PHYSICOCHEMICAL CHARACTERIZATION OF BIOMATERIALS COMMONLY USED IN DENTISTRY AS BONE SUBSTITUTES - COMPARISON WITH HUMAN BONE

ABSTRACT
The present work focuses on the physicochemical characterization of selected mineral-based biomaterials that are frequently used in dental applications. The selected materials are commercially available as granules from different biological origins: bovine, porcine, and coralline. Natural and calcined human bone were used for comparison purposes. Besides a classical rationalization of chemical composition and crystallinity, a major emphasis was placed on the measurement of various morphostructural properties such as particle size, porosity, density, and specific surface area. Such properties are crucial to acquiring a full interpretation of the in vivo performance. The studied samples exhibited distinct particle sizes (between 200 and 1000 microm) and shapes. Mercury intrusion revealed not only that the total sample porosity varied considerably (33% for OsteoBiol, 50% for PepGen P-15, and 60% for BioOss) but also that a significant percentage of that porosity corresponded to submicron pores. Biocoral was not analyzed by this technique as it possesses larger pores than those of the porosimeter upper limit. The density values determined for the calcined samples were close to the theoretical values of hydroxyapatite. However, the values for the collagenated samples were lower, in accordance with their lower mineral content. The specific surface areas ranged from less than 1 m$^2$/g (Biocoral) up to 60 m$^2$/g (BioOss). The chemical and phase composition of most of the samples, the exception being Biocoral (aragonite), were hydroxyapatite based. Nonetheless, the samples exhibited different organic material content as a consequence of the distinct heat treatments that each had received.
THE PERFORMANCE OF HUMAN PERIODONTAL LIGAMENT MESENCHYMAL STEM CELLS ON XENOGENIC BIOMATERIALS

INTERNATIONAL JOURNAL OF IMMUNOPATHOLOGY AND PHARMACOLOGY

Department of Stomatology and Oral Sciences
University of Chieti-Pescara, Chieti, Italy

ABSTRACT
Mesenchymal stem cells from periodontal ligament (PDL-MSCs) hold great promise for bone regeneration. Most studies regarding the osteogenic differentiation of stem cells from periodontal tissue suggest that PDL cells may have many osteoblast-like properties, including the ability to form calcified nodules in vitro. This study investigated the morphological and histochemistry aspects of human PDL-MSCs, induced for osteogenic differentiation and seeded on a xenogenic porcine bone substitute in vitro, at different times of incubation. This biomaterial seems physically identical to human bone, and it has been reported to be osteoconductive. Our results indicated that the cells had a high affinity for the three-dimensional biomaterials; in fact, cellular proliferation and colonization was evident, and after 21 days the adherent cells started to detach themselves from the substrate, and at 30 days of incubation in differentiation medium, the cells completely lost the adhesion to the Petri’s disk, englobing all bioparticles. In conclusion, the in vitro behaviour of PDL-MSCs and their relationship with three-dimensional scaffold biomaterials encourage in vivo investigations for their use in dental tissue regeneration.
RESORPTION PATTERN OF A PORCINE-DERIVED BONE SUBSTITUTE

ABSTRACT

BACKGROUND: Resorption of a graft material could be a relevant issue to drive the choice of a surgeon for the selection of the best clinical option to fulfill the needs of a given clinical situation. The aim of the present study was to evaluate the in vitro formation, adhesion and morphology of human osteoclasts (OCls) generated on a porcine-derived bone substitute (OsteoBiol Apatos Sp-Block, Tecnoss, Coazze (TO), Italy).

MATERIALS AND METHODS: Peripheral blood mononuclear cells from healthy volunteers were used to generate OCls in vitro in the presence of macrophage colony stimulating factor (M-CSF) and receptor activator of NF-kB ligand (RANKL) on bovine bone (positive control) and porcine bone slices. Morphological and biochemical methods were used to assess OCls formation and activity.

RESULTS: Cells generated after 21 days of culture on the porcine bone substitute showed morphologic features resembling those on the positive control and displayed typical OCI markers. These findings indicate that the porcine-derived biomaterial supported OCI formation. With regard to the resorption, on porcine bone OCls formed smaller discontinuous lacunae.

CONCLUSIONS: This study demonstrates that the porcine-derived bone substitute undergoes a cell-mediated resorption process.
THE BONE TISSUE RESPONSES TO PREHYDRATED AND COLLAGENATED CORTICO-CANCELLOUS PORCINE BONE GRAFTS: A STUDY IN RABBIT MAXILLARY DEFECTS

CLINICAL IMPLANT DENTISTRY AND RELATED RESEARCH
Institute of Biomedicine, Sahlgrenska Academy
Göteborg University, Göteborg, Sweden

ABSTRACT
BACKGROUND: Bone substitutes should have osteoconductive properties and be completely replaced with new bone with time. Adding collagen gel to prehydrated and collagenated porcine bone (PCPB) particles results in a sticky and moldable material which facilitates clinical handling. However, the possible influence of the gel on the bone tissue response is not known.
PURPOSE: The objective of the study was to evaluate the bone tissue responses to PCPB graft with or without collagen gel and to evaluate the resorption/degradation properties of the biomaterials.
MATERIALS AND METHODS: Fourteen rabbits were used in the study. Bilateral bone defects, 5 x 8 x 3 mm, were created in the maxilla and filled with PCPB + collagen gel (test) or with PCPB only (control) and covered with a collagen membrane. Animals were killed after 2 (n = 3), 4 (n = 3), and 8 weeks (n = 8) for histological and morphometrical evaluations. RESULTS: There were no differences between test and control defects. Both materials showed bone formation directly on the particles by typical osteoblastic seams. The bone area increased with time (2-8 weeks) for both sides, from 16.2% (control) and 19.2% (test) to 42.7 and 43.8%, respectively. The PCPB, whether mixed with collagen gel or not, was resorbed by osteoclasts as well as part of remodeling with the formation of osteons within the particles. Morphometry showed a decrease of PCPB area from 19.4% (control) and 23.8% (test) after 2 weeks to 3.7 and 9.3% after 8 weeks, respectively.
CONCLUSIONS: Mixing collagen gel and PCPB to facilitate the clinical handling does not influence the bone tissue responses to the material, which exhibited osteoconductive properties and was resorbed with time.

Nannmark U
Sennerby L

Epub 2008 Jan 30
PMID: 18241216

ulfnannmark@gu.se

NUMBER OF PATIENTS
14 rabbits

OSTEOBIOLOGICAL PRODUCTS
OSTEOBIOLOGICAL SOLUTIONS
OSTEOBIOLOGICAL SCIENCES

OSTEOBIOL® Gen-Os
OSTEOBIOL® mp3
OSTEOBIOL® Evolution
MELATONIN PLUS PORCINE BONE ON DISCRETE CALCIUM DEPOSIT IMPLANT SURFACE STIMULATES OSTEOINTEGRATION IN DENTAL IMPLANTS

JOURNAL OF PINEAL RESEARCH

Department of General and Implant Dentistry, Faculty of Medicine and Dentistry University of Murcia, Murcia, Spain

ABSTRACT

The aim of this study was to evaluate the effect of the topical application of melatonin mixed with collagenized porcine bone to accelerate the osteointegration on the rough discrete calcium deposit (DCD) surface implants in Beagle dogs 3 months after their insertion. In preparation for subsequent insertion of dental implants, lower premolars and molars were extracted from 12 Beagle dogs. Each mandible received three parallel wall implants with discrete calcium deposit (DCD) surface of 4 mm in diameter and 10 mm in length. The implants were randomly assigned to the distal sites on each side of the mandible in three groups: group I implants alone, group II implants with melatonin and group III implants with melatonin and porcine bone. Prior to implanting, 5 mg lyophylized powdered melatonin was applied to one bone hole at each side of the mandible. None was applied at the control sites. Ten histological sections per implant were obtained for histomorphometric studies. After a 4-wk treatment period, melatonin significantly increased the perimeter of bone that was in direct contact with the treated implants (P < 0.0001), bone density (P < 0.0001), new bone formation (P < 0.0001) in comparison with control implants. Topical application of melatonin on DCD surface may act as a biomimetic agent in the placement of endo-osseous dental implants and enhance the osteointegration. Melatonin combined with porcine bone on DCD implants reveals more bone to implant contact at 12 wk (84.5 +/- 1.5%) compared with melatonin treated (75.1 +/- 1.4%) and nonmelatonin treated surface implants (64 +/- 1.4%).

Calvo-Guirado JL Gómez-Moreno G Barone A Cutando A Alcaraz-Baños M Chiva F López-Mari L Guardia J

2009 Sep;47(2):164-72. Epub 2009 Jun 29
PMID: 19570131

joseluis.calvo@um.es

NUMBER OF PATIENTS
12 dogs

GRAFTED WITH BONE SUBSTITUTE OsteoBiol® mp3
ACTIONS OF MELATONIN MIXED WITH COLLAGENIZED PORCINE BONE VERSUS PORCINE BONE ONLY ON OSTEOINTEGRATION OF DENTAL IMPLANTS

JOURNAL OF PINEAL RESEARCH

Department of General and Implant Dentistry, Faculty of Medicine and Dentistry
University of Murcia, Murcia, Spain

ABSTRACT

This study evaluated the effect of the topical application of melatonin mixed with collagenized porcine bone on the osteointegration on the rough discrete calcium deposit (DCD) surface implants in Beagle dogs 3 months after their insertion. In preparation for subsequent insertion of dental implants, lower molars were extracted from 12 Beagle dogs. Each mandible received two parallel wall expanded platform implants with a DCD surface of 4 mm in diameter and 10 mm in length. The implants were randomly assigned to the distal sites on each mandible in the molar area and the gaps were filled with 5 mg lyophilized powdered melatonin and porcine bone and collagenized porcine bone alone. Ten histological sections per implant were obtained for histomorphometric studies. After a 4-wk treatment period, melatonin plus porcine bone significantly increased the perimeter of bone that was in direct contact with the treated implants (P < 0.0001), bone density (P < 0.0001), and new bone formation (P < 0.0001) in comparison with porcine bone alone around the implants. Melatonin plus collagenized porcine bone on DCD surface may act as a biomimetic agent in the placement of endo-osseous dental implants and enhance the osteointegration. Melatonin combined with porcine bone on DCD implants reveals more bone in implant contact at 12 wk (84.5 ± 1.5%) compared with porcine bone alone treated area (67.17 ± 1.2%).
EFICACIA OSTEOCONECTORA DEL HUESO MINERAL Y COLÁGENO PORCINO EN LA REGENERACIÓN ÓSEA: ESTUDIO EXPERIMENTAL EN CONEJOS

LABOR DENTAL

ABSTRACT
OBJETIVO: Evaluar la osteoconductividad del nuevo biomaterial de pasta de hueso y colágeno de origen porcino (Osteobiol Putty®) en conejos de Nueva Zelanda.
MATERIAL Y MÉTODOs: Implantamos en la zona proximal metafisaria de las tibias traseras de 20 conejos albinos de Nueva Zelanda, implantes de pasta de hueso de origen porcino con gránulos de 200 µm, y colágeno tipo I puro. Realizamos 2 grupos de estudio: 1 mes (Grupo I) y 6 meses (Grupo II) después de la implantación. Realizamos el estudio radiológico anteroposterior y lateral de las piezas óseas que contenían los implantes y el estudio microscópico óptico con las técnicas de Hematoxilina-Eosina, tricrómico de Masson y reticulita de Gordon-Switt.
RESULTADOS Y DISCUSIÓN: Nuestro estudio confirma la capacidad osteoconductora del material que actúan como andamiaje para las células óseas y a partir del 6° mes, una marcada disminución radiológica del volumen del implante y su parcial sustitución por tejido osteoide, médula ósea adiposa y hematopoyética, lo que demuestra un fenómeno de reabsorción parcial y progresiva del biomaterial.
CONCLUSIONES: La pasta de hueso y colágeno Osteobiol Putty puede ser considerado como un nuevo material osteoconductor, y por tanto un posible sustituto óseo.
SHORT COMMUNICATION: COLLAGENATED CORTICO-CANCELLOUS PORCINE BONE GRAFTS. A STUDY IN RABBIT MAXILLARY DEFECTS

CLINICAL IMPLANT DENTISTRY AND RELATED RESEARCH

Institute of Biomedicine, Sahlgrenska Academy
Göteborg University, Göteborg, Sweden

ABSTRACT

BACKGROUND: Bone substitutes of collagenated porcine bone (CPB) have previously been shown to have osteoconductive properties and to be resorbed with time. The influence of different ratios between bone particles and collagen on bone response is not yet known.

PURPOSE: The objective of the study was to evaluate the effect of different collagen ratios on the bone tissue responses to CPB grafts.

MATERIALS AND METHODS: Eight rabbits were used in the study. Bilateral bone defects, 5 ¥ 8 ¥ 3 mm, were created in the maxilla and were filled with 60% CPB/40% collagen gel or with 80% CPB/20% collagen gel. Animals were killed after 8 weeks for histological and morphometrical evaluations.

RESULTS: There were no differences between the two biomaterials tested. Both materials showed a high degree of bone formation, 42% and 46%, respectively. Both materials were showing signs of resorption at time of sacrifice.

CONCLUSIONS: Different collagen/CPB ratios do not influence the bone tissue responses to CPB. Both materials exhibited osteoconductive properties and were starting to be resorbed at 8 weeks.
ABSTRACT
The aim of this investigation was to assess the possibility of preserving the buccal and lingual plates of a postextraction socket from resorption using bone filler after tooth extraction. In 10 patients, 10 single extraction sites in the posterior area received a bone substitute. The osteoconductive material was covered by a collagen membrane in all cases. Contour changes of the alveolar process were evaluated intraorally using a surgical caliper over a 4-month period. Four months after extraction, a specimen was harvested from the area previously augmented with bone filler, and histologic analysis was performed. The results demonstrated that it was possible to preserve about 85% of the initial ridge dimensions, allowing for correct implant placement. From a histologic point of view, new bone formation was detected in all sites, with a 25% average residual presence of the graft particles. This investigation confirms the benefit of augmenting an extraction socket with bone substitutes.
ABSTRACT
AIM OF THE WORK: As bone physiology studies suggest, the incorporation of an autologous bone graft in the receiving site could take place in a shorter period than the one accepted today (9 months) since the subsequent bone remodelling could be stimulated by mastication. In this pilot study the effectiveness of such treatments assessed.
MATERIALS AND METHODS: Dental implants were inserted in grafted bone two months after grafting and were loaded two months later.
RESULTS AND CONCLUSIONS: The reduced graft resorption, the good primary stability of the fixtures and the respect of implant success criteria after the first year of function give evidence of this technique.
ABSTRACT

BACKGROUND: Reduction of alveolar height and width after tooth extraction may provide some problems in implant placement, especially in the anterior maxilla for esthetic reasons. Different graft materials have been advocated to prevent bone-volume reduction. The aim of this study was to evaluate radiographic parameters of implants positioned in grafted alveoli with three different biomaterials: magnesium-enriched hydroxyapatite (MHA), calcium sulfate (CS), and heterologous porcine bone (PB). METHODS: In 15 patients, 45 fresh extraction sockets with three bone walls were selected. Fifteen sockets received MHA, 15 sockets received CS, and 15 sockets received corticocancellous PB as a graft material. Three months after bone filling, titanium dental implants were placed in grafted sites. Three months after implant placement, temporary restoration was performed. Follow-up examinations were conducted, and intraoral digital radiographs were taken at baseline and 12 and 24 months after implant placement to evaluate the marginal bone level in each patient. Comparisons for marginal bone loss over time between groups were performed by the Student two-tailed t test. RESULTS: At the 24-month follow-up, a survival rate of 100% was reported for all implants. For the MHA group, a mean mesial bone loss of -0.21 +/- 0.08 mm and a mean distal bone loss of -0.22 +/- 0.09 mm (mean bone loss: 0.21 +/- 0.09 mm) were reported; for the CS group, a mesial bone loss of -0.14 +/- 0.07 mm and a distal bone loss of -0.12 +/- 0.11 mm (mean bone loss: -0.13 +/- 0.09 mm) were measured; for the PB group, a mean mesial bone loss of -0.15 +/- 0.10 mm and a mean distal bone loss of -0.16 +/- 0.06 mm (mean bone loss: -0.16 +/- 0.08 mm) were reported. No statistically significant differences were reported among groups (P >0.05). CONCLUSION: At the 24-month follow-up, the present study showed that placement of implants in grafted sockets was not influenced by the three different biomaterials because they did not negatively impact the clinical outcome.
XENOGRAFT VERSUS EXTRACTION ALONE FOR RIDGE PRESERVATION AFTER TOOTH REMOVAL: A CLINICAL AND HISTOMORPHOMETRIC STUDY

JOURNAL OF PERIODONTOLOGY

Division of Dentistry, Versilia Hospital, Lido dl Camaiore, Lucca, Italy

ABSTRACT

BACKGROUND: The preservation of bone volume immediately after tooth removal might be necessary to optimize the success of implant placement in terms of esthetics and function. The objectives of this randomized clinical trial were two-fold: 1) to compare the bone dimensional changes following tooth extraction with extraction plus ridge preservation using corticocancellous porcine bone and a collagen membrane; and 2) to analyze and compare histologic and histomorphometric aspects of the extraction-alone sites to the grafted sites.

METHODS: Forty subjects who required tooth extraction and implant placement were enrolled in this study. Using a computer-generated randomization list, the subjects were randomly assigned to the control group (EXT; extraction alone) or to the test group (RP; ridge-preservation procedure with corticocancellous porcine bone and collagen membrane). The following parameters were assessed immediately after extraction and 7 months prior to implant placement: plaque index, gingival index, bleeding on probing, horizontal ridge width, and vertical ridge changes. A bone biopsy was taken from the control and test sites 7 months after the surgical treatment. Histologic and histomorphometric analyses were also performed.

RESULTS: A significantly greater horizontal reabsorption was observed at EXT sites (4.3+/-0.8 mm) compared to RP sites (2.5+/-1.2 mm). The ridge height reduction at the buccal side was 3.6+/-1.5 mm for the extraction-alone group, whereas it was 0.7+/-1.4 mm for the ridge-preservation group. Moreover, the vertical change at the lingual sites was 0.4 mm in the ridge-preservation group and 3 mm in the extraction-alone group. Forty biopsies were harvested from the experimental sites (test and control sites). The biopsies harvested from the grafted sites revealed the presence of trabecular bone, which was highly mineralized and well structured. Particles of the grafted material could be identified in all samples. The bone formed in the control sites was also well structured with a minor percentage of mineralized bone. The amount of connective tissue was significantly higher in the extraction-alone group than in the ridge-preservation group.

CONCLUSIONS: The ridge-preservation approach using porcine bone in combination with collagen membrane significantly limited the resorption of hard tissue ridge after tooth extraction compared to extraction alone. Furthermore, the histologic analysis showed a significantly higher percentage of trabecular bone and total mineralized tissue in ridge-preservation sites compared to extraction-alone sites 7 months after tooth removal.
CLINICAL AND HISTOLOGICAL STUDY OF A XENOGENIC BONE SUBSTITUTE USED AS A FILLER IN POSTEXTRACTIVE ALVEOLUS

MINERVA STOMATOLOGICA

Operative Odontostomatologic Unit, Department of Periodontology, Tor Vergata University, Fatebenefratelli Hospital, Isola Tiberina, Rome, Italy

ABSTRACT

AIM: The development of oral implant techniques and the demand for the treatment of increasingly complex cases have drawn the attention of researchers and clinicians towards those systems and materials able to promote bone regeneration. The aim of this paper is to evaluate the clinical behavior and in particular the resorption times of the material used as a filler in postextractive alveolus with the intent of preserving the ridge volume, a prerequisite for successive insertion of osteointegrated fixtures.

METHODS: A group of 12 patients, aged between 30-40 years, have been selected at the Oral Surgery Unit of the San Giovanni Calibita Hospital in Rome. They all required an endosseous implant following the loss of a dental element due to radicular fracture of periodontal pathology. The grafting material used is OsteoBiol Putty, an antigen-free bone paste composed of 80% granulated mix and 20% pure collagen.

RESULTS: The results emerging from the histological analysis show that 3 months after insertion of this osteoconductive material in the receiving site it can no longer be detected in the samples collected and it has been completely substituted by trabecular bone tissue.

CONCLUSIONS: The conclusion is drawn that the heterologous material used in this study shows excellent manageability allowing the operator to easily and accurately remove and shape it in the receiving site.
TRATAMIENTO DE CANINO SUPERIOR RETENIDO, IMPLANTES INMEDIATOS Y REGENERACIÓN ÓSEA

LABOR DENTAL

ABSTRACT
El tratamiento de caninos superiores retenidos en adultos resulta inevitable cuando los caninos deciduos se exfolian o cuando el diente retenido comienza a referir sintomatología. Las alternativas de tratamiento incluyen un procedimiento ortodóntico con la finalidad de llevar la pieza a la arcada o la exodoncia y reposición protésica de la pieza ausente 1,2. Los autores describen una alternativa de tratamiento en dos fases quirúrgicas mediante procedimientos conjuntos de regeneración ósea guiada y la posterior rehabilitación protésica.

INTRODUCCIÓN
A excepción de los terceros molares, los dientes con mayor índice de impactación en adultos son los caninos superiores. Estas piezas causan relativamente pocos o ningunos problemas a los pacientes, y muchas veces permanecen sin erupcionar y asintomáticos por muchos años. Las causas por las que los caninos permanentes pueden permanecer retenidos en los adultos son la falta de un diagnóstico precoz en la niñez y del énfasis e importancia de su tratamiento. Antes de comenzar un tratamiento ortodóntico para resolver la impactación en un paciente adulto, el odontólogo debe informar que las piezas que han permanecido retenidas durante muchos años pueden experimentar cambios patológicos relacionados con su saco pericoronario. Además, mover un canino impactado en un paciente adulto hacia la arcada está relacionado con su posición tridimensional y conlleva un período de tratamiento considerablemente mayor que en un niño. Por ello, el paciente debe ser parte de la decisión a seguir y debe ser informado de los potenciales problemas relacionados con estos tratamientos 1,2.

Al optarse por la extracción de una pieza retenida en la región anterior del maxilar superior, los procedimientos de regeneración ósea guiada resultan necesarios con la finalidad de mantener el volumen del hueso, establecer un andamiaje para el proceso de regeneración tisular, evitar invaginaciones de tejido blando y ofrecer un buen lecho receptor para la futura colocación de implantes 3, 4, 5. Este artículo describe la extracción de un canino retenido en una primera fase quirúrgica con regeneración ósea simultánea, y una segunda fase quirúrgica donde se procede a la extracción de los cuatro incisivos superiores y a la colocación de dos implantes inmediatos en los alvéolos de los dos incisivos laterales.
Alveolar regeneration

LOCALIZED BONE REGENERATION WITH PORCINE BONE GRAFT: CLINICAL AND HISTOLOGICAL EVIDENCES

IL DENTISTA MODERNO

CliniGl Cliredent S.L. Av. del canal 186 bis. Prat de Llobregat Barcelona

SUMMARY
The presence of localized bone defects in the alveolar process can impede the use of implants because of insufficient bone volume for osseointegration. Localized resorption of bone can also prevent a good aesthetic result due to the scarce bone support of the gums.

Autologous bone grafting is considered the gold standard, but it has disadvantages for the patient, such as the need of a donor site and the risk of morbidity.

The use of alloplastic, allogeneic or xenogeneic grafts has become an attractive alternative.

A recent study in the rabbit maxilla has demonstrated that porcine bone graft has strong osteoconductive properties and is remodelled and replaced with new bone over time.

The aim of the study is to describe a technique for reconstruction of localized defects to enable installation of implants and to support the gums in order to obtain a satisfactory aesthetic result. The augmentation of the bone is evaluated also from a histological point of view.
CRESTAL RIDGE PRESERVATION WITH ALLOGENIC BONE, HISTOLOGICAL ANALYSIS

ITALIAN ORAL SURGERY
Chirurgia orale parodontale implantare. Riabilitazione protesica

ABSTRACT
Several scientific studies have shown that the ridge preservation, using filling materials that could guide bone formation, could be useful for the future implant placement or prosthetic rehabilitation. Goal of the present study was to evaluate with a clinical and histological observations the effect of a new heterologous bone as filling material in post-extraction sites. The bone allograft was used in combination with resorbable membranes to fill 4 post-extraction sites. Clinical and histological observations showed that post-extraction sites filled with deantigenated bone at 4 months had new bone formation and gave the opportunity to place implants for future prosthetic rehabilitation.
CLINICAL OUTCOME OF IMPLANTS PLACED IMMEDIATELY AFTER IMPLANT REMOVAL

ABSTRACT
BACKGROUND: The purpose of this study was to evaluate the clinical success of implants placed immediately after the explantation of failed implants due to fracture at 12 months.
METHODS: Nine immediate implants were placed in nine patients following explantation of nine fractured implants. Five experimental implants did not require any regenerative procedures; the remaining four immediate implants were grafted with deproteinized porcine bone particles and covered with bioabsorbable membranes. All implants were restored with fixed prostheses. The follow-up period was 12 months.
RESULTS: No residual bone defects were observed or probed around any implant at the second-stage surgery, and all implants were asymptomatic and stable. All the implants were successful after prosthetic rehabilitation showing no mobility, pain, suppuration, or absence of peri-implant radiolucency. The radiographic measurements showed no significant bone loss pattern at the 12-month follow-up visit.
CONCLUSION: The findings of this study suggested that implants placed immediately after implant explantation due to biomechanical fracture could be performed with results that are similar to results obtained with implants placed immediately after tooth extraction.
IMMEDIATE POSTEXTRACTION IMPLANTS: TREATMENT OF RESIDUAL PERI-IMPLANT DEFECTS. A RETROSPECTIVE ANALYSIS

EUROPEAN JOURNAL OF IMPLANT PROSTHODONTICS

Università degli studi di Genova. Cattedra di Patologia Speciale Odontostomatologica

ABSTRACT

AIM: This was to perform a retrospective analysis of clinical success of implants placed immediately after tooth extraction and the outcome of regenerative procedures used to treat peri-implant bone defects.

MATERIALS AND METHODS: Fifty patients were selected for this study and treated with an immediate implant. They were called back for a retrospective examination after prosthetic rehabilitation. Out of the 50 implants, 18% did not need any regenerative procedure: 40% were treated with resorbable membranes and heterograft; 20% with resorbable membranes and autogenous bone graft; 10% with putty and 12% with membrane alone.

RESULTS: One implant failed due to infection 2 months after placement. At the second stage surgery 82% of sites showed a complete bone healing, and the remaining 16% showed a residual bone defect smaller than 2 mm. All the implants were successful at the retrospective clinical examination, and the radiographic examination showed a very good stability of the marginal bone level.

CONCLUSION: In conclusion, results from this study pointed out the high success rate of immediate implants and the good clinical outcome of the regenerative procedure used to treat peri-implant bone defects.
BUCCAL BONE AUGMENTATION AROUND IMMEDIATE IMPLANTS WITH AND WITHOUT FLAP ELEVATION: A MODIFIED APPROACH

INTERNATIONAL JOURNAL OF ORAL AND MAXILLOFACIAL IMPLANTS

Department of Biophysical, Medical and Dental Sciences and Technologies, School of Dentistry, University of Genova, Italy

ABSTRACT

PURPOSE: The aim of this study was to compare the clinical success and bone healing of implants placed in fresh extraction sockets using a flapless procedure compared to those placed with flap elevation.

MATERIALS AND METHODS: Twenty teeth in 20 patients were selected for this study and were scheduled for tooth extraction and immediate implant placement. Ten implants were placed with flap elevation (control group), and 10 implants were placed without flap elevation (test group). All the sites selected showed a complete bone defect at the facial wall. All the implants included in this study were 2-stage implants placed at the level of palatal/lingual bone in augmented bone. Each surgical site was protected with a collagen membrane and, subsequently, a standardized radiograph was taken to evaluate the distance between the implant shoulder and the first bone-implant contact (DIB). Six months after placement, both control and test implants underwent a second-stage surgery and a clinical examination to determine the implant stability quotient, DIB, and the distance between implant shoulder and the crestal bone at the midbuccal aspect (DIC).

RESULTS: One implant failed in the test group. Only 1 implant (test group) showed bone growth over the implant neck at the re-entry procedure. Implant stability quotient (ISQ) and DIB did not show any significant differences between the control and test group; however, a higher DIC was found in the test sites compared to the control sites.

CONCLUSION: Data from this study showed that immediate implants with and without a mucoperiosteal flap elevation can be successfully used even in the presence of bone defects requiring augmentation procedures. It was also noted that the bone regenerated reached a higher coronal level in the group with flap elevation than in the group without flap elevation.
The purpose of this study was to evaluate the clinical success of an implant placed immediately after the explantation of a fractured blade implant. A healthy 58-year-old male nonsmoker presented with a fractured blade implant that had been subjected to biomechanical overload. A new blade implant was placed immediately after the removal of the fractured one. The new implant was placed with a composite graft of collagen gel and corticocancellous porcine bone and covered with a bioabsorbable membrane. Radiographic evaluation at 6 months postoperation showed complete bone healing. No residual bone defect was observed or probed during the uncovering phase; moreover, no mobility, pain, suppuration, or presence of peri-implant radiolucency were observed at the second-stage surgery.
CUANDO EL IMPLANTE INMEDIATO NO ES POSIBLE Y LA REGENERACION OSEA GUIADA SE HACE IMPRESCINDIBLE

LABOR DENTAL
CliniGl Cliredent S.L. Av. del canal 186 bis. Prat de Llobregat Barcelona

ABSTRACT
Desde hace mucho tiempo, se viene hablando de la importancia de realizar la inserción de los implantes de forma inmediata tras las exodoncias de los dientes naturales. Empiezan a ser muchos los estudios sobre este tema que demuestran que el 30% del volumen óseo se reabsorbe ya en el primer año después de la perdida del diente y que esta perdida llega a ser del 45% a los 3 años. La ausencia de los dientes afectara en primer lugar a la anchura del hueso y posteriormente a la altura. Por todo ello, se hace imprescindible que nos acostumbremos a que toda exodoncia de un diente vaya acompañada de la inserción de un implante de titanio en el alveolo residual. Aun realizando esta técnica sabemos que siempre se producirá una ligera perdida en el volumen óseo, pero de ninguna forma alcanzara los porcentajes antes mencionados. Sabemos que una de las claves del éxito del implante postexodoncia es conseguir un contacto 10 antes posible entre las espiras del implante y el hueso del alveolo postexodoncia. Esto 10 conseguimos mediante la utilización de implantes anchos o bien implantes de larga longitud para poder trabajar el hueso existente por encima del ápice del diente exodonciado. Esto nos permite anclar nuestro implante en hueso sano y conseguir una correcta estabilización del mismo. Sin embargo, hay situaciones en las que por la proximidad al seno maxilar o al nervio dentario inferior o por la presencia de grandes defectos osseos por infecciones dentarias antiguas, se hace imposible conseguir dicha estabilidad. En estos casos en los que debemos recurrir a intervenciones previas a la inserción de los implantes y entre ellas cabe destacar la regeneración ossea guiada, el relleno del seno maxilar o la utilización de injertos en bloque a ser posible de zonas donora del propio individuo. Por otro lado, se ha experimentado un gran avance en la utilización de biomateriales substitutivos del hueso humano. Hace años la utilización de la hidroxiapatita fue un gran avance, pero nos mostraba, en la mayoría de los casos, que el paso del tiempo no inflúa en la integración del material en el hueso natural del paciente. Los biomateriales utilizados en la actualidad acompañados de una correcta mezcla con la sangre del campo operatorio o de extracción venosa, podremos aplicarlos para conseguir la formación de un hueso neoformado de características muy parecidas a las del hueso original del paciente. Esto es 10 que presentare en el caso clínico que a continuación paso a desarrollar.
ABSTRACT
Paciente de 48 años que acude para rehabilitación superior e inferior. A la inspección se aprecian ausencias de sus piezas dentales 1.7; 1.2; 1.1; 2.1; 2.2 y 2.7, en el maxilar superior y de las 3.7; 3.6; 3.2; 3.1; 4.1; 4.2 y 4.7 en el inferior. Los caninos superiores presentan movilidad grado III con gran recesión que los hace tributarios de exodoncia. Resto de piezas dentales se conservan en buen estado. Por la edad del paciente y la gran predictibilidad que para los autores tienen los anclajes cónicos galvanizados, se planifica rehabilitación total mediante prótesis fija facultativamente removible, retenida a implantes y dientes mediante la técnica de las dobles coronas cónicas galvanoformadas. Con ello el paciente disfrutará de la comodidad de una prótesis fija y de la higiene de una prótesis removible. El tallado de las piezas residuales queda ampliamente compensado al poder ofrecer al paciente la garantía de una gran durabilidad del tratamiento. Cualquier eventualidad que pueda darse en alguno de suspilares, sean dientes o implantes será fácilmente subsanable al no ser comprometedor para la viabilidad de la prótesis. Los pilares tallados serán cubiertos, en este caso, con cofias coladas de 0,3 mm de grosor para poder conferir un paralelismo uniforme entre todos ellos, con una conicidad adecuada. Por la edad del paciente se planifica insertar implantes en las zonas edéntulas para evitar las posibles atrofias óseas que pudieran darse como consecuencia de su falta de función.
MAXILLARY SINUS AUGMENTATION: HISTOLOGIC AND HISTOMORPHOMETRIC ANALYSIS

INTERNATIONAL JOURNAL OF ORAL AND MAXILLOFACIAL IMPLANTS

Department of Biophysical, Medical and Dental Sciences and Technologies, Nanoword Institute, School of Dental Medicine, University of Genova, Italy

ABSTRACT

PURPOSE: Implant placement in the posterior maxilla may often be contraindicated because of insufficient bone volume and the presence of the maxillary sinus. In these situations, sinus floor lifting and grafting frequently have been proposed as the best treatment. The aim of this study was to compare histologically the use of 100% autogenous bone versus a combination of autogenous bone and corticocancellous pig bone for maxillary sinus augmentation.

MATERIALS AND METHODS: Eighteen patients requiring bilateral maxillary sinus augmentation were selected for this study. Bone for grafting was harvested from the iliac crest. Each patient received 100% autogenous bone in 1 randomly selected sinus (control side) and a 1:1 mixture of autogenous bone and corticocancellous pig bone particles in the contralateral sinus (test side). Five months after the augmentation procedure, bone biopsy specimens were taken at the time of implant placement.

RESULTS: No complications were observed during the surgical procedures; all patients healed uneventfully. No signs or symptoms of maxillary sinus disease were observed during the 5 months after surgery. No significant differences in bone percentages were observed in the bone biopsies from test and control sides.

DISCUSSION AND CONCLUSION: It could be concluded from this study that corticocancellous pig bone particles can be successfully used in a 1:1 mixture with autogenous bone from the iliac crest for maxillary sinus augmentation in cases of severely atrophic maxilla.
HISTOLOGIC AND ULTRASTRUCTURAL ANALYSIS OF REGENERATED BONE IN MAXILLARY SINUS AUGMENTATION USING A PORCINE BONE-DERIVED BIOMATERIAL

JOURNAL OF PERIODONTOLOGY

Dental School, University of Chieti-Pescara, Chieti, Italy

ABSTRACT

BACKGROUND: The purpose of the present study was the histologic and ultrastructural evaluation of a biomaterial composed of cortical pig bone in the form of granules.

METHODS: After maxillary sinus augmentation using this biomaterial, 10 specimens were retrieved after 5 months in 10 patients using this biomaterial. The specimens were processed to be observed under light microscopy (LM) and transmission electron microscopy (TEM). Histomorphometric measurements were presented by means +/- standard deviations.

RESULTS: LM showed that most of the particles were surrounded by newly formed bone. In some areas, the osteoid matrix was present; however, mainly compact bone was present at the interface. There was no evidence of an acute inflammatory infiltrate. The newly formed bone was 36% +/- 2.8% and marrow spaces were 38% +/- 1.6%, whereas residual grafted material was 31% +/- 1.6%. Under TEM, all phases of bone formation (osteoid matrix, woven, and lamellar bone) were observed in proximity with the biomaterial particles. The bone-biomaterial interface showed a close contact between the porcine bone particles and the surrounding bone that had mainly features of mature bone with numerous osteocytes. A lamina limitans was sometimes present at this interface.

CONCLUSIONS: According to our knowledge, this is the first study presenting data on TEM of a porcine bone-derived biomaterial used in sinus augmentation procedures in humans. Our findings show that this is a biocompatible biomaterial that can be used for maxillary sinus augmentation procedures without interfering with the normal reparative bone processes.
OSTEOTOMY AND MEMBRANE ELEVATION DURING THE MAXILLARY SINUS AUGMENTATION PROCEDURE. A COMPARATIVE STUDY: PIEZOELECTRIC DEVICE VS. CONVENTIONAL ROTATIVE INSTRUMENTS

CLINICAL ORAL IMPLANTS RESEARCH

Unit of Oral Pathology and Medicine, University of Genova, Genova, Italy

ABSTRACT

OBJECTIVES: The aim of the present study was to investigate in a randomized-controlled clinical trial the performance of rotary instruments compared with a piezoelectric device during maxillary sinus floor elevation.

MATERIALS AND METHODS: Thirteen patients who required a bilateral maxillary sinus augmentation for implant-prosthetic rehabilitation were included in this study. A within-patient control study was carried out. The osteotomy for sinus access was performed on one side of the maxilla using the piezosurgery (test sites) and on the other side using conventional rotary diamond burs (control sites). The parameters recorded were as follows: bony window length (L), bony window height (H), bone thickness (T) and osteotomy area (A)--calculated by multiplying L and H. In addition, the time necessary for the osteotomy and sinus membrane elevation as well as the number of surgical complications were calculated.

RESULTS: The mean length and height of the bone window were similar in both groups. The osteotomy area (A) obtained by multiplying L and H was wider in the control group (151.2 +/- 20.4 mm²) compared with the test group (137 +/- 24.2 mm²). The time necessary for the osteotomy and the sinus membrane elevation with conventional instruments was 10.2 +/- 2.4 min, while with the piezoelectric device it was 11.5 +/- 3.8 min. Moreover, membrane perforation occurred in 30% of the maxillary sinuses in the test group and in 23% of the control group. None of the differences observed between the two groups reached a level of significance.

CONCLUSIONS: Within the limits of the present study, it may be concluded that piezosurgery and conventional instruments did not show any differences in the clinical parameters investigated for the maxillary sinus floor elevation.
A CLINICAL STUDY OF THE OUTCOMES AND COMPLICATIONS ASSOCIATED WITH MAXILLARY SINUS AUGMENTATION

INTERNATIONAL JOURNAL OF ORAL AND MAXILLOFACIAL IMPLANTS

Department of Biophysical, Medical and Odontostomatological Sciences and Technologies, Medical School, University of Genova, Italy

ABSTRACT

PURPOSE: The aim of this study was to evaluate the rate of complications in maxillary sinus augmentation surgery and the impact of complications on subsequent implant treatment in a patient population with severe maxillary atrophy scheduled for treatment under general anesthesia.

MATERIALS AND METHODS: The study population consisted of 70 patients (124 sinuses) with severe maxillary atrophy who underwent maxillary sinus augmentation. Sixteen patients were scheduled to have a unilateral procedure and 54 patients a bilateral procedure. Sinus augmentation was performed with autogenous bone alone in 93 sinuses; in 31 sinuses, a 1:1 mixture of autogenous bone and corticocancellous pig bone particles was used. Twenty-six of 124 procedures involved both sinus augmentation and autogenous block grafting for the treatment of severely atrophic maxillae.

RESULTS: The most common intraoperative complication was the perforation of the sinus membrane, which was observed in 31 sinuses (25%). Seven (5.6%) sinuses in 7 patients exhibited suppuration of the maxillary sinus. Five of the 7 patients with sinus infection were smokers, showing a prevalence of complications significantly greater in smokers compared to nonsmokers. Moreover, the use of an onlay bone graft in conjunction with sinus augmentation appeared to significantly increase the rate of infective complications. Infections were treated by drainage and the administration of systemic antibiotics. Two clinical cases showing persistent signs of infection required an endoscopic inspection of the maxillary sinus.

DISCUSSION AND CONCLUSION: In the present study sinus membrane perforation was not shown to be a significant factor in the rate of implant complications. However, the combination of smoking and onlay bone grafting could significantly increase the rate of postoperative infection following sinus grafting.
ATRAUMATIC MAXILLARY SINUS ELEVATION USING THREADED BONE DILATORS FOR IMMEDIATE IMPLANTS. A THREE-YEAR CLINICAL STUDY

MEDICINA ORAL, PATOLOGIA ORAL Y CIRUGIA BUCAL

C/ Mozart n 1, 1 G, 3002 Murcia, Spain

ABSTRACT

OBJECTIVE: The aim of this study was to evaluate the efficacy of sinus floor elevation using sequential bone dilators.

MATERIALS AND METHODS: Thirty patients took part in the study (18 women and 12 men) with ages ranging between thirty-six and sixty-three years, selected according to inclusion and exclusion criteria, who showed a bone deficit in the upper posterior alveolar margin of 5-8 mm in height. Sixty expanded platform internal connection implants were placed with diameters of 4/5/4 mm and lengths varying between 10 (n=10) and 11.5 mm (n= 50).

RESULTS: Data obtained were analyzed using SPSS 15.0 software. The average intra-sinus bone gain with MP3 biomaterial of porcine origin was 4.13 +/- 0.97 SD mm at the moment of implant placement, 3.90 +/- 1.15 SD mm after twelve months, 3.74 +/- 1.05 SD mm after 24 months and 3.62 +/- 1.75 SD mm after 36 months. Two implants were lost at the moment of prosthesis placement.

CONCLUSIONS: Alveolar lifting technique in the upper maxilla using bone dilators achieved a 96.6 % implant success rate after a three-year follow-up. Intra-sinus bone biomaterial remodeling was 0.51 +/- 0.08 mm from day zero to the thirty-six-month follow-up. This is a procedure that reduces the amount of surgery necessary and is of both aesthetic and functional benefit to the patient.
IMPLANT PLACEMENT IN FRESH EXTRACTION SOCKETS AND SIMULTANEOUS OSTEOTOME SINUS FLOOR ELEVATION: A CASE SERIES

INTERNATIONAL JOURNAL OF PERIODONTICS AND RESTORATIVE DENTISTRY

Department of Oral Pathology, Nanoword Institute, School of Dental Medicine, University of Genova, Italy

ABSTRACT
The purpose of this study was to evaluate the clinical success of implants placed in fresh extraction sockets with simultaneous maxillary sinus floor elevation using the osteotome technique. Twelve patients were included. All the patients required the extraction of a maxillary premolar--close to the maxillary sinus--and were scheduled for immediate implant placement. One experimental implant was placed per patient, with an 18-month follow-up period. The graft materials used in both sinus augmentation and peri-implant bone defects were a mixture of collagen gel and corticocancellous porcine bone particles. All implants were allowed to heal for 6 months prior to prosthetic rehabilitation. One of the 12 experimental implants failed because of an abscess during early healing. No implants failed after definitive prosthetic rehabilitation. No significant bone loss was detected at the final follow-up visit. The mean bone height before sinus elevation and implant placement was 7.8 mm. Eighteen months after surgery, the mean bone height was 12 mm. When adequately performed, the surgical procedure described in the present study--immediate implant placement and simultaneous sinus floor elevation--appears to be unproblematic and predictable in terms of clinical success.
ABSTRACT
BACKGROUND: The accidental displacement of dental implants into the maxillary sinus is an infrequent but possible complication in dental clinical practice. The main cause of implant displacement is the inadequate bone height in the posterior maxilla. This event usually occurs during surgery and it is more rarely reported in the post-operative period, especially at long-term follow-ups. Here a case of an implant migrated inside the maxillary sinus at the time of abutment connection and removed 7 years later is described. Postoperative recovery was uneventful.

CONCLUSIONS: To the authors’ best knowledge, this case represents the first report concerning migration of an oral implant into the maxillary sinus removed after 7 years.
MAXILLARY SINUS AUGMENTATION IN HUMANS USING CORTICAL PORCINE BONE: A HISTOLOGICAL AND HISTOMORPHOMETRICAL EVALUATION AFTER 4 AND 6 M

ABSTRACT

BACKGROUND: Bone substitutes, such as allografts, xenografts, and alloplasts, have been proposed in several augmentation procedures. Purpose: The aim of the present study was a histologic and histomorphometric evaluation of specimens retrieved 4 or 6 months after sinus augmentation using cortical porcine bone augmentation material.

MATERIALS AND METHODS: A total of 77 specimens, retrieved after 4 and 6 months from augmented sinuses, were used in this study. The specimens were processed to be observed under light microscopy. Histomorphometric measurements were presented as means +/- standard deviations.

RESULTS: Most of the particles were surrounded by newly formed bone with large osteocyte lacunae. Histomorphometry showed that, after 4 months, the newly formed bone represented 28%, marrow spaces 36%, the residual graft material 37%, while, after 6 months, the newly formed bone represented 31%, marrow spaces 34%, while the residual graft material was 37%.

CONCLUSION: The present results show that cortical porcine bone is a biocompatible, osteoconductive biomaterial that can be used for maxillary sinus augmentation procedures without interfering with the normal reparative bone processes.
Maxillary sinus lift

MAXILLARY SINUS AUGMENTATION USING PREHYDRATED CORTICO-CANCELLOUS PORCINE BONE: HYSTOMORPHOMETRIC EVALUATION AFTER 6 MONTHS

CLINICAL IMPLANT DENTISTRY AND RELATED RESEARCH

Department of Bio-Physical Medical and Dental Sciences and Technologies, University of Genova, Italy

ABSTRACT

BACKGROUND: Insufficient alveolar bone height often prevents the placement of standard dental implants in the posterior part of edentulous maxilla. In order to increase adequately the vertical dimension of the reabsorbed alveolar process, a sinus lift procedure is often necessary. The aim of this study was to evaluate histologic results of a prehydrated cortico-cancellous porcine bone used in maxillary sinus augmentation.

METHODS: Patients (age 18–70 years) with a residual bone height requiring a maxillary sinus augmentation procedure to place dental implants were eligible for this study. All patients were treated with the same surgical technique consisting of sinus floor augmentation via a lateral approach. The space obtained by elevation of the mucosa wall was grafted with prehydrated and collagenated cortico-cancellous porcine bone. Biopsies were harvested 6 months after the augmentation procedures.

RESULTS: Twenty-four patients were enrolled. The mean percentage of new formed bone was 43.9 +/- 18.6% (range 7.5–100%), whereas the mean percentage of residual graft material was 14.2 +/- 13.6% (range 0–41.9%). The new bone/residual graft material ratio in the maxillary sinuses was 3.1. The mean soft tissues percentage was 41.8 +/- 22.7% (range 0–92.5%).

CONCLUSION: The present study suggested that porcine bone showed excellent osteoconductive properties and could be used successfully for sinus augmentation. Moreover, the porcine bone showed a high percentage of reabsorption after 6 months; this might be because of the presence of collagen and the porosity of the graft material.
SOFT TISSUE RESPONSE TO PLATELET RICH FIBRIN: CLINICAL EVIDENCES

COSMETIC DENTISTRY

ABSTRACT
One of the goals in plastic oral surgery is to obtain the best aesthetic result after healing phases. Several techniques have been developed to reduce incisions and facilitate reconstructive procedures, preserving, at the same time, the microcirculation to the flap margins. So the search for protocols promoting haemostasis and healing is a recurrent problem in all surgical disciplines. Thanks to the work of Lvnch, there has been a large interest in growth factors in periodontology and implantology. In 1998, Marx published the first studies on the use of platelet growth factors in oral surgery by fabricating platelet-rich plasma (PRP). Since then, different platelet aggregates have been used in a large number of clinical situations.

Intrabony defects

SOFT TISSUE RESPONSE TO PLATELET RICH FIBRIN: CLINICAL EVIDENCES

COSMETIC DENTISTRY

ABSTRACT
One of the goals in plastic oral surgery is to obtain the best aesthetic result after healing phases. Several techniques have been developed to reduce incisions and facilitate reconstructive procedures, preserving, at the same time, the microcirculation to the flap margins. So the search for protocols promoting haemostasis and healing is a recurrent problem in all surgical disciplines. Thanks to the work of Lvnch, there has been a large interest in growth factors in periodontology and implantology. In 1998, Marx published the first studies on the use of platelet growth factors in oral surgery by fabricating platelet-rich plasma (PRP). Since then, different platelet aggregates have been used in a large number of clinical situations.
HEALING OF GINGIVAL RECESSIONS USING A COLLAGEN MEMBRANE WITH A HEMINERALIZED XENOGRAFT: A RANDOMIZED CONTROLLED CLINICAL TRIAL

INTERNATIONAL JOURNAL OF PERIODONTICS AND RESTORATIVE DENTISTRY

ABSTRACT
This study compared the results following treatment of gingival recessions by a coronally advanced flap procedure alone (CAF) or combined with a bioabsorbable membrane and a demineralized xenograft (GTRF). Sixteen nonsmokers with 20 Miller Class I or Class II buccal gingival recessions at canines or premolars were included in the study. Sites were randomly assigned to either CAF treatment (control, n = 10) or GTRF treatment (test, n = 10) and examined at baseline and at 6 months postoperatively. Both treatments resulted in a significant reduction in recession and gain in clinical attachment level; there was no significant difference between treatments. No differences were found in probing depths among or between the groups. The increase in keratinized tissue from baseline to 6 months was slightly greater for the GTRF group than for the CAF group, but without statistical significance. The test group experienced a statistically significant increase in gingival thickness from baseline to the 6-month evaluation, while little gain was detected in the control group; the between-group difference was statistically significant in favor of the test group. Both procedures offer a predictable, simple, and convenient means of root coverage in Miller Class I and II recession defects, but the GTRF-supported procedure resulted in more keratinized tissue and a significant increase in gingival thickness than the CAF-only approach.
RIDGE SPLITTING TECHNIQUE IN ATROPHIC ANTERIOR MAXILLA WITH IMMEDIATE IMPLANTS, BONE REGENERATION AND IMMEDIATE TEMPORISATION: A CASE REPORT

JOURNAL OF IRISH DENTAL ASSOCIATION

School of Dentistry, University of Murcia, Spain

ABSTRACT
Narrow alveolar ridges remain a serious challenge for the successful placement of endosseous implants. This article reports a technique for widening the atrophic ridge by splitting the alveolar bone longitudinally and filling the bone gap with collagenised pig bone, treatment of ridges as thin as 2.5mm at the alveolar crest and simultaneous placement of dental implants. Treatment of a 22-year-old female patient with a severely resorbed anterior maxilla is described. 4mm wide by 13mm long threaded Osseotite implants were immediately placed within the split ridge and surrounded with a mixture of autogenous tuberosity and collagenised pig bone. The advantages of this technique for patients include less surgical trauma and reduced treatment time.
MAXILLARY ALVEOLAR RIDGE RECONSTRUCTION WITH NONVASCULARIZED AUTOGENOUS BLOCK BONE: CLINICAL RESULTS

ABSTRACT

PURPOSE: The purposes of this study were to evaluate the clinical success of bone reconstruction of the severely atrophic maxilla using autogenous bone harvested from the anterosuperior edge of iliac wing and to analyze the clinical success and the marginal bone level of dental implants placed 4 to 5 months after bone grafting and before prosthetic rehabilitation.

PATIENTS AND METHODS: Fifty-six patients (18 men, 38 women) aged 27 to 63 years were included in the study and required treatment for maxillary atrophy. All patients selected were scheduled for onlay bone graft and titanium implants in a 2-stage procedure. The dental implants were inserted 4 to 5 months after grafting.

RESULTS: No major complications were observed from the donor sites. A total of 129 onlay bone grafts were used to augment 56 severely resorbed maxillas. Three out of 129 bone grafts had to be removed because of early exposure occurring with bone grafts placed to increase the vertical dimension of the alveolar ridge. One hundred sixty-two implants were placed in the area of bone augmentation. Seven implants failed to integrate and were successfully re-placed without any need for additional bone grafting. The clinical measurements for bone resorption around implants revealed a mean bone loss of 0.05 mm (+/- 0.2); the marginal bone level evaluated with periapical radiographies was 0.3 mm (+/- 0.4) at implant placement and 0.1 mm (+/- 0.3) 6 months after placement.

CONCLUSION: The success rate of the block grafts was very good. The clinical and radiographic bone observations showed a very low rate of resorption after bone graft and implant placement. Therefore, on the basis of this preliminary study, iliac bone grafts (from the anterosuperior edge of the iliac wing) can be considered a promising treatment for severe maxillary atrophy.
Horizontal augmentation

RICOSTRUZIONE DELLA VOLUMETRIA OSSEA CRESTALE MEDIANTE INNESTO DI PARTICOLATO CORTICO-MIDOLLARE: CASO CLINICO

IL DENTISTA MODERNO

Università degli Studi di Genova, Dipartimento di Scienze e Tecnologie Biomediche e Odontoiatriche

ABSTRACT

Ridge bone reconstruction with porcine bone graft: a case report. The actual knowledges about the bone healing, the biology and the resorption rate of the post-extraction socket gives the opportunity to the clinicians to successfully treat severe atrophy of the edentulous ridge. The ridge bone preservation or its full volumetric ridge reconstruction. With the use of biomaterials and soft tissue management techniques become essential for a planning of a suitable implant oral rehabilitation. This case report showed the ridge reconstruction/preservation technique after the extraction of a hopeless maxillary premolar tooth. The preservation of the socket’s tridimensional structure associated to the regeneration of soft tissue component, permitted the implant placement with successful functional and aesthetics outcomes.
HESS AREA RATIO AND DIPLOPIA: EVALUATION OF 30 PATIENTS UNDERGOING SURGICAL REPAIR FOR ORBITAL BLOW-OUT FRACTURE

OPHTHALMIC PLASTIC AND AND RECONSTRUCTIVE SURGERY

Department of Ophthalmology, University of Rome La Sapienza, Rome, Italy

ABSTRACT
PURPOSE: To determine if the Hess area ratio is effective in predicting postoperative diplopia in patients undergoing surgery for orbital blow-out fracture.

METHODS: Our retrospective, interventional case series study involved 30 consecutive cases affected by orbital fractures and diplopia undergoing surgical correction within 7 days after injury. To evaluate ocular motility disturbance, we measured the involved ocular motility range by use of a manual Hess screen test before and 4 months after surgery. The percentage of Hess area ratio % was used to express the range of ocular motility in a numerical value.

RESULTS: All patients with preoperative Hess area ratio >85% had no postoperative diplopia, and most patients (57%) having a preoperative Hess area ratio <65% had postoperative diplopia. When the Hess area ratio was between 65% and 85%, surgical outcomes were variable and most patients (55%) described no problematic diplopia in the peripheral visual field.

CONCLUSIONS: The Hess area ratio is a useful procedure to convert Hess graphic representation in a numerical value so that Hess chart data can be compared among clinicians and used to predict surgical outcomes in patients undergoing surgery for orbital blow-out fractures.
ORBITAL FLOOR RESTORATION

JOURNAL OF CRANIOFACIAL SURGERY
University of Rome La Sapienza, Department of Maxillo-Facial Surgery, Rome, Italy

ABSTRACT
Orbital blow-out fractures reconstruction aims to restore the continuity of the orbital floor, to provide support of orbital contents and prevent soft tissues' fibrosis. Different materials have been tested over the years to reach this purpose. Traditionally, autogenous grafts have been used as the material of choice; in recent years alloplastic materials have gained popularity because of their availability and ease of use. The purpose of this study was to review materials used in orbital floor reconstructive surgery at the Department of Maxillo-Facial Surgery of University of Rome "La Sapienza", with emphasis on their biocompatibility, their shaping features, and mechanical properties. This report presents the results obtained by the application of these products on 379 patients who underwent surgical treatment for blow-out fractures from 1995 to 2003: the diagnosis of fracture of the orbital floor was based on clinical symptoms and CT axial scanning through coronal reconstruction. Follow-up period spanned from 1 to 8 years.

GRAFTED WITH
OsteoBiol® Lamina
MEDIAL ORBITAL WALL RECONSTRUCTION WITH SWINE BONE CORTEX

ABSTRACT
Fractures of the medial orbital wall can be isolated or associated with other orbital defects arising from maxillofacial fractures. However, a medial orbital wall defect results in a relative increase of the orbital volume. The decision regarding surgical intervention in the management of medial orbital wall fractures is influenced by a variety of factors, including the presence and severity of restricted ocular motility, the degree of enophthalmos, the estimated fracture size, and the clinical judgment of the surgeon; however, untreated medial orbital wall fractures can result in secondary enophthalmos. The aim of this study was to describe our experience with deantigenated swine bone cortex for the reconstruction of the fractured medial orbital wall.
ORBITAL WALL RECONSTRUCTION USING A SWINE BONE CORTEX: A SIX YEARS EXPERIENCE

EUROPEAN ASSOCIATION FOR CRANIO-MAXILLO-FACIAL SURGERY

ABSTRACT
OBJECTIVES: Orbital wall fractures are very common, with an incidence of 30% among facial fractures. The restoration of walls integrity was traditionally performed with titanium meshes or autologous grafts, but recently alloplastic materials have reached a large use because of their availability and molding properties. The aim of this work is to enhance Authors experience in orbita walls reconstruction with an heterologous material: swine bone cortex.

METHODS: From April 2002 to March 2008, 120 patients have been treated for orbital floor and medial wall fractures, pure or associated to other facial fractures. Diagnosis, treatment, and follow-up were based on CT scans in axial and coronal projection, Hess screen test and forced duction test, to assess both diplopia and muscle incarceration. Furthermore an ophthalmic consultation to check visual acuity was requested. Reconstructions of the walls were performed with swine bone cortex and the surgical approaches were transpalpebral, subciliary, transcaruncular and transconjunctival with or without lateral canthotomy. Follow-up spanned from 1 month to 6 years.

RESULTS: All cases of enophthalmos were corrected and who had previous diplopia showed improvement, the main advantage of the swine cortex is represented by the possibility of restoring fractures that may only be treated by titanium mesh, but avoiding the risks correlated with its use.

CONCLUSIONS: Based on our experience orbital walls restoration can be performed using alloplastic materials such as bovine pericardium, porous polietylene and titanium mesh, but the swine bone cortex has proved to be the best choice thanks to its excellent biocompatibility and large availability.
ANTERIOR CERVICAL FUSION WITH POLYETHERETHERKETONE (PEEK) CAGES IN THE TREATMENT OF DEGENERATIVE DISC DISEASE. PRELIMINARY OBSERVATIONS IN 36 CONSECUTIVE CASES WITH A MINIMUM 12-MONTH FOLLOW-UP

ABSTRACT
STUDY DESIGN: Retrospective analysis of 36 cases of degenerative disc disease treated by interbody fusion with polyetheretherketone (PEEK) cages. OBJECTIVE: To determine the safety and efficiency of PEEK cages for anterior cervical fusion (ACF). Summary of background data. ACF with autologous bone has been reported since over 50 years ago. The recent development of cages housing materials inducing osteogenesis simplifies the technique of interbody fusion. The main purposes of bone substitutes for ACF are immediate biomechanical support, osteo-integration of the graft, and elimination of local side effects at the donor site. This report shows our results using PEEK cages.

MATERIALS AND METHODS: During an 18-month period, 36 consecutive patients had cervical fusions at 43 levels between C3 and C7. All operations involved one or two disc spaces for degenerative disc disease. We implanted all disc spaces with PEEK cages (Stryker Corporation, Kalamazoo, MI) containing granulated coralline hydroxylapatite (Pro-Osteon 200, Interpore Cross International, Irvine, CA) or deantigenated pig bone in a gel solution (Gen-Os, Tecnoss, Torino, Italy).

Results. About 97% of patients had a good to excellent outcome; the result in one myelopathic patient was fair. The cervical fusion rate was 16.7% at 3 months, 61.1% at 6 months, and 100% at one year.

CONCLUSIONS: PEEK cages appear to be safe and efficient for ACF. In order to confirm our preliminary impressions studies on larger series with long term follow-up are warranted.
DECOMPRESSION BY ANTERIOR SURGICAL APPROACH AND INTERSOMATIC FUSION BY TITANIUM CAGE: EXPERIENCE IN 70 PATIENTS WITH CERVICAL MYELOPATHY

51TH NATIONAL CONGRESS - ITALIAN SOCIETY OF NEUROSURGERY

Department of Neuroscience, UOADU Neurosurgery 8, Turin University, Neurosurgery Clinic, University of Ancona

ABSTRACT
Over 4 years, at the Division of Neurosurgery University of Ancona and Turin, were treated 70 patients with cervical myelopathy. The indication for surgery was based on clinical and neuroradiologic evaluation of each patient. Were subjected to decompression and fusion at one or more levels 33 patients with radiculopathy and 37 with myelopathy. After decompression, performed with microsurgical technique, it was decided to a intersomatic fusion by titanium Cage (Syncage) filled with autologous bone (49 cases) or deantigenated porcine bone (Gen-Os, Tecnoss, Giaveno). There were no intra-or postoperative complications. The surgical procedure lasted significantly less than the traditional technique (601 on average compared to 901).
No patient had to be new surgery.
The result of the procedure was evaluated by neurological examination at discharge and distance, minimum 4 months of follow-up, and was completed with an interview on the degree of patient satisfaction and radiographs in flexion and extension of the head to ensure the degree of fusion.
EXPERIENCE OF CESENA NEUROSURGERY WITH DEANTIGENATED PORCINE BONE PASTE PUTTY

DIVISION OF NEUROSURGERY
Azienda U.S.L di Cesena

ABSTRACT
Already more than 1 year in this Operative Unit we use deantigenated porcine bone paste (Putty - Tecnoss srl - Turin) for the filling of the cages in order to promote cervical interbody fusion.

This is a paste made of natural origin, composed of 80% cortico-cancellous bone particulate and 20% of native natural collagen. It also contains a fraction of polyunsaturated fatty acids than with their antioxidant action promote tissue repair processes and thus will have osteoinductive power together with the fraction collagen. The mineral component has instead osteoconductive action. The bone is very handy for the fill of the cage and also can be easily located even in the interspace around the cage itself. We have used this procedure in 50 patients who were monitored with all RX at 1 month, 6 months and 1 year after surgery.

In all cases the clinical outcome was good: 20 patients had cervicobrachial pain syndrome by soft disc herniation and all had regression of their pain. Thirty cases were suffering from myelopathy, some from hernia springs, but in most case from hard osteophytic bar; 12 patients were operated on at 2 levels. All cages used in cervicobrachial pain syndrome cases and in 17 myelopathy cases (in the remaining 13 cases were used cage-plate PCB - Scient’X-titanium) are in peek CBK (Scient’X). Of course, in cases where was use cages made of titanium has not been possible a RX follow-up of interbody fusion.

Patients operated with CBK cage (37 cases) showed a good fusion in 85% cases and in remaining 15% which seems to appreciate a little "gap" between bone and the top plate have been made RX analysis with dynamic tests that have shown a substantial stability at 1 year from surgery, with initial formation of bone bridges around the cage.

In conclusion, the deantigenated porcine bone paste (Putty) has proved a valid alternative to the use of autologous bone, avoiding the discomfort of withdrawal from the iliac ridge and ensuring a high rate of fusion.
HETEROLOGOUS CARBONATED NANOCRYSTAL BONE MINERAL IN THE TREATMENT OF THE UNUNION FEMUR IN DOG

BULLETIN OF THE VETERINARY INSTITUTE IN PULAWY

Department of Surgery and Radiology, Faculty of Veterinary Medicine, University of Warmia and Mazury, 10-957 Olsztyn, Poland

ABSTRACT
This report describes the treatment of osteomyelitis of the femur of 9-month-old dog with the use of heterologous carbonated nanocrystal bone mineral and collagen, stabilised by a bone plate. In this dog, due to mistakes during earlier stabilisation, bone infection and sequestration had arisen. After antibiotic therapy, plating stabilisation was carried out. Osteosynthesis with the use of dynamic compression plate and heterologous carbonated nanocrystal bone mineral and collagen was an effective method of stabilisation, which led to the bone healing.

CLINICAL SIGNIFICANCE: Heterologous carbonated nanocrystal bone mineral and collagen in preparation OsteoBiol turned out to be an effective material in the treatment of the lack of bone. The clinical case outlined is the first notification, which describes the applying of the preparation in therapy of osteomyelitis of the femur in a dog.