Aim: To evaluate whether chair-side prepared autologous platelet-rich growth factor (PRGF) in a β-TCP carrier enhances bone formation and implant osseointegration.

Methods: Large box-type defects (10 mm × 6 mm; W × H) were prepared in the edentulated and healed mandibles of six Beagles. An implant (3.25 mm × 11.5 mm; ∅ × L) was placed in the middle of each defect leaving the coronal 6 mm uncovered by bone. The remaining defect space was then filled-out with chair-side prepared autologous PRGF in a β-TCP carrier and covered with a collagen membrane (PRGF + β-TCP + CM) (six sites) or left without a collagen membrane as control (PRGF + β-TCP) (five sites); five sites received only β-TCP with a collagen membrane. Evaluation of the outcome after 3 months of healing was performed histologically, and differences among groups were tested for significance with the Kruskal–Wallis test with P set at 0.05.

Results: Histological analysis showed variable amounts of new lamellar and woven bone formation and residual β-TCP particles within the defect space, as well as osseointegration of the previously uncovered portion of the implants, with no apparent qualitative differences among groups. In one implant in each group, in different animals, no osseointegration in the portion of the implant within the defect was observed. New mineralized bone formation and marrow fraction (%) within the defect was similar among groups and averaged 44.4 ± 9.6, 45.8 ± 14.9, 48.4 ± 7.6 in the PRGF + β-TCP + CM, PRGF + β-TCP, and β-TCP + CM groups, respectively. Relative bone-to-implant contact (%) within the defect space averaged 33.8 ± 14.3 in the PRGF + β-TCP + CM, 44.9 ± 15.7 in the PRGF + β-TCP, and 21.4 ± 8.6 in the β-TCP + CM group, the difference between the two latter groups being significant ($P = 0.004$).

Conclusions and clinical implications: Application of chair-side prepared autologous PRGF in a β-TCP carrier, with or without the use of a collagen membrane, does not enhance bone formation over β-TCP implantation alone in large peri-implant defects, but seems to enhance implant osseointegration. The present study was partially funded by Biomet 3i Inc., Florida, USA.

300 | Tissue Augmentation and Engineering

A 5-year randomized pilot study with chemically modified SLA implants

Presenter: Bernard J-P

Department of Stomatology and Oral Surgery, School of Dental Medicine, University of Geneva, Geneva, Switzerland

Co-authors: Nedir R[1], Nurdin N[1], Bischof M[2], Bernard J-P[3], Reeners N[4], Najm SA[2], El Hage M[2]

[1]Ardentis Clinique Dentaire, Swiss Dental Clinics Group, Vevey, Switzerland, [2]Ardentis Clinique Dentaire, Swiss Dental Clinics Group, Lausanne, Switzerland, [3]Department of Stomatology and Oral Surgery, School of Dental Medicine, University of Geneva, Geneva, Switzerland, [4]Ardentis Clinique Dentaire, Swiss Dental Clinics Group, Yverdon, Switzerland

Background: Chemical modification to a sandblasted, large-grit, acid-etched implant surface (SLA) demonstrated significant greater bone-to-implant contact during the first weeks of bone healing in an experimental animal study (Buser et al. 2004). Oates et al. (2007) showed that modified surface (mod-SLA) might enhance healing process and decrease healing time when examining changes in implant stability over 6 weeks after placement. Until now, no study has been performed to compare long-term success rates of implants with mod-SLA and SLA surface.

Aim: (1) To evaluate the 5-year clinical performances of mod-SLA and SLA implants, (2) to compare crestal bone levels around implants.

Methods: This randomized controlled trial was approved by the Ethics Committee of Lausanne University (Switzerland). It was conducted with 14 patients. Each patient received one mod-SLA (SLActive) and one SLA implant (Straumann AG, ∅ 4.1 or 4.8 mm, length 8 or 10 mm) in either posterior mandible or maxilla. Clinical and radiographic parameters allowing success rate evaluation were assessed at 5 years after loading. Crestal bone levels were evaluated at the mesial and distal implant sides using peri-apical radiographs. The distance, parallel to the implant axis, between the implant apex and the most coronal bone–implant contact was measured at 5 years and postoperatively. When the substraction of the two values was negative, it indicated crestal bone loss; when positive, crestal bone gain.

Results: All 28 implants were successfully integrated and restored after 6 weeks of healing. At 5-year control, no patient complained about pain, suppuration or sinus-related pathology. All implants were clinically stable and fulfilled success criteria. Seventeen sides, either mesial or distal or both, of mod-SLA implants showed crestal bone loss (mean 0.81 ± 0.74 mm) and 11 mod-SLA implant sides showed bone gain (mean 0.54 ± 0.22 mm). Also 17 sides of SLA implants displayed bone loss (mean 1.08 ± 0.84 mm) whereas 11 SLA implant sides displayed bone gain (mean 0.54 ± 0.36 mm). The difference in bone loss and gain between mod-SLA and SLA implants was not statistically significant ($P > 0.05$).

Conclusions and clinical implications: This study showed that implants with mod-SLA surface could be placed using an early loading protocol and could achieve tissue integration over a period of 5 years. Crestal bone loss was limited with no significant difference between both implant types. The 5-year success rates were 100% for mod-SLA and SLA implants.

301 | Tissue Augmentation and Engineering

Ridge preservation following tooth extraction by using PRF (Platelet Rich Fibrin): a pilot study

Presenter: Bolukbasi N

Department of Oral Implantology, Faculty of Dentistry, Istanbul University, Istanbul, Turkey

Co-authors: Bolukbasi N, Kutan-Misirlioglu E, Ozdemir T

Department of Oral Implantology, Faculty of Dentistry, Istanbul University, Istanbul, Turkey

Background: The importance of growth factors in enhancing wound healing has become the focus of researches. Platelets contain large number of growth factors that have a key role in bone regeneration and soft tissue maturation.

Aim: The aim of this study is to evaluate the effectiveness of Platelet Rich Fibrin (PRF) on bone resorption after tooth extraction.
Methods: A total of 20 patients providing 28 extraction sides were included in the study. All extractions were done under local anesthesia with atraumatic tooth extraction techniques. After tooth extraction sockets were filled with PRF concentrations ensured from patients' own blood. PRF was prepared according to Choukroun protocol. Standardized peri-apical radiographs were taken to evaluate vertical resorption and periodontal probes were used to evaluate horizontal resorption. Measurements were made at the time of extraction and at the time of implant placement (2 months later after extraction).
Results: All extraction sights healed uneventfully. The clinical measurements 2 months after extraction revealed a loss of bone 0.2 ± 0.4 mm horizontally and 0.3 ± 0.5 mm vertically.
Conclusions and clinical implications: Within the limitations of this study it can be concluded that PRF is effective biomaterial for socket preservation before dental implant installation.

302 | Tissue Augmentation and Engineering

Toward efficient calcium phosphates in craniofacial bone regeneration: the role of magnesium ions

Presenter: Cabrejos-Azama J
Estomatología III, Facultad de Odontología, UCM, Madrid, Spain
Co-authors: Cabrejos-Azama J[1,2], Alkhraisat M[2], Torres J[3], Rueda C[2], Blanco L[1], López-Cabarcos E[2]
[1]*Estomatología III, Facultad de Odontología, UCM, Madrid, Spain,* [2]*Química-Física II, Facultad de Farmacia, UCM, Madrid, Spain,* [3]*Dep. de Estomatología, Facultad de Ciencias de la Salud, URJC, Alcorcón, Spain*

Background: Several calcium phosphates are increasingly employed to substitute the ideal autologous bone graft and large investments are dedicated to improve their efficiency in bone engineering. Magnesium ions are involved in various biological processes like cellular processes of proliferation and differentiation, cell-matrix interaction, normal function of parathyroid glands and metabolism of vitamin D. Thus, we consider the incorporation of Mg^{2+} ions presents a biological approach toward increasing the bioactivity of calcium phosphate-based scaffolds.
Aim: The purpose of this work is to incorporate Mg^{2+} ions in calcium phosphate cements and challenge them in bone regeneration.
Methods: Mg-substituted tricalcium phosphate (TCP) powder is synthesized and mixed with primary monocalcium phosphate to produce cement samples. The cements were then crushed and sieved to grain size between 0.5 and 0.8 mm. The bone substitutes were then sterilized and used to fill critical bone defects in rabbits calvaria. The samples were harvested after 8 weeks of implantation and processed for histological and histomorphometric analysis.
Results: All animals recruited for the study survived the surgeries and the recovery was uneventful.

1. Macroscopic evaluation: All cements were well incorporated to the adjacent bone and did not elicit an obvious inammatory reaction. Residual cement granules could be appreciated after 8 weeks of surgery.

2. Histological evaluation: Magnesium ions indeed improve the bone formation provoked by calcium phosphate implants and maintain the osteotransductive property of calcium phosphates.

Conclusions and clinical implications: The development of bone substitute with controllable biodegradable properties and improved bone regeneration is a step toward personalized therapy that can adapt to patient needs and clinical situations. Herein, we suggest and show that the employment of magnesium ions could improve the clinical efficiency of calcium phosphates and modify the pace of their biodegradation.

303 | Tissue Augmentation and Engineering

Sinus lift and the use of xenografts (porcine) – review

Presenter: Correia FDC
Faculdade de Medicina Dentaria da Universidade do Porto, Porto, Portugal
Co-authors: Correia FDC, Da Costa De Lemos Costa AMC, De Faria E Almeida RMCL, De Campos Felino AC, De Campos Felino AC
Faculdade de Medicina Dentaria da Universidade do Porto, Porto, Portugal

Background: The insufficiencyof alveolar bone height at the posterior part of the maxilla, loss of alveolar bone, the pneumatization of maxillary sinus or a combination of both means that often need to undertake a surgical sinus lift at the posterior maxillary in order to place dental implants. To maxillary augmentation the use of Anorganic bovine and equine bone are the most used xenografts fields in alternative to autologous grafts (considered Gold Standart). Nowadays Porcine xenografts are being used as maxillary field too and its considered a good option.
Aim: The aim of this literature review is visualize the state-of-art on sinus lift procedures using xenografts of porcine origin: what we know at this moment, advantages, disadvantages and complications that can be associated to this material.
Methods: To carry out this literary review we used the database Pubmed combined with two combinations of keywords: ''sinus lift porcine'' and ''maxillary augmentation porcine''. The limit established was the articles published in the last 10 years. In the end, we had a manual introduction of a review paper from data base Cochrane.
Results: Using the combination of keywords ''sinus lift porcine'' and ''maxillary augmentation porcine'' we found 32 articles in total (one was common to the two combination of keywords). After reading the abstract, 25 articles were excluded since it did not refer to the use of the biomaterial we want to review (porcine). In the final we have seven articles. In the end we have do a manual introduction of one review, very important for our base lines of knowledge.
Conclusions and clinical implications: The porcine bone shows excellent osteoconductive propertiesand it may be used in safe and successful sinus lift augmentation procedures. No disadvantages and complications were found in the literature with the use of this biomaterial. In spite of the good results found,