3.3 in men and 0.9± 1.8 in women (p=0.03).
**Conclusion:** There are statistically significant differences between both sexes in this study and signs of infectio in patients with CHD, which need oral surgical treatment.

## BIODEGRADABLE SELF-REINFORCED POLYLACTIDE OSTEOSYNTHESIS IN MAXILLOFACIAL TRAUMATOLOGY

*Sailer H.F.[1]*, Haers P.E.[1], Suuronen R.[2], Lindqvist C.[2]*

*[1]Department of Cranio-Maxillofacial Surgery, University Hospital Zurich, Switzerland. [2]Department of Oral and Maxillofacial Surgery, University Hospital Helsinki, Finland.*

**Introduction:** Metallic osteosynthesis material in maxillofacial traumatology has the disadvantage that it has to be removed after the osteotomy has consolidated, which often requires general anaesthesia. Titanium plates have been introduced to bypass this need for secondary intervention. However, due to corrosion, titanium particles have been found in scar tissue covering these plates and regional lymph nodes. Moreover, if plates remain in situ for life, they cause artefacts in CT-imaging and especially in MRI-examination of the midface and oral cavity. In earlier studies, self reinforced polyactide devices have proven to be strong enough to bypass the need of additional support for the fixation of fractures in experimental and clinical conditions.
**Method:** Four different systems of self-reinforced polyactide osteosynthesis material were developed in order to enable osteosynthesis with biodegradable material in craniofacial and orthognathic surgery as well as in maxillofacial traumatology. These systems consist of the same material with screws in different diameters (1.5 mm; 2.0 mm; 2.5 mm and 2.7 mm) and plates with different profiles (0.6 mm; 1.0 mm; 1.2 mm; 1.4 mm).

The new systems of self-reinforced polyactide biodegradable osteosynthesis were consequently used in all patients volunteering when undergoing craniofacial surgery, orthognathic surgery and presenting with fractures of the maxillofacial skeleton. Excluded were fractures causing discontinuity of the mandible, patients suspected of H.I.V.-infection and patients with systemic diseases. In all cases, clinical examinations were done on a weekly basis until the sixth postoperative week, three and six months postoperatively. Radiological examinations were performed preoperatively, immediately postoperatively, six weeks, three and six months postoperatively.

The preliminary **results** (follow-up period from six weeks to six months) concerning the clinical use of this new material (fit in the bone, damage of the material by manipulation, need of emergency screws) and postoperative findings (incidence of material-related complications, skeletal stability) will be reported.

## DISTRACTION OSTEOGENESIS OF CRANIO-FACIAL SKELETON – RESEARCH & CLINICAL APPLICATIONS

*A. Rachmiel,*

*Dept. of OMS, Rambam Medical Center, Haifa, Israel*

## BIODEGRADABLE SELF-REINFORCED POLYLACTIDE OSTEOSYNTHESIS IN ORTHOGNATHIC SURGERY

*Haers P.E.[1]*, Suuronen R.[2], Lindqvist C.[2], Sailer H.F.[1].*

*[1]Department of Cranio-Maxillofacial Surgery, University Hospital Zurich, Switzerland. [2]Department of Oral and Maxillofacial Surgery, University Hospital Helsinki*

**Introduction**: Metallic osteosynthesis material in orthognathic surgery has the disadvantage that it has to be removed after the osteotomy has consolidated, which often requires general anaesthesia. Titanium plates have been introduced to bypass this need for secondary intervention. However, due to corrosion, titanium particles have been found in scar tissue covering these plates and in regional lymph nodes. Therefore, their removal has been advocated too. Moreover, if plates remain in situ for life, they cause artefacts in CT-imaging and especially MRI-examination of the midface and oral cavity is impossible. In earlier studies, self-reinforced polylactide devices have proven to have sufficient strength to bypass the need of additional support for the fixation of fractures and mandibular osteotomies.
**Method:** Self-reinforced polylactide plates and screws were used for osteosynthesis in 10 consecutive cases of bimaxillary osteotomies with simultaneous genioplasty (January-February 1998). Exclusion criteria were syndromes, systemic diseases, cleft deformities and refusal to participate in the study. The plates used in the maxilla (two on each side) and at the level of the sagittal split (one on each side) were fixated with 2 mm screws, whereas the chin fragment was fixated with two 2.7 mm bicortical screws. The self-reinforced plates and screws were bent at room temperature. Training elastics were used postoperatively. The clinical follow-up took place on a weekly base during the first six postoperative weeks. Cephalograms and orthopantomograms were made preoperatively, immediately postoperatively and six weeks, three and six months postoperatively.
**Results:** There were no postoperative complications linked to the osteosynthesis material. Wound dehiscence, infection or pseudarthrosis did not occur. All bone fragments were clinically stable. Cephalometric analysis after six weeks showed normal initial skeletal stability, comparable with the pattern reported following osteosynthesis with titanium plates. The six months results concerning skeletal stability will be reported.
**Conclusion:** The results of this study so far suggest that biodegradable SR-PLLA plates and screws can be used for osteosynthesis in bimaxillary orthognathic procedures and genioplasties. Long term follow-up is mandatory to obtain data concerning skeletal stability one year and more postoperatively.

## SANDWICH PROCEDURES WITH INTERPOSED GRAFTS AND TITANIUM IMPLANTS

*Sailer, H.F.,*

*Department of Cranio-Maxillofacial Surgery, University Hospital Zurich, Switzerland*

In 1987 we established and performed several kinds of sandwich procedures of the upper and lower jaw in combination with bone grafts and simultaneous placement of dental titanium implants. From the beginning our aim was not only to achieve good functional but also excellent results of the facial aesthetics.

For the mandible we developed the anterior and posterior sandwich procedures (Sailer 1989, 1991), using from the beginning not only autologous but also homologous lyophilized bone. The autologous bone was taken from the iliac crest, the calvarium or from the ascending ramus of the mandible.

The posterior mandibular sandwich procedure made the lateralisation of the inferior alveolar nerve necessary. The anterior mandibular sandwich procedure we performed from a height of 5 mm on. The same procedure was also used in a modified way in patients with spontaneous fractures due to extreme mandibular atrophy. From 1991 on we used also bone morphogenetic proteins (Sailer and Kolb 1994) in some of these procedures.

In the upper jaw we developed in 1987 two procedures: One was the Le Fort-I osteotomy of the edentulous highly atrophic jaw (Cawood Class VI) with removal of the sinus floor mucosa, the placement of autologous bone grafts (from the hip or calvarium) and the simultaneous setting of titanium implants. The indication for these procedures was again a functional and especially an aesthetic one because the whole osteotomized part of the maxilla was simultaneously moved forward and downward to re-establish the former facial height.

The second procedure for the upper jaw was the vertical circular sandwich procedure with splitting of the extremely narrow alveolar ridge of the maxilla (Cawood Class IV): The thin outer bone lamella is left pedicled to the periosteum and some submucous tissue and moved forward and outward; the gap in between was filled again by bone grafts which were loaded outside the oral cavity with titanium implants. Both the outer and palatal lamellae were then fixed to each other by compression screws.

The partial vertical sandwich procedure is often used in posttraumatic cases were several teeth are lost and the narrow ridge should be widened for the placement of implants.

The outcome of the procedures described above is presented, the problems and complications discussed.

## NEUROMUSCULAR CONTROLLED HYDROXYLAPATITE OCULAR IMPLANTS. A FUNCTIONAL AND AESTHETIC TREATMENT CONCEPT.

*Sailer H.F.*

*Department of Cranio-Maxillofacial Surgery, University Hospital Zurich, Switzerland.*

**Introduction:** Patients who have lost an eye due to trauma or tumour often suffer from aesthetic and functional problems with conventional eye prostheses. Most of the problems are caused by the lack of motility of the prosthesis and by postoperative conditions following enucleation or exenteration of the orbit resulting in inadequate conjunctival pockets, ptosis, deep superior sulcus syndrome etc.. The insertion of a neuromuscular controlled hydroxylapatite globe can correct these deficiencies.
**Method:** Immediate or delayed insertion of hydroxylapatite globes following enucleation of the bulbus oculi was performed in ten patients. The fixation of the rectus muscles to this globular implant is the main principle of this method and of utmost importance for functional and aesthetic success. Therefore, the Tenon's capsule together with the four rectus muscles are preserved during enucleation or exentera-

tion when performing immediate insertion of the implant. In case of delayed insertion the four muscles are identified. In both cases the muscles are directly fixated with resorbable sutures through small burr holes at the periphery of the implant. Six months later, following capillary in-sprouting into the porous hydroxylapatite globe, a sleeved peg is inserted into the orbital implant for fixation of the eye-prosthesis.
**Results:** Good aesthetic results could be achieved in all patients. The insertion of the rectus muscles resulted in adequate motility of the ocular prosthesis. The movements of the prosthesis were symmetrical and most cases with the same amplitude when compared to the contralateral intact eye. In one patient with an inadequate small implant, the low position of the implant and the deep superior sulcus could be corrected by transplantation of lyophilized cartilage sheets into the depth of the orbit. No complications (infection, dehiscencies, implant migration or extrusion) were seen in this small series.
**Conclusions:** The replacement of the bulbus oculi is recommended in all cases of eye enucleation or exenteration, as long as oncological radicality is not compromised. This method is especially useful in case of an empty orbit with malpositioned eyelids and short conjunctival fornices which are insufficient for incorporation of an adequate prosthesis. In these cases it is mandatory to insert a hydroxylapatite globe for fixation of the eye prosthesis.

## HARD DRILLING AND CUTTING WITH LASERS

*H.F. Sailer, M. Nübler-Moritz, M. Makek, G. Eyrich*

Hard tissue cutting with lasers was the most prestigious challenge for many physicists and clinicians over the last decade. Especially, as far as cranio and maxillofacial surgery is concerned, none of the current available laser systems are useful. Very recently, an ultrapulsed CO2 laser emitting at 9600 nm has been developed, providing efficient drilling and cutting of hard tissues such as teeth and bone. A series of in vitro and in vivo examinations in patients was performed. Histology from osteotomy areas and from cavities and pulps of vital teeth shows absence of hard tissue necrosis and of inflammatory reaction of the dental pulp.

## LASER INDUCED INTERSTITIAL THERMOTHERAPY

*H.F. Sailer, M. Nübler-Moritz, G. Eyrich, P. Hilfiker*

The possibility of localized tissue coagulation has formed the basis of a novel tumour treatment technique called laser induced interstitial thermotherapy (LITT). It was recently introduced to the treatment of various types of head and neck tumours such as AV-malformations, hemangiomas and lymphangiomas. The principle idea of laser induced interstitial thermotherapy is to position an appropriate laser fibre inside the tissue to be coagulated and to achieve necrosis by heating cells above 60°C. Denaturation of proteins and coagulation occur at these temperatures. In order to achieve a safe LITT procedure, knowledge of the final amount of damaged tissue is essential. Especially in OMF surgery, it is very important to prevent injury from adjacent healthy and sensitive structures. Therefore, special laser fibres are needed and an imaging-guided monitoring is mandatory. Either temperature probes, ultrasonography, CT or MRI can be used for this purpose. The best in terms of qualified monitoring is currently provided by real time open MRI techniques which will be illustrated and explained by means of clinical cases and computer simulations, respectively.

## MANDIBULAR ALLOGRAFT: A NEW METHOD FOR EXPLANTATION AND TRANSPLANTATION OF VASCULARIZED MANDIBLES USING MICROSURGICAL ANASTOMOSIS IN RATS.

***Saka, B., Gundlach, K.,***

*Medical School, Department of Maxillofacial and Plastic Surgery, Rostock University, Rostock, Germany*

**Aims:** One of the major problems in reconstructive craniofacial surgery is reconstruction of the mandible following tumor surgery or trauma. Vascularized allografts would offer many possibilities for reconstructive craniofacial surgery. A method of explantation and microsurgical transplantation of one side of the mandible has been examined and has been successful in rats.
**Method:** 60 Wistar rat with a weight of 300 g each were used for anatomical studies and establishing a method of explantation and transplantation of the mandible. The inferior alveolar artery and vein were identified and followed up to mandibular foramen. Medial and lateral muscles of mastication had been removed and osteotomy in the region of the chin were followed by opening the articular capsule in order to detach the transplant.Transplantation was done as replantation and began with microplate osteosynthesis of the mandible. The inferior alveolar vessels were attached microsurgically end to side : inferior alveolar artery to external carotid artery, inferior alveolar vein to the retromandibular vein.
**Results:** 60 transplantations of right and left mandibles were performed. The anastomosis of inferior alveolar artery and vein were satisafying in all rats. No size problem was found in transplantation when the rats were of the same age.
**Conclusion:** A standardized method for allograft explantation and transplantation of vascularized mandibles in the rat was established. This is the first step introducing microsurgical mandibular allografts in reconstructive craniofacial surgery.

## 2 CASES OF PEMPHIGUS

***Y.Sakuma, N.Kawatsu. M.Uchida***

*The Nippon Dental University, School of Dentistry at Tokyo, Department of Oral and Maxillofacial Surgery*

**Aims:** To analyzed the immunological changes in 2 Pemphigus patients.
**Method:** We conducted histopathological diagnosis pemphigus a 63-year old male and 62-year old female as our test subjects. White blood cells, platelets,lymphocytes, IgG,IgA,IgM,IL1-ß,IL12,and lymphocytes surface antigens CD?,CD4,CD8,CD16, CD45RA,CD45RO,CD56,HLADR and CD4/CD8 ratio were determined to assess Immunological competence.
**Results:** There were no changed white blood cells Platelets lymphocytes, IgA,IgM, IL1-ß, IL12. IgG was increased.Among the subset of lymphocyte NK cells decreased.

given methylprednisolone in a megadose regimen (P<0.05).
**Conclusion:** For the first time a neuroprotective effect of megadose MP (Urbasone®) in a calibrated experimental model of blunt optic nerve trauma was demonstrated. This strongly supports the clinical use of megadose MP in patients with blunt optic nerve trauma as is widely used in analogy to the National Acute Spinal Cord Injury Study II but without as yet an experimental basis.

## TMJ AND LATERAL PTERYGOID MUSCLE PATHOLOGICAL IMAGES BEFORE AND AFTER EXTRA ARTICULAR REARRANGEMENT OPERATION: A PRELIMINARY MRI REPORT

*Yang XJ,* MD, MMFS; Hong M MD, PhD, DDS;*

*Maxillofacial Surgery Dept. , General PLA Hospital, Beijing, China*

An MRI study is reported in the evaluation of a new operation for Temporomandibular Joint Dysfuction(TMJd): TMJ Extra Articular Rearrangement (EARe) operation. This operation attempts to rearrange the internal derangement of the TMJ and associated masseteric muscle disorder without opening the capsule of the joint. Magnetic Resonance Imaging (MRI) is used before operation for the diagnosis and after operation to evaluate the results.

Twnty six cases (40 joints) are reported on. Twenty cases (32 joints) with recurrent disc displacement and flat condylar surfaces, without severe degenerative imaging changes in the condyles ; 6 cases (8 joints) with recurrent disc displacement and degenerative imaging are shown in the condyle. Hypertrophy of the lateral pterygoid muscle (35 joints); effusion (25 joints) and dystrophy of the muscle (6 joints) are noted on MRI. The pathological images are also found in the anterior attachment and posterior bilaminar zone of the disc. On the MRI of 3 months to 14 months postoperation, 22 cases (35 joints) symptoms of TMJd are improved and with MRI changes in the lateral pterygoid muscles. Eighteen cases (20 joints) with improved disc replacement; 4 cases (5 joints) are improved in regard to degenerative changes in condyles; 3 cases (4 joints) with relief of pain symptoms but without evidence of imaging changes after 5 months. One case(1 joint) without evidence improvement in both symptoms and images.

*CORRESPONDING:
Dr. Xiao-Jiang Yang ,Beijing Kofta Medical Institute, 123 Rm. Science Center ;
11, Bei San Huan Xi Lu;100088, BEIJING CHINA

## EFFICACY AND TOLERABILITY OF A SELECTIVE, PERIPHERALLY ACTING, K-OPIOID-AGONIST AFTER EXTRACTION OF WISDOM TEETH

*C.M. Ziegler, S. Hoelzer*, J.E. Zöller, J. Jacob, U. Münster*

*Dep. of Oral & Maxillofacial Surgery University of Heidelberg, Germany*

**Background** Opioids have been used as highly potent analgesics for thousands of years. The analgesic effect, but also the side effects of morphine, are mediated on m-, d- and k-receptors. The strong, centrally acting opioids mostly work on m-receptors. Besides strong analgesia k-receptors also mediate sedation, dysphoria and diuresis as side effects, which are ascribed to the CNS and should not appear with a peripherally acting substance. An analgesia mediated through peripheral k-receptors represents a new therapeutic approach which has not yet been examined on patients. Asimadoline has been developed by the Merck Co. as a selective, peripherally acting k-opioid- receptor- agonist.
**Method:** Sixty out- patients (aged between 18 and 47 years) were randomized double-blind in four treatment groups during a period of 11 months. Three of these groups took Asimadoline in a concentration of either 0.5, 2 or 5mg post-operatively after wisdom tooth-extraction, as a single dose, the fourth group received a placebo. Paracetamol was a permitted concomitant-medication. The main interest was pain intensity on a visual analog scale (VAS). Further the onset of response, the pain intensity scale (PIS), the pain relief scale (PRS), the amount of Paracetamol used, the global assessment of the analgesic effect by patient and investigator and finally the postoperative swelling. To obtain an impression of the tolerance, type and frequency of adverse events, blood pressure and heart rate, laboratory findings and the assessment of global tolerance were documented.
**Results** Significant differences concerning the analgesic effect have only been found at certain times and confined to single pairwise comparisons of two doses at single times. Equally the final assessment of the analgesic effect from the point of view of the investigators and patients and the measure of swelling did not show any statistical significant differences between the single doses and the placebo group. Adverse events however only occurred in 5 cases which could be connected with the study medication. Only 14 patients reported "medium" adverse events. In no case did an adverse event lead to study exclusion. Only one patient reported a "serious" adverse event, which afterwards proved to be a simultaneously acquired EBV- infection.
**Conclusion** This study showed that Asimadoline is a peripherally-acting opiate, which could, because of the kind and frequency of adverse events, be designated as very good or tolerable, but which did, in the study design chosen referring to the analgesic effect, not show satisfying results. Further investigations will have to prove, whether by changing the doses, the frequency of application or maybe the indication (e.g. chronic pain, visceral pain) sufficient analgesia can be attained by maintaining the advantages concerning the tolerability.

## PRECISION AND PREDICTABILITY OF MAXILLARY MOVEMENTS IN BIMAXILLARY SURGERY

277

*Zimmermann A.P.*, Haers P.E., Sailer H.F., Eyrich G.*

*Department of Cranio-Maxillofacial Surgery, University Hospital Zurich, Switzerland*

**Introduction:** In contrast to conventional simulation techniques used in orthognathic surgery, the 3 D orthognathic surgery simulator (3D OSS) developed by Krenkel allows simulation and metric measurement of linear displacements and rotations in the three dimensions. This prospective clinical study evaluates the precision and predictability of surgical repositioning of the maxilla when using this system, by comparing repeated pre- and postoperative face-bow registrations and cephalograms.
**Material and method**: This study was done in a consecutive series of seventeen patients (14 females, 3 males, mean age 22 y 8 m) undergoing bimaxillary orthognathic surgery. A face-bow registration of the maxilla was performed preop-

eratively in order to plan the maxillary displacement in the orthognathic simulator. A face bow registration of the maxilla in its new position in the simulator was then made and compared to a clinical registration made six weeks postoperatively. The displacement as planned in the simulator was transferred during surgery by using the Face-O-Meter in combination with an intermediate wafer in intermaxillary fixation. Lateral and posterio-anterior cephalograms were made 10 days preoperatively, 5 days and 6 weeks postoperatively. Relevant skeletal and dental landmarks were digitized and the surgical movements analyzed. The linear displacements of the I-point in the three dimensions served as reference for the planning and for the evaluation.

**Results:** For sagittal, horizontal and vertical movements, the precision of the surgical execution based upon the 3D OSS simulation was extremely high. The mean simulated sagittal displacement was 4.8 ± 2.5 mm and the displacement measured in the cephalogram was 5.5 ± 2.8 mm. In the vertical dimension, an average movement of 1.6 ± 1.0 mm was planned and a movement of 1.4 ± 1.0 mm measured. Transversally, a mean discrepancy of 0.25 mm between model and real surgery was detected.

**Discussion**: A very high precision and metric control of model surgery and transfer during surgery can be achieved when using the 3D OSS in combination with the Face-O-Meter. The regular use of this device should be recommended especially for complex threedimensional movements of the maxillomandibulary complex.

## CLOSURE OF MAXILLARY ALVEOLAR DEFECTS BY MEANS OF NARROWING SEGMENTAL OSTEOTOMIES AND BONE GRAFTING

*Zimmermann A.P.*, Haers P.E., Oechslin C.K., Grätz K.W., Sailer H.F.*

*Department of Cranio-Maxillofacial Surgery, University Hospital Zurich, Switzerland*

**Introduction:** Defects in the maxillary alveolar process with otherwise an intact dental arch demand for optimal aesthetic and functional repair. An implant supported prosthesis is preferred in cases where the neighbouring teeth are intact.

**Material and method:** Seventeen patients (average 25 years at surgery, eleven female and six male patients) with defects involving the anterior maxilla were included in this study. Ten of these presented with posttraumatic defects and in seven cases these were due to surgical removal of benign tumours. The bone defect was either filled with autologeous bone grafts (8 cases) or, prior to this, the gap was narrowed by performing a segmented Le Fort I osteotomy with approximation of the segments and ensuing bone grafting (9 cases). In all cases, delayed insertion of fixtures was done 8-12 weeks postoperatively (42 implants).

Indication and treatment results of both treatment modalities were compared (maximum follow up of 36 months).

**Results:** Implant success rates were similar in both groups (95,2%). An algorithm for deciding to perform a segmented Le Fort I osteotomy or not was based on the site of the defect in the dental arch, its width (number of teeth involved), size (height and depth), the occlusion, the availability of a graft, the age of the patient as well as his/her aesthetic expectations.

A segmented Le Fort I-osteotomy was done in cases of major defects exceeding 4 tooth units and extending into the basal bone. Other factors leading to this treatment option were open bite deformities or other types of dysgnathia and highest aesthetic demands. Bone grafting alone was preferred in cases in which the height of the bone defect was less than the heigth of the alveolar process and its width limited to 3 teeth or less and in cases with normocclusion.

**Discussion:** The application of methods established for closing diastema in secondary cleft surgery is also valid for the reconstruction of tumour and trauma related alveolar maxillary defects. The more elaborated surgery related to the segmented Le Fort I-osteotomy allows to reduce the defect as well as the volume of the transplant and the number of implants needed. Consequently primary closure was facilitated. Moreover, in cases of malocclusion and dysgnathia a global treatment plan is available, which can be combined with preoperative orthodontic coordination.

## LATERAL CEPHALOMETRIC ANALYSIS OF THE MANDIBLE IN YOUNG WHITE PATIENTS

*Zöllner B*, Ehmer A, Smolka K, Ehmer U, Joos U*

*Cranio-Maxillofacial Surgery, University of Muenster, Germany*

**Aims:** The aim of this longitudinal study was to define female and male cephalometric standard values for sagittal growth of the mandible and the mandibular symphysis in eugnathic probands.

**Method:** Lateral cephalometric radiographs at the age of 9, 12, 15 and 18 years were digitized with a reflex metrograph to determine the development of the bone extension of the mandibular ramus, the mandibular body and the symphysis of the mandible. 36 male and 41 female white patients with an Angle Class I and no history of facial trauma, facial surgery or orthodontic treatment were randomized selected from the Bolton Brush Growth Study Cleveland, Ohio.

**Results:** The length of the mandibular ramus increased from a mean of 59.7 mm at the age of 9 years to 71.5 mm at 18 years of age in men, and stagnated at the age of 15 years at a mean of 65.5 mm in women. The sagittal extension of the mandibular ramus increased in men gradually to a mean of 33.9 mm at the age of 18 years and stagnated in women with 30.7 mm average at the age of 15 years. In men and in women the sagittal dimension of the symphysis increased from the age of 9 to 18 years by 1 to 1.5 mm. The mean of the sagittal dimension of the symphysis was 15 mm at the age of 18 years in women ranging from 10 mm to 18 mm.

**Conclusions:** The standards reported proved to be useful as a yardstick for planning and treatment in orthognathic surgery and might be a keystone in timing of early genioplasty.

## HIGH FREQUENCY ULTRASOUND IN DETERMINATION OF EXPANSION IN DEPTH OF TUMOURS OF THE SKIN OF THE FACE

*Pesic, Z.*, Mihailovic, D., Djordjevic,B., Milosavljevic, M.,*

*Department of Maxillofacial Surgery, Institute of Pathology, Clinic for Dermatovenerology, Medicine University, Nis, Yugoslavia.*

als produced by resin transfer moulding (RTM). PCL of varying molecular weights has been produced using properties compared to that of commercially available PCL. Biocompatibility of PCL was assessed by seeding CFC onto polymer discs and culturing for 48 hours. Cell activitiy was assessed by the alamar Blue assay as a measure of mitochondrial activity and cell morphology was viewed by light microscopy and scanning electron microscopy (SEM).
**Results:** High quality PCL with a narrow molecular weight distribution and properties comparable to commerically available PCL can be produced by this novel manufacturing process. Cell morphology and activity was good on PCL of varying molecular weights. It was noted that activity was lower on gamma-irradiated than non-irradiated PCL.
**Conclusions:** PCL can be produced in the manner detailed and is biocompatible with CFC. This technique may be used with stereo lithography to produce individually tailored bioabsorbable implants for craniofacial bone repair.

## BENIGN NEUROGENIC TUMORS OF THE MAXILLOFACIAL REGION

***Antoniades K*, Toliou T, Psimopoulou M, Kesaridou D, Thanoulis P, Giannouli T, Vahtsevanos K.***

*Department of OMFS, Theagenion Cancer Hospital of Thessaloniki, Greece.*

Neurilemmoma and neurofibroma are uncommon benign nerve sheath tumors with a predilection for the head and neck region. Both types may be solitary or may be part of the clinical presentation of von Recklinghausen's disease. They are slow growing, well circumscribed and often with the associated nerve attached peripherally. The purpose of this paper is to demonstrate the detailed clinical and histological features and to present the method of treatment of three very unusual maxillofacial neurogenic tumors (two cases of neurofibroma and one of neurolemmoma).

Case 1 was a 70-year-old female patient with Recklinghausen neurofibromatosis who presented with a rapidly growing skin neurofibroma over the left cheek. The lesion was widely excised and the pathologic examination of the specimen revealed a Merkel cell carcinoma of the cheek arising at a neurofibroma. We believe that the patient is the first to be described a Merkel cell carcinoma associated with neurofibomatosis, in the literature.

Case 2 was a 20-year-old male who presented with a huge tumor at the right floor of the mouth. The lesion was slow growing with a long year history, painless and a CT-scan disclosed a well circumscribed soft tissue mass with heterogeneous density. The lesion was completely excised intraorally and the histologic examination disclosed a neurolemmoma of the hypoglossal (XII) nerve. Although the neurolemmoma of the floor of the mouth is a very rare tumor it should be included in the differential diagnosis of tumor lesions in and around the mouth.

Case 3 was a 51-year-old female who presented with a mass in the left maxilla. A CT-scan revealed a very extensive lesion filling the left maxillary sinus with bone destruction and extending to the inferior nasal turbinate. The patient underwent a total left maxillectomy and the histologic examination of the specimen demonstrated neurofibromatosis. Benign neurogenic neoplasms are considered very rare tumors of the nasal and paranasal sinuses.

## ANALYSIS OF CHANGES OF THE OCCLUSAL PLANE FOLLOWING BIMAXILLARY OSTEOTOMIES.

***Novak J.B.*, Haers P.E., Sailer H.F.***

*Department of Cranio-Maxillofacial Surgery, University Hospital Zurich, Switzerland*

**Aims:** This study aims to analyse the changes of angulation of the occlusal plane following bimaxillary surgery.
**Method:** Cephalograms taken preoperatively and 1 year postoperatively in a series of 50 consecutive cases of bimaxillary surgery were analysed. Subgroups were made according to the underlying types of dysgnathia. The corresponding pre- and postoperative profile views of the patients were analysed for changes of the paranasal volume and nasolabial angle, whereas incisor exposure at rest and during smiling were studied on en face pictures. Planning of changes of the occlusal plane was based on these aesthetic parameters.
**Results:** The preoperative angulation of the occlusal plane was different for the underlying types of dysgnathia (with mean values for the subgroups ranging from 5° to 13°) and was corrected such that postoperatively, the differences were not significant anymore (ranging from 9° to 12°), although standardisation of the angulation of the occlusal plane had not been a parameter for planning. The clinical relevance of changes of angulation of the occlusal plane shall be demonstrated with clinical and radiological illustrations.
**Conclusions:** There is a relevant influence of changes of angulation of the occlusas plane on the aesthetic characteristics of the paranasal area and smile line. This should be taken into account when planning bimaxillary procedures.

**Materials and methods**
The selected patients were ten consecutive cases of bimaxillary osteotomies (January-February 1998) who volunteered following an informed consent approved by the medical ethicas committee.

Plates with a profile of 1.2 mm and screws with a diameter of 2 mm were used for osteosynthesis of the Le Fort I osteotomy (two plates on each side) and the BSSO (one plate on each side). The self-reinforced plates were bent without need of a heating device. Training elastics were used postoperatively.

During surgery, notes were made on failure of plates and screws. Clinical and radiological data were collected immediately postoperatively, at six weeks, six months and one year. The cephalograms were analyzed digitally using the Zurich cephalometric analysis system.

**Results**
None of the plates broke during adaptation. Twelve out of 396 screws (3.9%) had to be replaced.

There was one infection in the area of a BSSO, which resolved following intraoral incision and antibiotic therapy. In another case there was a transient tenderness on palpation of the upper screw of a paranasal plate, which resolved spontaneously.

The six weeks and six months results showed skeletal stability patterns comparable with the ones obtained with titanium devices[1]. The one year results will be reported.

**Conclusion**
Self-reinforced biodegradable osteosynthesis material is an alternative for metal devices in orthognathic surgery.

**Reference**
HAERS PE, SAILER HF. Biodegradable polylactid acid plates and screws in orthognathic bimaxillary surgery. Short term skeletal stability and material related failures. J Craniomaxillofac Surg 1998: **26**: Accepted for publication.

## 18. Upward Repositioning of the Extruded Posterior Maxillary Alveolar Segment by One-Stage Segmental Osteotomies

*Kim, C., Kim, M., Kim, D.*

*Department of Dentistry and Oral Surgery, Ewha Womans University, Seoul, Korea*

**Purpose**
This is to review the cases of posterior maxillary segmental osteotomies and to evaluate the clinical efficacy and surgical limitations of one-stage approach in regaining of interarch spaces to restore the posterior mandibular teeth with dental implants.

**Materials & methods**
Four patients who presented with extreme alveolar extrusion of posterior upper molars being unable to restore the prolonged missing teeth of lower molars underwent the segmental osteotomies by one-stage buccal approach. The segments were immobilized by prefabricated palato-occlusal resin splints for 6 weeks. The amount of regained spaces, tooth vitality, periodontal healing, relapse, tenderness to bite, and other complications were examined in 4 weeks, 3 months, 6 months and 1 year postoperatively.

**Results**
The surgeries were done under IV-sedation and local anesthesia within 80 minutes. The regained spaces (vertical distance between upper 1st molar and lower alveolar crest) averaged 4.7 ($\pm$0.6) mm. All showed no evidence of vitality lost, no sign of gingival and periodontal breakdown, no tenderness to function, but some degree of relapse was found in the case who had not been followed for 8 months without microplate fixation of segment.

**Conclusion**
The extruded alveolar segment of posterio maxillary molars can be repositioned properly by one-stage posterior maxillary segmental osteotomy with partial resection of bone in 4–6 mm. One microplate can be of help to keep the position until delivery of lower implant supported prostheses.

condylar hyperplasia by an orthognathic surgery (Le Fort I Bi-condylectomy) with orthodontic treatment, and another 15 inactive condylar hyperplasia by an orthognathic surgery (Le Fort I+IVRO) with orthodontic treatment.

We observed long term postoperative functional remodeling of facial skeletons in a high condylectomy alone group for 2 years.

Postoperative results between Le Fort I/Bi-condylectomy group and Le Fort I/IVRO group were compared by means of Delaire's cephalometric analysis.

The results of our investigation were as follows:

1. Facial asymmetry was improved and favorable occlusion was obtained without any orthodontic intervention in unilateral high condylectomy alone group.
2. Both orthognatbic surgery groups (Bi-condylectomy, IVRO) showed favorable postoperative stability except for one Bi-condylectomy case (open-bite tendency).

**Conclusion**

Active condylar hyperplasia can be corrected by high condylectomy alone. Both IVRO and Bi-condylectomy are appropriate surgical techniques, but IVRO seems to be a better indication in an inactive condylar hyperplasia.

## 15. The Vector of Growth During Mandibular Distraction with Intraoral Devices

*Karakasis, D.*

*Department of Oral and Maxillofacial Surgery, Aristotle University, Thessaloniki, Greece*

Intraoral distractors, as they are attached to the surface of the mandible, have a more or less certain defined plane for placement. The vector of growth is placed to the desired direction parallel to the surface of the mandible. This vector does not remain constant during the distraction period but its direction is changing. The problem of predictability of the final result is related to these changes. Placing the distractor, the surgeon should anticipate the changes of the vector of growth.

These changes are demonstrated in the clinical material of our cases treated in the last three years.

It seems that the changes of the vector of growth are due to the differences of resilience between the surrounding soft tissues but also they are due to the interaction between distraction forces if more than one distractor has been used.

## 16. A Prospective Study on the Selection of Surgical Techniques According to the Type of Skeletal Open-Bite

*Kim, B., Baik, S., Park, J., Park, H., Yi, C.*

*Department of Oral and Maxillofacial Surgery, Yonsei University, Seoul, Korea*

There is a plethora of surgical techniques to correct skeletal open-bite, yet the incidence of relapse is still high. This means that the decisive point in managing skeletal open-bite is not so much surgical technique itself but rather a careful diagnostic evaluation to make a selection of the appropriate surgical technique.

We classified the type of skeletal open-bite based on the architectural and structural craniofacial cephalometric analysis as follows: 1. excessive rotational growth of maxilla, 2. deficient vertical growth of anterior maxilla, 3. excessive mandibular angle, and 4. deficient vertical growth of mandibular ramus.

The following surgical techniques were used according to the type of skeletal open-bite: posterior impaction of maxilla, anterior down repositioning of maxilla, sagittal split horizontal ramus osteotomy of mandible, and extraoral vertical ramus osteotomy of mandible.

We evaluated the postoperative stability and relapse of 30 skeletal open-bite patients who had been operated on from 1995 to 1997 and followed up for 6 months.

The following results were obtained:

1. 28 cases among 30 skeletal open-bite cases were corrected by proper surgical techniques selected according to the type of etiologic factors and favorable postoperative stability was observed without a skeletal relapse.
2. One of 2 relapse cases relapsed due to surgical error and the other due to the improper selection of surgical technique.

The selection of appropriate surgical techniques according to the type of skeletal open-bite is considered to be important for postoperative stability without a relapse.

~~226~~

## 17. Self-Reinforced P(L/DL)LA Osteosynthesis with Bimaxillary Surgery: A Prospective Study of Material-Related Failures and Skeletal Stability 276

*Haers, P., Sailer, H.*

*Department of Cranio-Maxillofacial Surgery, University Hospital Zurich, Zurich, Switzerland*

**Statement of the problem**

Metal/titanium osteosynthesis has disadvantages such as corrosion, interference with modern imaging techniques and the need of a second intervention if the material has to be removed. This can be overcome with biodegradable material. This study presents the incidence of material related failures and the skeletal stability pattern one year postoperatively when using self-reinforced poly (L/DL) lactide copolymer (70/30) in bimaxillary procedures.