

OsteoBiol®
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SCIENTIFIC ABSTRACTS

REGENERATION SCIENCE

INSPIRED BY NATURE



Table of contents

OsteoBiol® by Tecnoss

LABORATORY TESTS

Trubiani O, Scarano A, Orsini G, Di Iorio D, D'arcangelo C, Piccirilli M, Sigismondo M, Caputi S
The performance of human periodontal ligament mesenchymal stem cells on xenogenic biomaterials
International Journal of Immunopathology and Pharmacology, 2007 Jan-Mar;20(1 Suppl 1):87-91 8

Figueiredo M, Henriques J, Martins G, Guerra F, Judas F, Figueiredo H
Physicochemical characterization of biomaterials commonly used in dentistry as bone substitutes - comparison with human bone
Journal of Biomedical Materials Research Part B: Applied Biomaterials, 2010 Feb;92(2):409-19 9

EXPERIMENTAL STUDIES

Nannmark U, Sennerby L
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, 2008 Dec;10(4):264-70, Epub 2008 Jan 30 12

Calvo Guirado JL, Gómez Moreno G, Barone A, Cutando A, Alcaraz Baños M, Chiva F, López Marí L, Guardia J
Melatonin plus porcine bone on discrete calcium deposit implant surface stimulates osteointegration in dental implants
Journal of Pineal Research, 2009,47:164-72 13

Calvo Guirado JL, Gómez Moreno G, López Marí L, Guardia J, Marinez González JM, Tresguerres IF, Paredes SD, Fuentes Breto L
Actions of melatonin mixed with collagenized porcine bone versus porcine bone only on osteointegration of dental implants
Journal cf Pineal Research, 2010,48:194-203 14

Nannmark U, Azarmehr I
Short communication: collagenated cortico-cancellous porcine bone grafts. A study in rabbit maxillary defects
Clinical Implant Dentistry and Related Research, 2010 Jun 1;12(2):161-3 15

Calvo Guirado JL, Fernández MP, Negri B, Delgado Ruiz R, Maté Sánchez de Val J, Gómez Moreno G
Experimental model of bone response to collagenized xenografts of porcine origin (OsteoBiol® mp3®): a radiological and histomorphometric study
Clinical Implant Dentistry and Related Research, 2011 Mar 31, Epub ahead of print 16

ALVEOLAR REGENERATION

Covani U, Ameri S, Crespi R, Barone A
Crestal ridge preservation with allogenic bone. Histological analysis
Italian Oral Surgery, 2004, Vol 3, 1: 17-23 18

Arcuri C, Cecchetti F, Germano F, Motta A, Santacroce C
Clinical and histological study of a xenogenic bone substitute used as a filler in postextractive alveolus
Minerva Stomatologica, 2005 Jun;54(6):351-62 19

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Xenograft versus extraction alone for ridge preservation after tooth removal: a clinical and histomorphometric study
Journal of Periodontology, 2008 Aug;79(8):1370-7 20

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Preservation of the postextraction alveolar ridge: a clinical and histologic study
International Journal of Periodontics and Restorative Dentistry, 2008 Oct;28(5):469-77 21

Crespi R, Capparè P, Gherlone E
Dental implants placed in extraction sites grafted with different bone substitutes: radiographic evaluation at 24 months
Journal of Periodontology, 2009 Oct;80(10):1616-1621 22

Rossi R, Santos Morales R, Frascaria M, Benzi R, Squadrito N
Planning implants in the esthetic zone using a new implant 3D navigation system
The European Journal of Esthetic Dentistry, 2010 Summer;5(2):172-88 23



Table of contents

OsteoBiol® by Tecnoss

DEHISCENCES AND FENESTRATIONS

Covani U, Barone A, Cornelini R, Crespi R
Clinical outcome of implants placed immediately after implant removal
26 Journal of Periodontology, 2006 Apr;77(4):722-7

Barone A, Ameri S, Covani U
Immediate postextraction implants: treatment of residual peri-implant defects. A retrospective analysis
27 European Journal of Implant Prosthodontics, 2006 May-Aug;2(2):99-106

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28 International Journal of Oral and Maxillofacial Implants, 2008 Sep-Oct;23(5):841-6

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Immediate implant placement after removal of a failed implant: a clinical and histological case report
29 Journal of Oral Implantology, 2009;35(4):189-95

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Implant placement in fresh extraction sockets and simultaneous osteotome sinus floor elevation: a case series
32 International Journal of Periodontics and Restorative Dentistry, 2008 Jun;28(3):283-9

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Atraumatic maxillary sinus elevation using threaded bone dilators for immediate implants. A three-year clinical study
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LATERAL ACCES SINUS LIFT

Barone A, Crespi R, Nicoli Aldini N, Fini M, Giardino R, Covani U
Maxillary sinus augmentation: histologic and histomorphometric analysis
36 International Journal of Oral and Maxillofacial Implants, 2005 Jul-Aug;20(4):519-25

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Histologic and ultrastructural analysis of regenerated bone in maxillary sinus augmentation using a porcine bone-derived biomaterial
38 Journal of Periodontology, 2006 Dec;77(12):1984-90

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39 Clinical oral implants research, 2008 May;19(5):511-5, Epub 2008 Mar 26

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Maxillary sinus augmentation using prehydrated corticocancellous porcine bone: hystomorphometric evaluation after 6 months
41 Clinical Implant Dentistry and Related Research, 2010 May 11, Epub ahead of print

Scarano A, Piattelli A, Assenza B, Quaranta A, Perrotti V, Piattelli M, Iezzi G
Porcine bone used in sinus augmentation procedures: a 5-year retrospective clinical evaluation
42 Journal of Oral and Maxillofacial Surgery, 2010 Aug;68(8):1869-73



Table of contents

OsteoBiol® by Tecnoss

LATERAL ACCES SINUS LIFT

Barone A, Orlando B, Tonelli P, Covani U
Survival rate for implants placed in the posterior maxilla with and without sinus augmentation: a comparative cohort study
Journal of Periodontology, 2011 Feb;82(2):219-26, Epub 2010 Sep 10 — 43

Pagliani L, Andersson P, Lanza M, Nappo A, Verrocchi D, Volpe S, Sennerby L
A collagenated porcine bone substitute for augmentation at Neoss implant sites: a prospective 1-year multicenter case series study with histology
Clinical Implant Dentistry and Related Research, 2010 Oct 26, Epub ahead of print — 44

Scarano A, Piattelli A, Perrotti V, Manzon L, Iezzi G
Maxillary sinus augmentation in humans using cortical porcine bone: a histological and histomorphometrical evaluation after 4 and 6 months
Clinical Implant Dentistry and Related Research, 2011;13(1):13-18 — 45

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Del Corso M
Soft tissue response to Platelet Rich Fibrin: clinical evidences
Cosmetic Dentistry, 2008,3:16-20 — 48

Cardaropoli D, Cardaropoli G
Healing of gingival recessions using a collagen membrane with a demineralized xenograft: a randomized controlled clinical trial
International Journal of Periodontics and Restorative Dentistry, 2009 Feb;29(1):59-67 — 49

HORIZONTAL AUGMENTATION

Cassetta M, Calasso S, Vozza I, Dell'aquila D
Rehabilitation of atrophic alveolar crests with cylindrical sandblasted and acid etched implants: a pilot study
European Journal of Implant Prosthodontics, 2005;(3)1:133-144 — 52

Barone A, Covani U
Maxillary alveolar ridge reconstruction with nonvascularized autogenous block bone: clinical results
Journal of Oral and Maxillofacial Surgery, 2007 Oct;65(10):2039-46 — 53

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Journal of Irish Dental Association, 2007 Winter;53(4):187-90 — 54

VERTICAL AUGMENTATION

Scarano A, Murmura G, Carinci F, Assenza B, Piattelli M, Piattelli A.
Vertical ridge augmentation of atrophic posterior mandible using an inlay technique with a xenograft without miniscrews and miniplates: case series
Clinical Oral Implants Research, 2011 Jan 20, Epub ahead of print — 56

MAXILLOFACIAL

Rinna C, Ungari C, Saltarel A, Cassoni A, Reale G
Orbital floor restoration
Journal of Craniofacial Surgery, 2005 Nov;16(6):968-72 — 58

Grenga PL, Reale G, Cofone C, Meduri A, Ceruti P, Grenga R
Hess area ratio and diplopia: evaluation of 30 patients undergoing surgical repair for orbital blow-out fracture
Ophthalmic Plastic and Reconstructive Surgery, 2009 Mar-Apr;25(2): 123-5 — 59

Rinna C, Reale G, Foresta E, Mustazza MC
Medial orbital wall reconstruction with swine bone cortex
The Journal of Craniofacial Surgery, 2009 May;20(3):881-4 — 60



Laboratory tests



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LABORATORY TESTS

010

The performance of human periodontal ligament mesenchymal stem cells on xenogenic biomaterials

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ABSTRACT

Periodontal diseases are the most frequent cause of tooth loss, due to the destruction of the tooth supporting tissues. Consequently, the reconstruction of healthy periodontium is a major goal of periodontal therapy.

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 *in vitro* investigated the use of autologous mesenchymal stem cells, easily obtained from oral tissues, seeded on a xenogenic porcine bone substitute, consisting of cortical porcine bone particles (Apatos, OsteoBiol®, Tecnoss®, Coazze, Italy). This grafting material is a xenogenic bone substitute consisting of sterilized cortical pig bone in the form of particles with a high porosity and with a diameter ranging from 600 to 1000 μm. This biomaterial appears physically identical to human bone and has been reported to be osteoconductive, well integrated in the host site and to show an incomplete resorption.

The results indicated high affinity of the cells towards the three-dimensional biomaterial. This scaffold was able to supply an excellent support for cell structures, with evident cellular proliferation and colonization on the bone substitute. Moreover, the examinations revealed that a considerable part of the surface of the biomaterial was covered and an elaborated form of attachment was evident.

CONCLUSIONS

As demonstrated by several studies, cortical porcine bone derived biomaterial may promote bone formation and can be used for maxillary sinus augmentation because it does not interfere with bone regeneration processes and implants osseointegration. Moreover, this study revealed that porcine bone-derived biomaterial did not interfere with the PDL-MSCs development, demonstrating an osseointegration process within the bone microenvironment. Consequently, it seems reasonable to suggest that the bone regeneration in oral and maxillo-facial surgery could be improved by this kind of hard scaffold, which have been shown to be perfectly biocompatible and able to support cell growth and differentiation.

ORIGINAL ARTICLE
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Material tested

BONE SUBSTITUTE
OsteoBiol® *Apatos*

Abstract author: Cristina Rodighiero, dental journalist, free publication, not for resale. Printed by Tecnoss® Dental s.r.l.



OsteoBiol® by Tecnoss

Physicochemical characterization of biomaterials commonly used in dentistry as bone substitutes – comparison with human bone

ABSTRACT

Xenografts have been regarded as promising alternatives to autografts, thanks to their unlimited supply of available material and because they can reduce morbidity by eliminating the donor site. The main purpose of this study was the characterization of a variety of granulate mineral-based biomaterials, chosen to encompass materials of different origins (bovine, porcine and coralline) and different types (cortical and cancellous bone and mineral based). The biomaterials examined included grafting materials of different origins: bovine (BioOss® and PepGen P-15®), porcine (Gen-Os, OsteoBiol®, Tecnoss®, Coazze, Italy) and coralline (Biocoral®). These samples were tested with no further treatment. The results obtained for these biomaterials were compared with those of human bone. Besides a classical rationalization of chemichal composition and crystallinity, a major emphasis was placed on the measurement of various morphostructural properties, specifically particle size, porosity, density, and surface area. Each material was used in a granular form (easier to accommodate and more quickly resorbed) with the lowest particle size range available, recommended for application in the treatment of oral, periodontal, and maxillo-facial bone defects. Mercury intrusion revealed a significant variation in the samples porosity: 33% for OsteoBiol®, 50% for PepGen P-15®, and 60% for BioOss®. Moreover, it showed 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®).
FTIR spectra of OsteoBiol® Gen-Os and natural human bone showed collagen bands clearly visible in addition to those of hydroxyapatite, while diffractograms of these samples represent the dual-phase composition: hydroxyapatite (sharp peaks) and collagen (broad band).

CONCLUSIONS

In evaluating these biomaterials, the Authors detected significant differences in terms of particle size, crystallinity, porosity and pore size distribution, surface area, and mineral content. Consequently, they concluded that *"although these morphological characteristics greatly influence the in vivo behavior of the samples, they are often not taken into consideration when the samples' biological performance is evaluated. This may be responsible for the conflicting results frequently found in the literature. It is believed that the results provided for the materials investigated will be most useful to fully interpret their clinical responses"*.

LABORATORY TESTS

026

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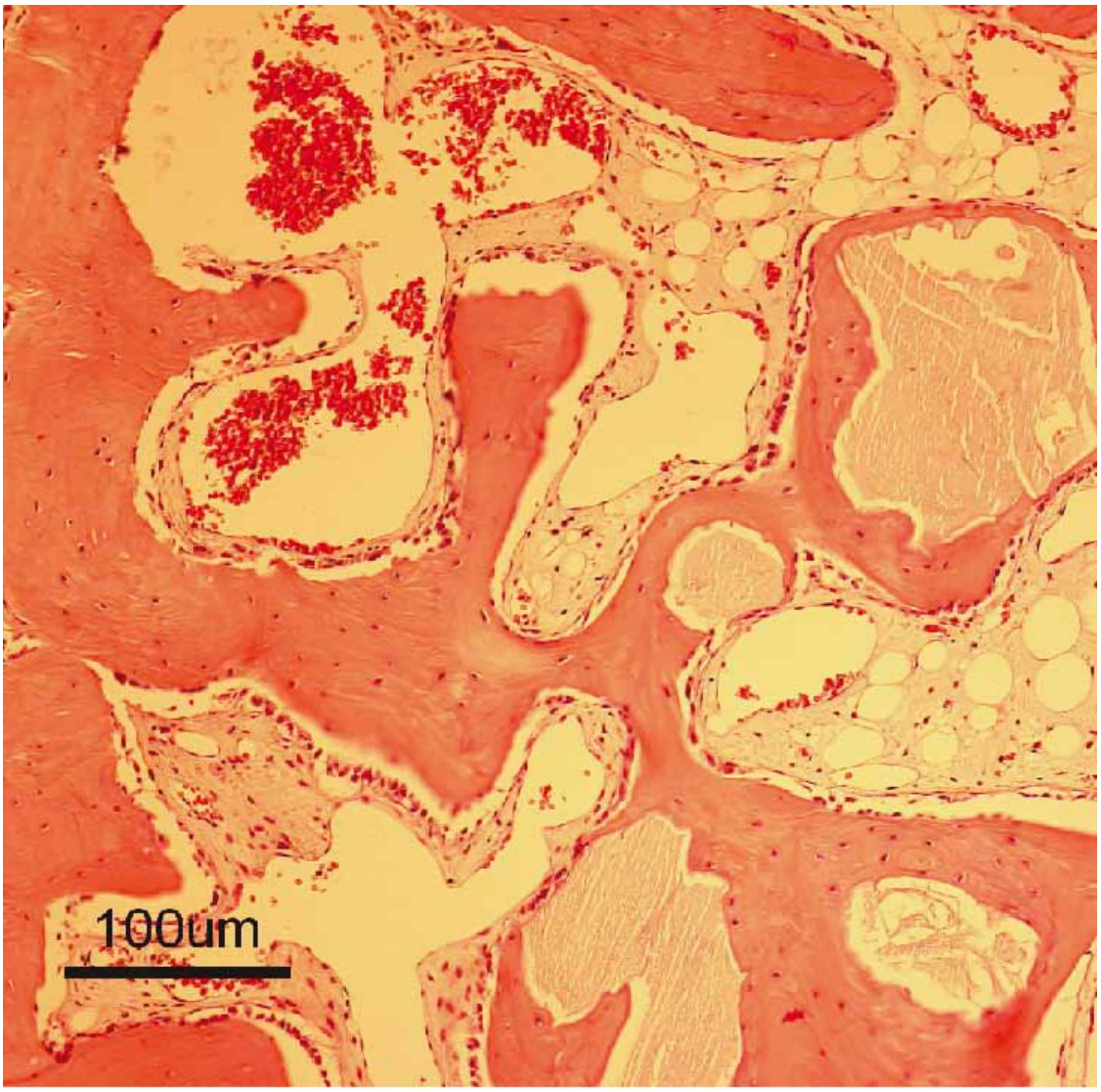
ORIGINAL ARTICLE
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Material tested

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Experimental studies



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EXPERIMENTAL STUDIES

019

The bone tissue responses to prehydrated and collagenated cortico-cancellous porcine bone grafts: a study in rabbit maxillary defects

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ORIGINAL ARTICLE
Clinical Implant Dentistry and Related Research
2008 Dec;10(4):264-70, Epub 2008 Jan 30

ABSTRACT

Bone substitutes of xenogeneic origin are frequently used as grafting materials for filling bone defects and maxillary sinus floor augmentation procedures. To be effective, bone substitutes must have osteoconductive properties and be completely replaced with new bone with time. In order to improve the clinical handling, it is possible to add collagen gel to prehydrated and collagenated porcine bone (PCPB) particles, with the result of a sticky and moldable material which facilitates its application in the site to be filled.

As the possible influence of the gel on the bone tissue response is not known, the objective of the study was to histologically evaluate the bone tissue responses to PCPB graft with or without collagen gel and to evaluate the resorption/degradation properties of the biomaterials.

For these study, bilateral bone defects (dimensions: 5x8x3 mm) were created in the maxilla of 14 rabbits. The defects were filled with prehydrated and collagenated cortico-cancellous porcine bone (PCPB) particles (Gen-Os, OsteoBiol®, Tecnoss®, Coazze, Italy - granulometry: 250-1000 μm) as control material, or PCPB particles mixed with collagen gel (mp3®, OsteoBiol®, Tecnoss®, Coazze, Italy - granulometry: 600-1000 μm) as test material. A collagen membrane (Evolution, OsteoBiol®, Tecnoss®, Coazze, Italy) was used to cover the defect and to prevent migration of the particles and the wounds were closed with resorbable sutures. Animals were killed after 2 (n=3), 4 (n=3), and 8 weeks (n=8) for histological and morphometrical evaluations.

According to the results of these evaluations, there was no obvious difference between the test and control materials. There were no signs of adverse reactions, and both osteogenesis and angiogenesis followed ordinary time frames. 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. The histology showed that the membrane had fulfilled its function and was well integrated with the overlaying soft tissues.

CONCLUSIONS

From the findings of this study, it is possible to conclude that 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. Both graft materials exhibited osteoconductive properties as bone formation with typical osteoblastic seams was observed directly on the surface of the grafted particles. The morphometric measurements showed increased bone area with time in parallel with a decrease of the graft area. The Authors concluded that *"collagenated porcine bone exhibits good biocompatibility and osteoconductive properties, whether mixed with collagen gel or not. In this model, the material was resorbed by surface osteoclasts as well as part of remodeling with the formation of osteons"*.

Abstract author: Cristina Rodighiero, dental journalist, free publication, not for resale. Printed by Tecnoss® Dental s.r.l.

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BONE SUBSTITUTES
OsteoBiol® *Gen-Os*
OsteoBiol® *mp3®*

MEMBRANE
OsteoBiol® *Evolution*



OsteoBiol® by Tecnoss

Melatonin plus porcine bone on discrete calcium deposit implant surface stimulates osteointegration in dental implants

EXPERIMENTAL STUDIES

022

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ABSTRACT

Bone grafts are normally placed in bone defects or into extraction sockets in order to facilitate healing, to increase the width of the crest or for augmentation of the maxillary sinus floor prior to an implant placement.

As several studies have documented that melatonin is an important mediator in bone formation and stimulation and that acts directly on osteoclasts in the bone metabolism, this study aimed to evaluate the effect of the topical application of melatonin mixed with collagenized porcine bone mp3® (OsteoBiol®, Tecnoss®, Coazze, Italy) to accelerate the osteointegration on the rough discrete calcium deposit (DCD) surface implants in Beagle dogs 3 months after their insertion. After a 4-week 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. Melatonin combined with collagenized porcine bone covered discrete calcium deposit surface implants and reveals more bone to implant contact at 12-week follow up study compared with implants covered with melatonin and control implants. In implants with melatonin plus porcine bone mp3® it was observed less crestal bone resorption than implants covered with melatonin and implants control group at 12 weeks.

CONCLUSIONS

The findings of this study suggest that the combination of melatonin and mp3® increases bone-to-implant contact (BIC) and reduces crestal bone loss and that the topical application of melatonin on DCD surface may act as a biomimetic agent in the placement of endo-osseous dental implants, enhancing the osseointegration.

Consequently, the Authors affirmed that *"these actions of melatonin on bone tissue are of interest as it may be possible to apply melatonin during endosseous dental implant surgery as a biomimetic agent. As a result, the process of healing may be more precise, initial conditions of receptor tissues may be enhanced, the period of osseointegration and settling of the implant may be reduced, and therefore the quality of life of the patient may be improved"*.

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2009; 47:164-172

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Abstract author: Cristina Rodighiero, dental journalist, free publication, not for resale. Printed by Tecnoss® Dental s.r.l.



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EXPERIMENTAL STUDIES

033

Actions of melatonin mixed with collagenized porcine bone versus porcine bone only on osteointegration of dental implants

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Journal of Pineal Research
2010; 48:194-203

ABSTRACT

Several studies have documented that melatonin is an important mediator in bone formation and stimulation, suggesting an osteogenic effect of melatonin that may be of clinical importance. Consequently, the aim of this study was to evaluate the effect of the topical application of melatonin mixed with collagenized porcine bone on the osseointegration 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 mixed with porcine bone mp3® (OsteoBiol®, Tecnoss®, Coazze, Italy) in test sites and collagenized porcine bone alone (mp3®) in control sites.

The histomorphometric evaluations showed that after a 4-week 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.

CONCLUSIONS

The Authors choose to use this porcine bone-derived biomaterial because of its very good biocompatibility, focusing on the possibility that the topical application of porcine bone graft and melatonin synergistically promote in vivo bone formation by enhancing the differentiation and the proliferation of osteogenic cells. As the findings of this study demonstrate the effect of porcine bone graft mixed with melatonin on osseointegrated DCD surface dental implants, augmenting bone-to-implant contact (BIC: 84,5±1,5%) compared with implants treated with porcine bone alone (BIC: 66,17±1,2%) at 12-week follow-up study, the Authors concluded that *"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 osseointegration"*.

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Abstract author: Cristina Rodighiero, dental journalist, free publication, not for resale. Printed by Tecnoss® Dental s.r.l.



OsteoBiol® by Tecnoss

Short communication: collagenated cortico-cancellous porcine bone grafts. A study in rabbit maxillary defects

Ulf Nannmark[1]
Iman Azarmehr[2]

ABSTRACT

In a previous study, the Authors evaluated the bone tissue responses to collagenated porcine bone (CPB), with and without prehydration, finding that CPB exhibits good biocompatibility, osteoconductive properties, and that the material was resorbed by surface osteoclasts as well as part of the remodeling with the formation of osteons. Moreover, they found that the dehydration process made the graft material sticky, facilitating clinical handling. As the influence of different ratios between bone particles and collagen on bone response is not known yet, the aim of this short communication was to evaluate the bone tissue response to CPB, with different collagen gel content, when placed in defects in the rabbit maxilla. In this study, bilateral bone defects, 5x8x3 mm, were created in the maxilla of 8 rabbits. The defects were filled with prehydrated (20% collagen I/III) collagenated cortico-cancellous porcine bone mix (Putty, OsteoBiol®, Tecnoss®, Coazze, Italy – granulometry up to 300 μm) (A) or prehydrated (40% collagen I/III) collagenated cortico-cancellous porcine bone mix (Gel 40, OsteoBiol®, Tecnoss®, Coazze, Italy - granulometry up to 300 μm). Animals were killed after 8 weeks for histological and morphometrical evaluations that evidenced that both materials showed a high degree of new bone formation, 42% and 46%, respectively, and clear signs of resorption at time of the animals sacrifice.

CONCLUSIONS

The present study clearly demonstrates that CPB with different collagen gel content induces bone formation in defects in rabbit bone and that resorption of the porcine bone particles takes place. The high presence of collagen might induce adhesion of both mesenchymal cells and osteoclasts to the surface of the material because these cells are shown to link to different proteins. Also, collagen has been shown to have a chemotactic and differentiation effect on mesenchymal stem cells.

On the basis of the findings of this study, the Authors concluded that *"CPB with different ratios of collagen exhibits good biocompatibility and osteoconductive properties. In this model, the two materials were equal with respect to both bone formation and resorption which had started at the endpoint at 8 weeks"*.

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ORIGINAL ARTICLE
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2010 Jun 1;12(2):161-3

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BONE SUBSTITUTES
OsteoBiol® *Putty*
OsteoBiol® *Gel 40*

Abstract author: Cristina Rodighiero, dental journalist, free publication, not for resale. Printed by Tecnoss® Dental s.r.l.



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EXPERIMENTAL STUDIES

042

Experimental model of bone response to collagenized xenografts of porcine origin (OsteoBiol® mp3®): a radiological and histomorphometric study

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Clinical Implant Dentistry and Related Research, 2011 Mar 31, Epub ahead of print

ABSTRACT

In case of atrophied ridges, it is necessary to reconstruct an adequate bone volume in order to perform a successful rehabilitation with implants. Nowadays, the clinician has the possibility to choose between several techniques for reconstructing atrophied ridges, all with advantages and limitations. One of these techniques is the use of bone substitute grafts. These have been for many years the subject of the clinical dental research aimed to find the ideal biomaterial that must be biologically safe, reliable, biocompatible and without toxicity.

The aim of this study was to carry out radiological and histomorphometric evaluations of bone response to a xenograft of porcine origin over a 4-month period following the insertion in rabbits' tibiae. The biomaterial tested was mp3® (OsteoBiol®, Tecnoss®, Coazze, Italy), an antigen-free bone consisting of 90% collagenized granules between 600 and 1000 μm mixed with 10% pure Type-I porcine collagen gel. 20 collagenated porcine bone xenografts in granulated form of 600 to 1000 μm, were inserted in the proximal metaphyseal area of 20 New Zealand rabbits' tibiae. In the same animals, 20 control areas were created. Following implantation, the animals were sacrificed in four groups of five, after 1, 2, 3, and 4 months, respectively.

After 4 months, the radiological examination revealed in the bone defects, into which the collagenated xenografts had been placed, images of a complete repair of the osseous defect, with a decrease in graft volume. The anatomopathological study showed the presence of mature osseous bone in the cortex of the implant insertion site and a bone remodeling of osseous trabeculae around the implant.

Histomorphometric analysis at 4 months found that the newly formed bone was represented by a value of 31,5±2,4%, the residual graft material by a value of 33,1±2,3%, and the nonmineralized connective tissue was represented by a value of 35,4±3,4%. No healed or residual bone alterations attributable to the presence of the implants were observed.

CONCLUSIONS

The outcomes of this study suggest that OsteoBiol® mp3® is a biocompatible material and it has osteoconductive properties. The material acted as a scaffold for bone cells, leading to progressive increases in bone growth in and around the xenograft. The Authors concluded that *"the said biomaterial may be considered a satisfactory substitute for bone tissue, a material that does not interfere with the bone's normal reparative processes"*.

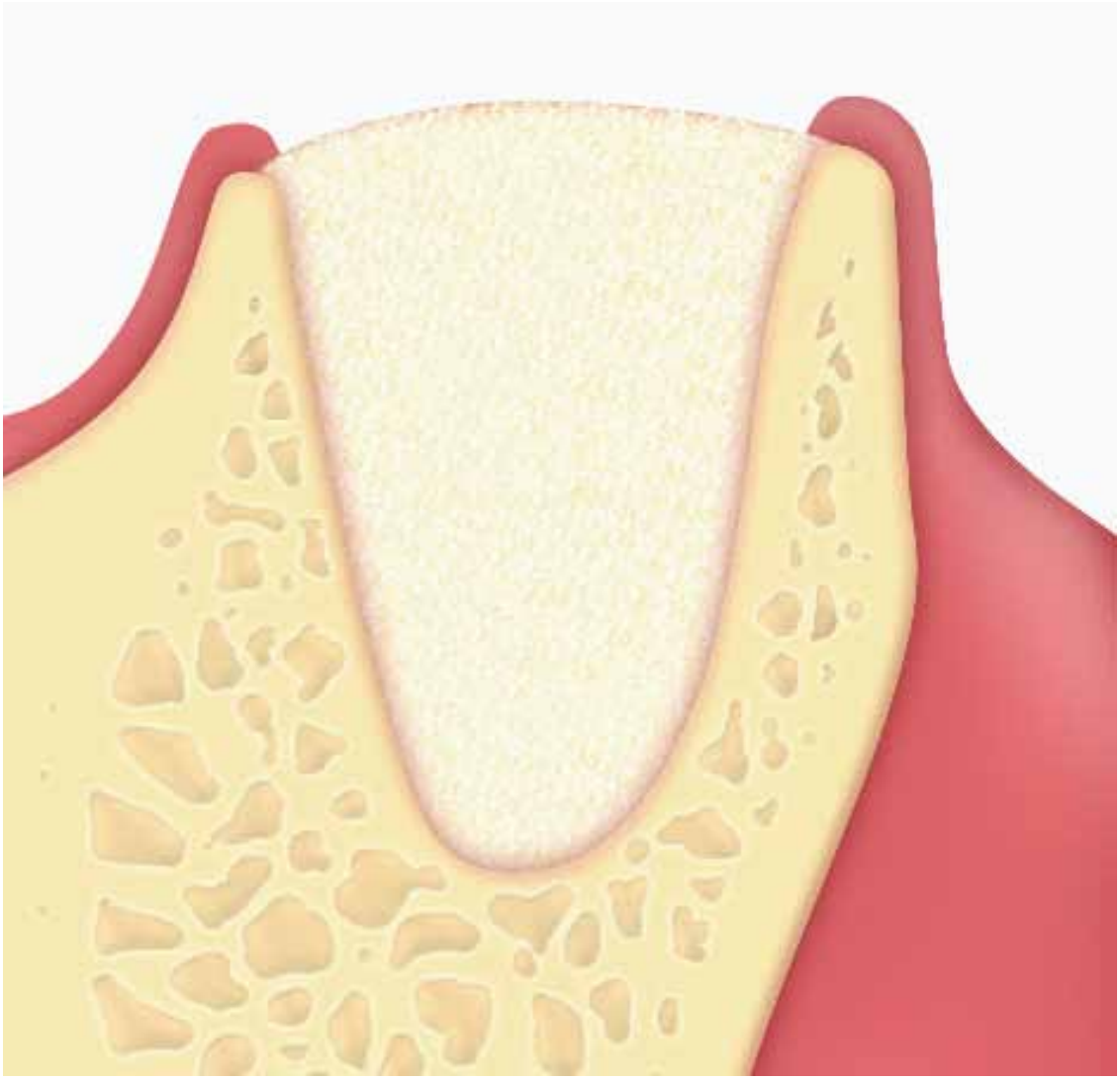
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Alveolar regeneration



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ALVEOLAR REGENERATION

001

Crestal ridge preservation with allogenic bone. Histological analysis

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ABSTRACT

Some of the main causes of alveolar bone atrophy requiring augmentation procedures are the bone reabsorption and healing patterns that occur after tooth extraction. In this case, an augmentation of the existing alveolar bone is often necessary in order to establish the ideal conditions for the implant placement. Thanks to the ridge preservation techniques, it is possible to keep under control the bone resorption process. The augmentation of the alveolus after tooth extraction seems to increase the probability of maintaining the original crestal form, allowing ideal implant placement with optimal bone and gingival tissues. Different biocompatible materials and autogenous bone have been used to treat bone atrophy of the alveolar ridges. In this pilot study, the aim was to evaluate with clinical and histological observations the effect of a new eterologous bone as filling material in post-extraction sites. The porcine bone xenograft (Gen-Os, OsteoBiol®, Tecnoss®, Coazze, Italy) was used in combination with resorbable membranes (Evolution, OsteoBiol®, Tecnoss®, Coazze, Italy) 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 rehabilitations.

CONCLUSIONS

The results show that the resorption of the crestal width can be significantly reduced by the treatment of the extraction socket with this filling material and the histological analysis showed that the formation of new bone allowed a successful implant placement. All the 4 cases treated with porcine bone showed a satisfactory healing, without any signs of complications.

ORIGINAL ARTICLE
Italian Oral Surgery
2004 Vol 3,1:17-23

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Clinical and histological study of a xenogenic bone substitute used as a filler in postextractive alveolus

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ABSTRACT

The remodeling process following a tooth avulsion results in a three-dimensional modification of the alveolar bone, making the insertion of an implant extremely difficult and requiring an augmentation procedure. The aim of this study was to evaluate the clinical behavior and the resorption times of the graft material (Putty, OsteoBiol®, Tecnoss®, Coazze, Italy), an antigen-free bone paste composed of 80% granulated mix and 20% pure collagen. This product has an average resorption time of less than 4 months. 12 patients were included in the study and all of them required an endosseous implant following the loss of a tooth due to root fracture or periodontal pathology. After the flap elevation and the defect examination, OsteoBiol® Putty was inserted in the cavity by means of a sterile spatula and the flaps were sutured. The histological analysis and the x-ray performed after 3 months showed a complete resorption of the heterologous material and its substitution with trabecular bone tissue.

CONCLUSIONS

The Authors appreciated the ideal malleability and plasticity of the product that allow a very simple application. Moreover, this biomaterial support a correct bone tissue regeneration, facilitating and accelerating the physiological processes. In the Authors' opinion, *"this material could be the best indication for the insertion of postextractive implants in sites where the bone defects are more than 2 mm"*. They also concluded that OsteoBiol® Putty can be used also in not prominent or in 3-wall defects, with the advantage of an easy applicability.

ORIGINAL ARTICLE
Minerva Stomatologica
2005 Jun;54(6):351-62

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ALVEOLAR REGENERATION

016

Xenograft versus extraction alone for ridge preservation after tooth removal: a clinical and histomorphometric study

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ORIGINAL ARTICLE
Journal of Periodontology
2008 Aug;79(8):1370-1377

ABSTRACT

In order to allow a proper implant placement from both esthetics and function points of view, it is fundamental to preserve as much as possible the ridge bone volume immediately after tooth extraction. In order to obtain this, different biocompatible materials and autogenous bone have been used to treat the bone atrophy of the alveolar ridges.
The purpose of this randomized clinical trial was to compare the bone dimensional changes following tooth extraction with extraction plus ridge-preservation using cortico-cancellous porcine bone and a collagen membrane. Moreover, the Authors analyzed and compared the histologic and histomorphometric aspects of the extraction-alone sites to the grafted sites.

40 patients who required tooth extraction and implant placement were enrolled in this study and randomly assigned to the control group (EXT; extraction alone) or to the test group (RP; ridge-preservation procedure). In this last group, cortico-cancellous porcine bone (mp3®, OsteoBiol®, Tecnoss®, Coazze, Italy) was packed into the socket and collagen membrane (Evolution, OsteoBiol®, Tecnoss®, Coazze, Italy) was hydrated in sterile saline and trimmed to completely cover the socket.

The clinical and histologic evaluations showed significant differences between the two treatments. The implants were placed at all sites, although some implants in the extraction-alone group showed a buccal dehiscence that required guided bone regeneration procedures after implant insertion. The bone biopsies taken from the control and test sites 7 months after the surgical treatment and the histologic and histomorphometric analyses showed a significantly greater horizontal reabsorption (4,3±0,8 mm EXT vs. 2,5±1,2 mm RP) and a greater ridge height reduction (3,6±1,5 mm) at the buccal side in the EXT group (RP: 0,7±1,4 mm). The vertical change at the lingual sites was inferior in the ridge-preservation group. The biopsies harvested from the grafted sites revealed the presence of trabecular bone, which was highly mineralized and well structured. The amount of connective tissue was significantly higher in the extraction-alone group than in the ridge-preservation group.

CONCLUSIONS

This study showed that the almost complete incorporation of the cortico-cancellous particles in bone created a dense and hard tissue network in which the porcine bone particles were completely surrounded by vital bone. The results obtained suggest that the ridge-preservation approach using porcine bone in combination with collagen membrane can limit the resorption of hard tissue ridge after tooth extraction. Moreover, the new bone formation observed between the porcine bone particles might indicate that the biomaterial is osteoconductive and acts as a natural scaffold for new bone formation.

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Preservation of the postextraction alveolar ridge: a clinical and histologic study

ALVEOLAR REGENERATION

018

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ABSTRACT

When the treatment planning foresees the placement of an implant following a tooth extraction, it is necessary to preserve the dimension of the post-extraction alveolus. In literature different ridge preservation procedures have been proposed and it has been confirmed that filling and covering the post-extraction alveolus preserve the bone volume in a more predictably way compared to the natural healing. However, some controversy exists regarding the quality of the tissue augmented in the extraction site.

The aim of this investigation was to assess the possibility of preserving the buccal and lingual plates of a post-extraction socket from resorption using a bone filler. Consequently, this study investigated the role of a bone substitute material in preserving the ridge after the extraction of posterior teeth. In order to do this, after the tooth extraction, 10 single sockets in the posterior area were filled with a xenograft material (Gen-Os, OsteoBiol®, Tecnoss®, Coazze, Italy). The granules were then covered with a collagen membrane (Evolution, OsteoBiol®, Tecnoss®, Coazze, Italy), and the soft tissues were sutured over the membrane without obtaining primary closure.

The histologic analysis performed 4 months after extraction on the specimens harvested from the area previously augmented with bone filler evidenced that about 85% of the initial ridge dimensions was preserved, allowing for a correct implant placement. From a histologic point of view, new bone formation was detected in all sites.

CONCLUSIONS

The results obtained in this investigation confirm that the resorption of the crestal width can be significantly reduced thanks to the use of a filling material and that the augmentation of the alveolus after tooth extraction seems to increase the probability of maintaining the original crestal form, allowing ideal implant placement with optimal bone and gingival tissues. In the Author's opinion, *"the results promote the use of a bone substitute to fill the post-extraction site of posterior teeth to avoid alveolar bone loss"*.

ORIGINAL ARTICLE
The International Journal of Periodontics & Restorative Dentistry
2008 Oct;28(5):469-477

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ALVEOLAR REGENERATION

028

Dental implants placed in extraction sites grafted with different bone substitutes: radiographic evaluation at 24 months

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ABSTRACT

In case of a post-extraction socket, it may be necessary to adopt surgical procedures such as guided bone regeneration, bone allografts, bone autografts, and xenografts in order to assure the proper biologic and esthetic conditions for the consequent implant placement. For this purpose, different graft materials have been advocated to prevent a bone-volume reduction and the aim of this study was to evaluate radiographic parameters of implants positioned in grafted alveoli with 3 different biomaterials: magnesium-enriched hydroxyapatite (MHA), calcium sulfate (CS), and heterologous porcine bone (PB).

15 patients, 7 women and 8 men, were included in this prospective study, requiring the extraction of 3 teeth for each patient. In total, 45 fresh extraction sockets with three bone walls were selected. 15 sockets received MHA, 15 sockets received CS, and 15 sockets received cortico-cancellous PB (Gen-Os, OsteoBiol®, Tecnoss®, Coazze, Italy) as a graft material. After 3 months, in all the grafted sites titanium dental implants were placed and the temporary restoration was performed 3 months after the implant placement.

In order to evaluate the marginal bone level, at baseline and 12 and 24 months after implant placement, follow-up examinations, including intraoral digital radiographs, were conducted.

After 24 months, the results were the following: 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).

CONCLUSIONS

The findings of this study at the moment of the 24-month follow-up showed that all the graft materials allowed the proper conditions for the implant osseointegration and that the placement of implants in grafted sockets was not influenced by the three different biomaterials, as they did not negatively impact the clinical outcome. The absence of statistically significant differences of bone level around implants among groups confirmed the results reported by other studies.

ORIGINAL ARTICLE
Journal of Periodontology
2009 Oct;80(10):1616-1621

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Planning implants in the esthetic zone using a new implant 3D navigation system

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Riccardo Benzi[4]
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5 | CDT Lab. | Golden Smile, Genova, Italy

ABSTRACT

When a dental implant replaces a natural tooth, any deficit of soft or hard tissue makes more difficult to achieve a satisfactory and predictable esthetic results.

Nowadays, guided implant surgery has become a clinical reality in implant dentistry and on the market different navigation systems are available for the planning both of the surgical and prosthetic stages. Moreover, the evolution of digital technology and imaging led to new perspectives in planning modern implant-prosthetic therapy, with interesting effects on implant-guided surgery.

In this article, the Authors present a case report planned and executed with the help of a new procedure for the planning of guided surgery using a hybrid approach as an alternative to current CAD/CAM techniques. This is a low-cost and simple technique, based on a presurgical CT scan, that allows the surgeon and the prosthodontist to work in a team to deliver a fixed restoration at the time of the surgical procedure in a minimally invasive and predictable way.

As after the tooth extraction in an esthetic zone the patient showed a bone deficit, the extraction socket was cleaned carefully, extracting all the residual inflammatory tissue, and was grafted with a porcine cortico-cancellous mixed graft (Gen-Os, OsteoBiol®, Tecnoss®, Coazze, Italy) and sealed with a fibrin sponge. The healing was uneventful, and despite the expected buccolingual contraction of the soft tissue, the 6-month follow-up radiograph evidenced the ideal integration of the bone graft.

CONCLUSIONS

Based on the satisfactory results obtained in their clinical experiences, the Authors concluded that *"minimally invasive approaches are very important when dealing with soft and hard tissue management. The conventional flapless approach is known to have good results with less recession of hard and soft tissues. Therefore, planned flapless surgery may become the gold standard for soft and hard tissue regeneration in the future"*.

The procedure described in this article, together with the use of diagnostic three-dimensional software, seems a precise and efficient means of providing a prosthetic device before surgery takes place.

ORIGINAL ARTICLE
The European Journal of Esthetic Dentistry
2010; Summer 5(2):172-188

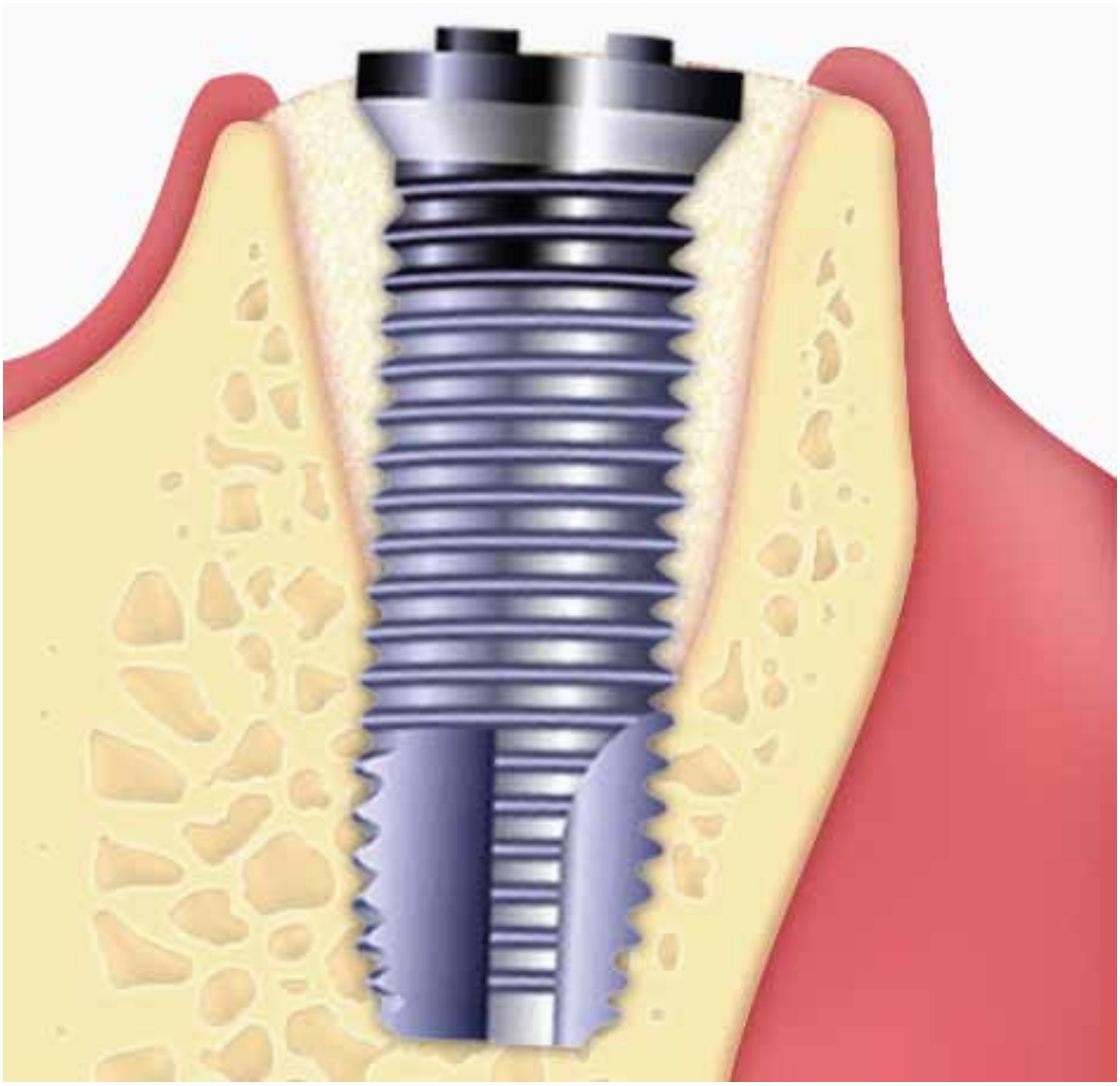
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DEHISCENCES AND FENESTRATIONS

008

Clinical outcome of implants placed immediately after implant removal

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Roberto Cornelini[1,3]
Roberto Crespi[1,4]

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ORIGINAL ARTICLE
Journal of Periodontology
2006 Apr; 77(4):722-7

ABSTRACT

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. 9 patients (3 males and 6 females) aged 35 to 63 years were included in this study in a period ranging from 1999 to 2004. All of the patients selected for this study required the extraction of failed implants and were scheduled for immediate implant replacement.

As the placement of an immediate implant is often associated with a residual bone defect between the outer surface of the implants and the residual bone walls, the Authors considered to apply a GBR protocol only in case of a large bone defect. Consequently, 5 experimental implants which showed the absence of fenestrations or dehiscences of the bone walls and a residual gap between implant surface and surrounding bone walls <2mm, were not treated with any regenerative procedures. The remaining 4 experimental immediate implants, which exhibited bone fenestrations or dehiscences and/or peri-implant bone defects >2mm, were grafted with cortico-cancellous porcine bone particles (Gen-Os, OsteoBiol®, Tecnoss®, Coazze, Italy) and covered with bioabsorbable membranes (Evolution, OsteoBiol®, Tecnoss®, Coazze, Italy). The membranes were used for the treatment of large bone defects and where a large portion of the bone recipient site around the implant was missing. A bioabsorbable barrier membrane was used in all instances when necessary. Due to insufficient stiffness of the membrane, cortico-cancellous porcine bone particles were grafted into the defect to prevent the collapse of the membrane and maintain a space beneath the membrane for bone regeneration.

All implants were then restored with fixed prostheses. After 12 months, all the implants were successful and no residual bone defects were observed or probed around any implant. Analogously, the follow-up x-rays showed no significant bone loss pattern.

CONCLUSIONS

Considering the findings of this study, the Authors suggest that it is possible to place implants immediately after a fractured implant explantation, with results that are similar to results obtained with implants placed immediately after tooth extraction.

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Immediate postextraction implants: treatment of residual per-implant defects. A retrospective analysis

DEHISCENCES AND FENESTRATIONS

006

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1 | University of Genova, Italy

ABSTRACT

Very often, the placement of an implant in a fresh extraction socket is associated with a bone defect between the neck of the implants and the residual bone walls. This article is a retrospective analysis of the clinical success of immediately post-extractive implants in combination with regenerative procedures performed in order to treat the peri-implant bone defects. 50 patients were enrolled in the study and treated with an immediate implants. The marginal bone defects were treated in different ways. 20 sites were treated with collagen barrier membranes (Evolution, OsteoBiol®, Tecnoss®, Coazze, Italy) and cortico-cancellous pig bone particles (Apatos, OsteoBiol®, Tecnoss®, Coazze, Italy). 10 sites were treated with membranes and autologous bone. 5 sites were grafted with a stratified bone paste (Putty, OsteoBiol®, Tecnoss®, Coazze, Italy) and 6 sites were treated with a collagen membrane (Evolution, OsteoBiol®, Tecnoss®, Coazze, Italy).

The second stage surgery was performed 6 months later for the prosthetic rehabilitation and in order to evaluate the residual peri-implant bone defects. Consequently, it was possible to assess that the 82% of the treated sites showed a complete bone healing without residual defects, while the 16% showed a residual bone defect.

CONCLUSIONS

At the moment of the second stage surgery, most of the peri-implant bone defects showed a complete healing and the residual bone defects did not require any further treatment procedure. Even if in this study it was not possible to evaluate the different behavior of the filling materials, the results of this study confirm the highly predictable success rate of post-extractive implants and of the regenerative procedure for the peri-implant bone defects treatment.

ORIGINAL ARTICLE
European Journal of Implant Prosthodontics
2006 May-Aug;2(2):99-106

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DEHISCENCES AND FENESTRATIONS

017

Buccal bone augmentation around immediate implants with and without flap elevation: a modified approach

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ORIGINAL ARTICLE
The International Journal of Oral & Maxillofacial Implants
2008 Sept-Oct ;23(5): 841-6

ABSTRACT

In literature, there is evidence of the fact that implants placed in fresh extraction sockets reduce not only morbidity rates in patients, but also the total time between tooth removal and the final prosthetic restoration. 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. 20 patients (8 male and 12 female) aged 30 to 67 years were included in the study. All the patients selected for this study required the extraction of a natural tooth and were scheduled for immediate implant replacement.

10 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, which required bone augmentation. Bone augmentation was performed with a mixture of collagen gel and cortico-cancellous porcine bone (Gel 40, OsteoBiol®, Tecnoss®, Coazze, Italy). The surgical sites were protected at the level of gingival wound with a collagen membrane (Evolution, OsteoBiol®, Tecnoss®, Coazze, Italy). All grafting procedures were successfully carried out as planned without any complications. All the implants included in this study were 2-stage implants placed at the level of palatal/lingual bone in augmented bone. 6 months after placement, both control and test implants underwent a second-stage surgery and a clinical examination to determine the implant stability quotient (ISQ), the distance between the implant shoulder and the first bone-implant contact (DIB) and the distance between implant shoulder and the crestal bone at the midbuccal aspect (DIC). One implant failed in the test group. Only one implant (test group) showed bone growth over the implant neck at the re-entry procedure. 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.

CONCLUSIONS

The present study showed that implants placed immediately after tooth extraction in presence of vertical bone defects can be successfully treated either with or without flap elevation, 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. These findings suggest more favorable outcomes in terms of regenerated bone for the flap elevation group.

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Immediate implant placement after removal of a failed implant: clinical and histological case report

DEHISCENCES AND FENESTRATIONS

024

Ugo Covani[1]
Simone Marconcini[2]
Roberto Crespi[3]
Antonio Barone[4]

ABSTRACT

This article reports the clinical success of an implant placed immediately after the explantation of a fractured blade implant due to a fracture caused by biomechanical complications. A healthy 58-year-old male nonsmoker presented with a fractured blade implant that had been subjected to biomechanical overload. A gentle explantation was performed, and a new implant of the same shape was immediately placed. The peri-implant bone defect was grafted with a mixture of collagen gel and cortico-cancellous porcine bone (mp3®, OsteoBiol®, Tecnoss®, Coazze, Italy) and covered with a bioabsorbable membrane (Evolution, OsteoBiol®, Tecnoss®, Coazze, Italy).

Radiographic evaluation at 6 months after the treatment 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.

CONCLUSIONS

When an implant fails, it must be immediately removed. In case of a new implant placed in a fresh extraction socket, if the contact implant-bone is not ideal or portion of the implant wall is exposed because of a dehiscence in the bone, guided tissue regeneration techniques can be employed using barrier membranes with or without bone graft materials.

The present case report demonstrated the successful immediate replacement of a failed blade implant with a new implant of the same shape in the same location in combination with a graft material and a membrane.

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ORIGINAL ARTICLE
Journal of Oral Implantology
2009;35(4):189-95

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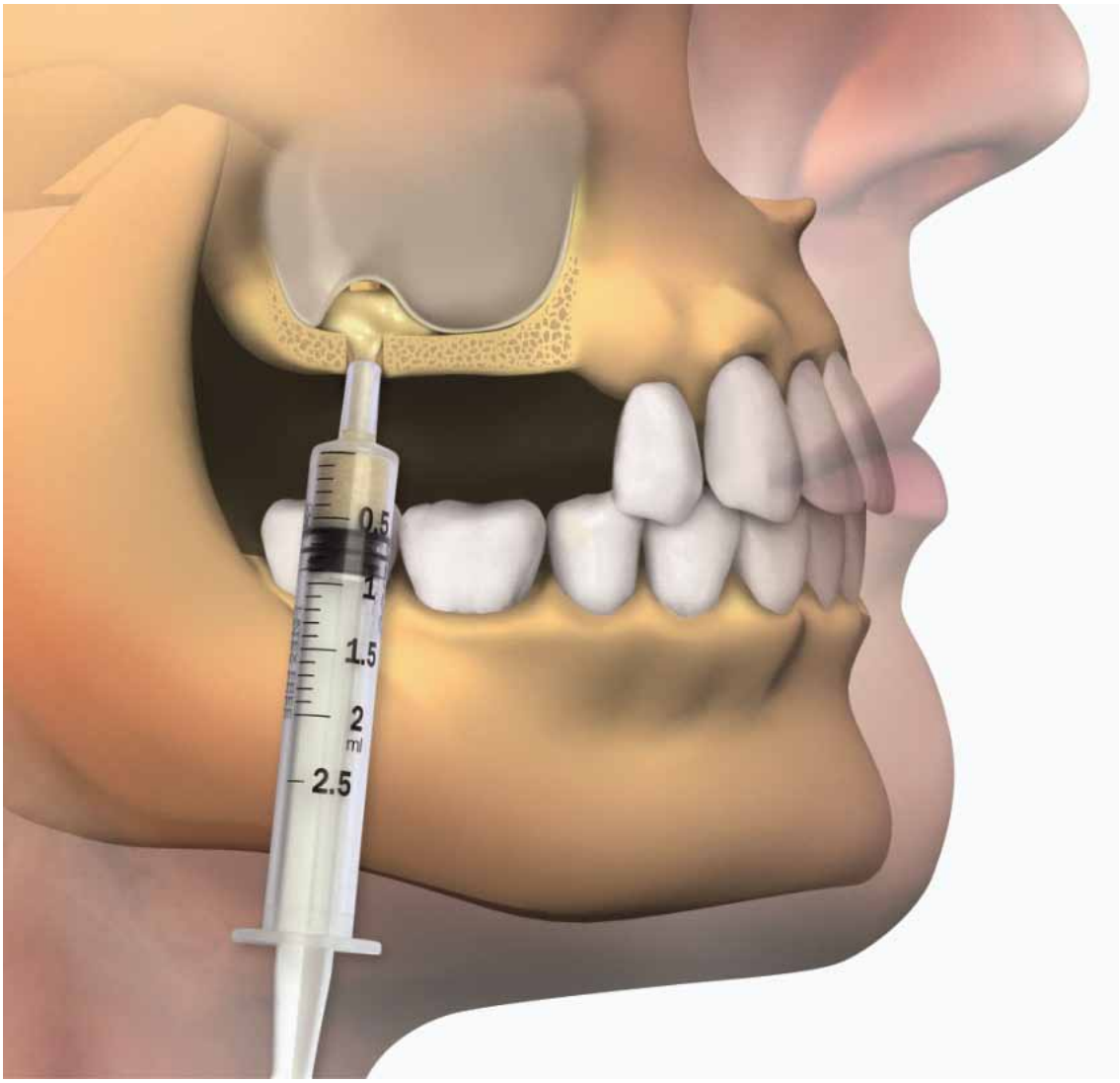
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Crestal access sinus lift



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Implant placement in fresh extraction sockets and simultaneous osteotome sinus floor elevation: a case series

Antonio Barone[1]
Roberto Cornelini[2]
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ORIGINAL ARTICLE
The International Journal of Periodontics & Restorative Dentistry
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ABSTRACT

In the posterior maxilla, implant placement immediately after tooth extraction is frequently complicated by the presence of the maxillary sinus and by a lack of adequate bone volume and quality, thus preventing a precise placement and stabilization of the implants. Therefore, in these situations, normally a maxillary sinus augmentation is performed, followed by implant placement in the reconstructed bone.

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.

12 patients (7 men and 5 women) aged 38 to 56 years were included in this study, requiring the extraction of a maxillary premolar and scheduled for immediate implant placement. The graft materials used in both sinus floor augmentation and peri-implant bone defects were a mixture of collagen gel and cortico-cancellous porcine bone particles (Gel 40, Osteobiol®, Tecnoss®, Coazze, Italy), covered with bioabsorbable membranes (Evolution, Osteobiol®, Tecnoss®, Coazze, Italy). The resulting graft material was extremely easy to handle because the collagen gel acted as a sealing material.

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. 18 months after surgery, mean bone gain evaluated by radiographies was 4,2±1,4 mm.

CONCLUSIONS

The results of this study demonstrate that the use of the osteotome technique in order to obtain the sinus floor elevation and the implant placement in fresh extraction sockets can be considered a predictable procedure. Thanks to the lateral condensation of bone performed by this technique during the preparation of the implant site, the resulting bone quality seems to be improved.

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Atraumatic maxillary sinus elevation using threaded bone dilators for immediate implants. A three-year clinical study

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ABSTRACT

Different techniques are available in order to create a sufficient volume of supporting bone in and around the maxillary sinus in case of a bone reduction both in height and width of the alveolar process due to atrophy and pneumatization. However, some of these treatments are complex and require specific surgical training.

The aim of this study was to evaluate the efficacy of sinus floor elevation carried out via the alveolar ridge, with collagenated porcine bone grafts and immediate implant placement in a single surgical session through the use of angled osteotomes, threaded and with depth markings and restored 18 weeks later.

30 patients (18 women and 12 men) were included in the study, with atrophy affecting both height and width of the posterior upper maxillary. All implants were placed immediately after the application of convex and concave bone dilators for sinus floor lifting by means of the introduction of porcine bone mp3® (Osteobiol®, Tecnoss®, Coazze, Italy) with a granulometry of 600-1000 μm. Residual bone height (RBH) varied between 5 and 8 mm for all patients.

From the radiographic analysis it was possible to determine that the average intra-sinus bone gain was 4,13±0,97 SD mm at the time of surgery, 3,90±1,15 SD mm at 12 months, 3,74±1,05 SD mm at 24 months and 3,62±1,75 SD mm at 36 months.

CONCLUSIONS

After a follow-up period of 36 months, it was possible to put in evidence that the alveolar maxillary sinus floor elevation technique with angled threaded osteotomes and collagenated porcine mp3® bone achieved a success rate of 96,6%. Intra-sinus bone biomaterial remodeling was 0,51±0,08 mm from day zero to the 36-month follow-up. The advantage of the bone dilators technique is that it is a less invasive technique with a lower risk of complications both during and following surgery, with advantages from the aesthetic and functional point of view.

ORIGINAL ARTICLE
Medicina Oral, Patología Oral y Cirugía Bucal
2010 Mar 1;15 (2):E366-70

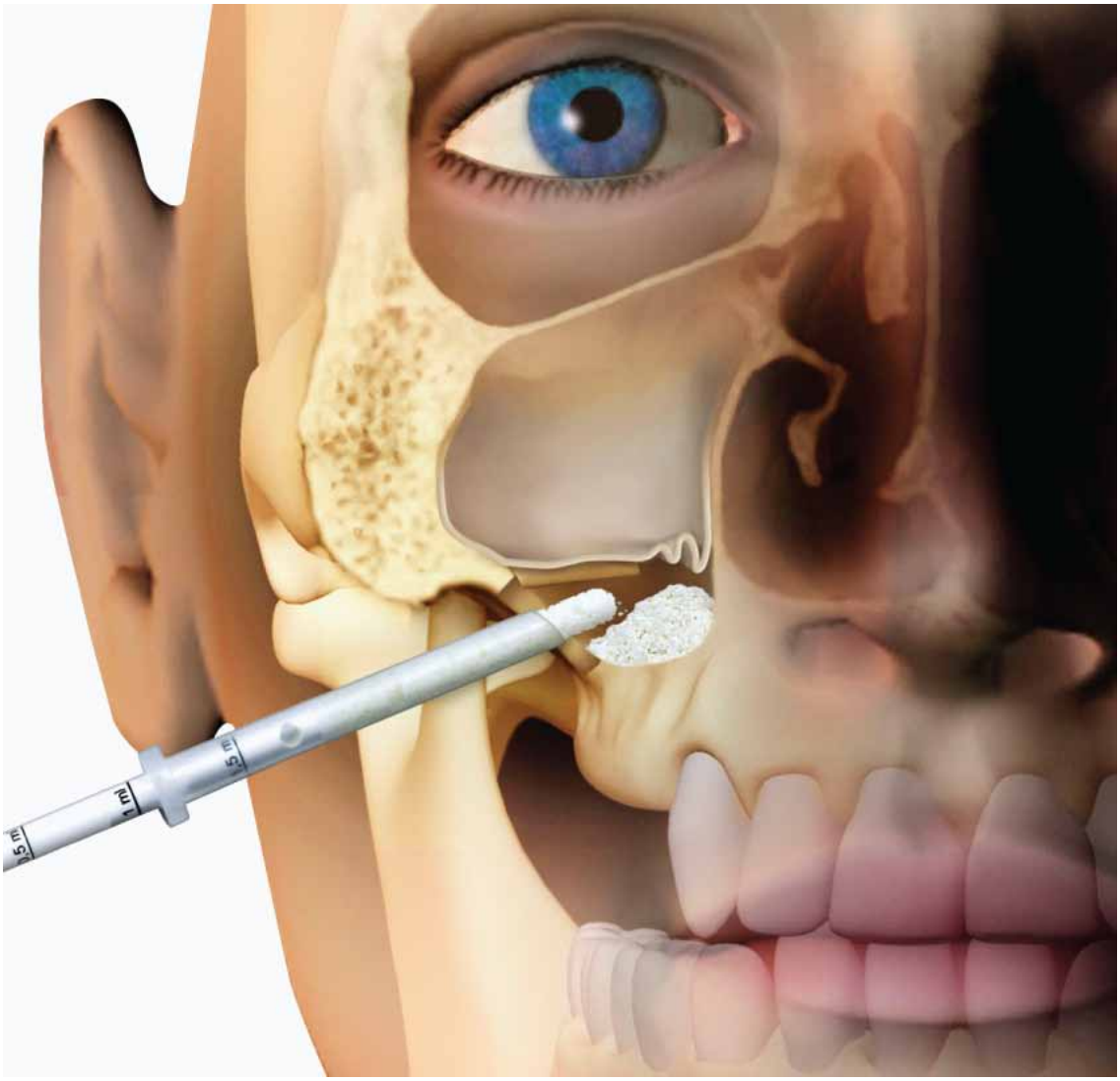
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Lateral access sinus lift



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LATERAL ACCESS SINUS LIFT

004

Maxillary sinus augmentation: histologic and histomorphometric analysis

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ORIGINAL ARTICLE
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ABSTRACT

A limited quantity of bone volume, related to an excessive r esorption of the alveolar bone following a tooth extraction and enlargement of the maxillary sinus, can complicate the implant placement in the posterior maxilla. In order to allow a predictable implant placement, sinus floor lifting and grafting have been proposed. In this study, the Authors aimed to compare from a histological point of view the use of 100% autogenous bone versus a combination of autogenous bone and cortico-cancellous porcine bone for the sinus floor augmentation procedure.

For this study, 18 patients were selected following these criteria: need for bilateral sinus lifting and grafting, presence of severe maxillary bone atrophy, presence of a residual maxillary sinus floor of less than 3 mm and presence of healthy systemic conditions. The surgery was performed under general anesthesia and the bone for grafting was harvested from the iliac crest.

Each patient received 100% autogenous bone in one randomly selected sinus (control side) and a 1:1 mixture of autogenous bone and cortico-cancellous porcine bone particles (Gen-Os, OsteoBiol®, Tecnoss®, Coazze, Italy) in the controlateral sinus (test side). The bony sinus windows were covered by a resorbable collagen membrane (Evolution, OsteoBiol®, Tecnoss®, Coazze, Italy).

5 months after surgery, all patients received at least 2 implants on each side of the maxilla and bone biopsy specimens (2 from each side) were taken at the time of implant placement.

The histologic evaluation of the test sites at 5 months showed the presence of some residual cortico-cancellous bone particles and that the incompletely resorbed bone graft was well integrated and in complete continuity with the new bone tissue formation. No significant differences in bone percentages were observed in the bone biopsies from test and control sites.

CONCLUSIONS

In the present study, cortico-cancellous pig bone particles at 5 months became partially resorbed and surrounded by new woven bone. On the basis of the findings from this study, the Authors concluded that the cortico-cancellous pig bone particles have the capacity to support bone augmentation and can be successfully used in a 1:1 mixture with autogenous bone harvested from the iliac crest in case of severe maxillary atrophies (class V Cawood).

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A clinical study of the outcomes and complications associated with maxillary sinus augmentation

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ABSTRACT

The sinus lift procedure is performed in order to increase the bone volume in the lateral maxilla and allow the use of dental implants. The dental implants can either be placed simultaneously when there is sufficient bone height, or be placed in a second moment, after an augmentation procedure.

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

70 patients (124 sinuses) with severe maxillary atrophy were included in the study for the maxillary sinus augmentation treatment under general anaesthesia. In 93 sinuses, the treatment was performed with autogenous bone alone. The donor sites for bone harvesting included the mandibular symphysis or the antero-upper border of the iliac crest. The remaining 31 sinuses were augmented with a 1:1 mixture of autogenous bone and cortico-cancellous pig bone particles (Gen-Os, OsteoBiol®, Tecnoss®, Coazze, Italy). The particles had granulometry between 250 and 1000 μm. The bony sinus windows were covered with a resorbable collagen membrane. Finally, the mucoperiosteal flap was replaced and sutured using vertical interrupted mattress sutures.

CONCLUSIONS

In evaluating the intraoperative complications, the Authors found that the use of an onlay bone graft in conjunction with sinus augmentation appeared to significantly increase the rate of infective complications. Anyway, this study showed no significant correlations between the occurrence of complications and the type of filling material adopted in the maxillary sinus augmentation. Furthermore, it was observed that new bone formation took place within 6 months of the sinus lift operation.

In particular, the Authors concluded that *"no radiographic discrepancies in the amount of bone regenerated were observed between sinuses where only autogenous bone was used and those where a 1:1 mixture of autogenous bone and cortico-cancellous pig bone particles was used"*.

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LATERAL ACCESS SINUS LIFT

009

Histologic and ultrastructural analysis of regenerated bone in maxillary sinus augmentation using a porcine bone-derived biomaterial

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Journal of Periodontology
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ABSTRACT

In case of an insufficient bone volume in the posterior maxilla, maxillary sinus floor augmentation procedures are used. Even if several different materials have been proposed for sinus augmentation procedures, it is still not clear which graft materials are clinically most suitable for bone regeneration. Autogenous bone is considered to be the gold standard, but its main disadvantages, especially those related to the patient's discomfort, produced a quest for a bone substitute that could be used in bone regeneration techniques and induce a predictable and rapid healing of the tissues at the interface with dental implants.

The aim of the present study was to report the results of light microscopy (LM) and transmission electron microscopy (TEM) in specimens retrieved 5 months after sinus floor augmentations using a porcine bone-derived biomaterial in the form of granules (Apatos, OsteoBiol®, Tecnoss®, Coazze, Italy). 10 patients were included in this study. After maxillary sinus augmentation using this biomaterial, 10 specimens were retrieved after 5 months and processed to be observed under light microscopy (LM) and transmission electron microscopy (TEM). At the same time, implants have been placed, planning second-stage surgery after 5 months.

After 5 months, the clinical observation revealed that all implants were stable and the x-rays showed the presence of bone around and above the implants placed in the augmented maxillary areas. The light microscopy observation showed that most of the particles were surrounded by newly formed bone and that mainly compact bone was present at the interface. Moreover, 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. Newly formed bone area was 36±2,8%, marrow spaces were 38±1,6%, while residual graft 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.

CONCLUSIONS

The findings of this study show that this cortical porcine bone-derived biomaterial is biocompatible and can be used for maxillary sinus augmentation procedures, promoting bone formation without in-terfering with the normal reparative bone processes and implant osseointegration.

Based on these results, the Authors concluded that *"these findings could increase the scientific knowledge of the clinician for understanding the biologic interactions occurring in proximity of a porcine bone substitute, showing that bone in contact with it presents all the phases of bone formation and shows features similar to the pre-existing osseous tissue, thus indicating the biocompatible properties of this graft"*.

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Osteotomy and membrane elevation during the maxillary sinus augmentation procedure. A comparative study: piezoelectric device vs. conventional rotative instruments

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ABSTRACT

Sinus lift is generally considered to be a safe surgical procedure for the maxillary sinus floor augmentation with a low prevalence of complications. Anyway, in case of a sinus membrane perforation, it is no more possible to guarantee the graft stability and its vascularization, jeopardizing the maturation and mineralization of the bone graft. Moreover, the presence of a large sinus membrane perforation allows migration of the graft to the respiratory mucosa and its bacterial contamination.

The aim of this randomized-controlled clinical trial was to compare two treatment procedures for the surgical access (osteotomy and sinus membrane elevation) to the maxillary sinus by means of piezoelectric device and conventional instruments during the maxillary sinus floor augmentation procedures.

A total of 13 patients (10 females and 3 males) who required a bilateral maxillary sinus floor elevation for implant-prosthetic rehabilitation were selected. 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).

Once the sinus membranes were elevated to obtain the requested volume for bone grafting, all the maxillary sinuses were grafted using 100% cortico-cancellous pig bone particles (mp3®, OsteoBiol®, Tecnoss®, Coazze, Italy). The bony sinus windows were covered with a reabsorbable collagen membrane (Evolution, OsteoBiol®, Tecnoss®, Coazze, Italy).

CONCLUSIONS

All patients had an uneventful healing and no signs or symptoms of maxillary sinus disease were observed after the augmentation surgical procedures.

With reference to the comparison between the two surgical procedures, none of the differences observed between the two groups reached a level of significance.

Within the limits of the present study, the Authors concluded that *"piezosurgery and conventional instruments did not show any differences in the clinical parameters investigated for the maxillary sinus floor elevation"*.

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Clinical Oral Implants Research
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LATERAL ACCESS SINUS LIFT

023

Removal, after 7 years, of an implant displaced into the maxillary sinus. A clinical and histologic case report

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ABSTRACT

Even if the placement of endosseous implants in the posterior maxilla has become a standard procedure, different complications can occur and among these there is the implant displacement inside the maxillary sinus, that may cause local infection around the implant; it is the most common effect and consequently may lead to an extensive resorption of the surrounding bone. The main cause of implant displacement is the inadequate bone height in the posterior maxilla.

In this article the Authors reported a case of an implant migrated inside the maxillary sinus at the time of abutment connection and removed 7 years later. After the removal of the implant, a bone Lamina (OsteoBiol®, Tecnoss®, Coazze, Italy) was used to close the lateral window of the sinus. The mucoperiosteal flap was then replaced and sutured with multiple horizontal mattress sutures.

The removed implant underwent histological examination, while post-surgical visits were scheduled at monthly intervals to check the healing process. 7 months after the implant removal from the maxillary sinus a CAT scan image revealed normal mucosal thickness and no opacification of the left maxillary sinus.

CONCLUSIONS

In case of the displacement of an implant into the sinus, the implant must be removed and so it is important to accurately evaluate the specific characteristics of the patient and receptor site in order to establish the best treatment of the specific clinical case that can include the use of a graft material to fill the residual cavity.

ORIGINAL ARTICLE
Journal of Osseointegration
2009

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Maxillary sinus augmentation using prehydrated cortico cancellous porcine bone: hystomorphometric evaluation after 6 months

LATERAL ACCESS SINUS LIFT

032

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ABSTRACT

Bone substitutes, such as allografts, xenografts and allografts have been proposed for the augmentation procedures in case of insufficient alveolar bone height that can prevent the placement of standard dental implants in the posterior part of edentulous maxilla. Recently, a xenogenic bone substitute consisting of sterilized cortical pig bone in the form of particles with high porosity and diameter ranging from 600 to 1,000 μm has been proposed.

The aim of this study was to evaluate histologic results of a prehydrated cortico-cancellous porcine bone used in maxillary sinus augmentation. 24 patients with a residual bone height requiring a maxillary sinus augmentation procedure to place dental implants were included in this study. After the sinus membranes elevation in order to obtain the necessary volume for bone grafting, all the maxillary sinuses were grafted using 100% cortico-cancellous porcine bone particles (mp3®, OsteoBiol®, Tecnoss®, Coazze, Italy). The bony sinus windows were covered with a reabsorbable collagen membrane (Evolution, OsteoBiol®, Tecnoss®, Coazze, Italy). The mucoperiosteal flaps were sutured using vertical-interrupted mattress sutures.

From the biopsies harvested 6 months after the augmentation procedures, it was possible to determine that 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%). The histological evaluation showed that the residual graft particles were surrounded by newly formed bone which presented features of mature bone, with well-organized lamellae and numerous small osteocytic lacunae.

CONCLUSIONS

Even if more studies on collagenated cortico-cancellous porcine bone are recommended by the Authors, the histological and histomorphometrical findings supported the idea that porcine bone has excellent osteoconductive properties and can be used successfully for sinus augmentation. In particular, after 6 months, it was evident a high percentage of reabsorption of the porcine bone.

Moreover, the presence of multinucleated cells in resorption lacunae along the surface of porcine bone particles and the presence of bone metabolizing units within granules indicated that a remodelling/resorption processes were taking place. In the Authors' opinion, the clinical success observed with porcine bone could be dependent on the surface topography of this biomaterial.

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Clinical Implant Dentistry and Related Research 2010 May 11. [Epub ahead of print]

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Porcine bone used in sinus augmentation procedures: a 5-year retrospective clinical evaluation

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ORIGINAL ARTICLE
Journal of Oral and Maxillofacial Surgery
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ABSTRACT

Inadequate bone height in the lateral part of the maxilla is a contraindication for implant surgery and the rehabilitation of the edentulous posterior maxilla with dental implants often represents a clinical challenge.

The aim of this study was to evaluate from a clinical point of view the maxillary sinus augmentation using porcine bone. This study included 121 healthy patients (71 women and 50 men), all candidates for augmentation in the posterior maxilla. After the elevation of the sinus membrane, the maxillary sinus was filled with sterilized porcine cortico-cancellous mixed bone particles (Apatos, OsteoBiol®, Tecnoss®, Coazze, Italy). In 20 cases a perforation of the sinus membrane occurred, but without clinical complications and all the membrane perforations were successfully repaired with a collagen membrane (Evolution, OsteoBiol®, Tecnoss®, Coazze, Italy) and showed uneventful healing.

After a 4- to 6-month healing period, sandblasted and acid-etched implants were inserted. All grafted sinuses healed well without major complications and did not show occurrence of symptoms indicating possible maxillary sinusitis and the cumulative survival implant rate was 92% after a mean loading time of 5 years.

CONCLUSIONS

The results of this study show that porcine bone can be used with success in sinus floor augmentation procedures, and rougher-surfaced implants are probably preferable. These findings are in accordance with other studies that showed that porcine bone has good biocompatibility and osteoconductive properties, with osteoblastic seams forming bone directly on the biomaterial surface and with no histologic signs of adverse reactions.

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Survival rate for implants placed in the posterior maxilla with and without sinus augmentation: a comparative cohort study

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ABSTRACT

As an inadequate residual bone height in the posterior maxillary region often limits the insertion of standard implants, it is normally accepted that the elevation of the maxillary sinus floor can represent an option in solving this problem and the reconstruction of the atrophic posterior maxilla can be performed by means of a sinus augmentation procedure.

This study was designed as a prospective cohort study with the aim to evaluate and compare the cumulative survival rate of implants placed in native bone (control group) with that of implants placed in augmented sinuses via the lateral approach (test group). The patients of the test group were treated according to the 2-stage technique. 105 patients with 393 implants were enrolled in the study. 201 implants were inserted after preliminary sinus floor grafting in 41 patients. The graft used for sinus augmentation was a mixture 1:1 of autologous bone and cortico-cancellous porcine bone (mp3®, OsteoBiol®, Tecnoss®, Coazze, Italy). The antero-superior iliac crest was the extra-oral site used for bone harvesting. The graft particles and the autogenous bone were put together, mixed with sterile saline solution and some blood, and carefully packed in the sinus cavity using a plugger. A resorbable membrane (Evolution, OsteoBiol®, Tecnoss®, Coazze, Italy) was positioned against the packed sinus window. Implant placement was performed after a healing period of 6 months after augmentation.

CONCLUSIONS

In this preliminary 6-year report of an ongoing study, the results indicate that dental implants inserted after sinus floor grafting procedure exhibit successful tissue integration with high predictability over 6 years of follow-up. Anyway, the results showed that that implants placed in augmented sinuses (test group) had a lower survival rate (86,1%) compared with implants inserted in pristine bone (96,4%).

As most of the failures were observed in few patients, this seems to suggest a cluster behavior. This considering, the Authors concluded that *"Further studies are needed to better investigate the influence of patient related factors on implant survival, such as residual alveolar bone height, smoking habits and susceptibility to peri-implantitis"*.

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LATERAL ACCESS SINUS LIFT

038

A collagenated porcine bone substitute for augmentation at neoss implant sites: a prospective 1-year multicenter case series study with histology

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ORIGINAL ARTICLE
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ABSTRACT

It is well known that the presence of localized defects and/or small amounts of bone below the maxillary sinus can compromise implant placement. In such situation, in order to achieve predictable results, it is necessary to perform specific bone augmentation techniques. Different bone substitutes and barrier membranes are commonly used for the augmentation of localized defects and of the maxillary sinus floor and the aim of this study was to evaluate from a clinical and histological point of view a porcine bone (PB) substitute used for augmentation of the alveolar crest or the maxillary sinus floor prior to or in conjunction with implant placement. The biomaterials used were two types of collagenated bone of porcine origin (Gen-Os or mp3®, OsteoBiol®, Tecnoss®, Coazze, Italy), two types of collagen gel (Gel 40 or Gel 0, OsteoBiol®, Tecnoss®, Coazze, Italy), and two types of membranes (Evolution Fine or Lamina Soft X-fine, OsteoBiol®, Tecnoss®, Coazze, Italy). 19 patients were treated, with a total of 34 implants (Neoss Ltd., Harrogate, UK) placed. Implants were followed with implant stability measurements at placement and abutment connection, and with intraoral radiographs at abutment connection and after at least 1 year of loading. A biopsy for histology and morphometry was taken at the first re-entry operation. The results show that all but one procedure resulted in successful augmentation, with an overall procedure success rate of 94,7% and 90% for maxillary sinus floor augmentations. The histological examination showed the formation of new bone at the PB surface, forming bridges between particles and between particles and preexisting bone. The presence of scalloped resorption lacunae and new osteons inside the particles indicated ongoing resorption/remodeling of the particles.

CONCLUSIONS

The clinical cases presented in this study showed that collagenated PB could effectively be used for bone augmentation of various defects in all the 19 patients. The study included different defects and treatment strategies because the Authors decide to evaluate the use of the PB in consecutive patients with different needs as usually dealt with in everyday practice. This study showed good clinical results when using a PB substitute and barrier membranes for augmentation of the alveolar crest and maxillary sinus and the histology revealed osteoconductive properties of the material and also indicated osteoclastic resorption.

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Abstract author: Cristina Rodighiero, dental journalist, free publication, not for resale. Printed by Tecnoss® Dental s.r.l.



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Maxillary sinus augmentation in humans using cortical porcine bone: a histological and histomorphometrical evaluation after 4 and 6 months

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ABSTRACT

Bone substitutes, such as allografts, xenografts, and alloplasts, have been proposed in several augmentation procedures as an alternative to autogenous bone. Although autogenous bone is considered as the gold standard, its use has several disadvantages: a limited availability, a tendency to partially resorb, the need for an additional surgery, and the increased morbidity.

Among the bone substitutes available on the market, Apatos (OsteoBiol®, Tecnoss®, Coazze, Italy) is a xenogeneic bone substitute consisting of sterilized cortical porcine bone in form of particles with a high porosity and with a diameter ranging from 600 to 1000 μm. This biomaterial is similar to human bone, and it has been reported, in humans, to be osteoconductive, well integrated in the host site and incompletely resorbed after 5 months, and with no signs of adverse reactions in a rabbit study. All sinuses have been augmented with porcine cortical bone particles (Apatos) mixed with sterile saline solution and blood. A resorbable membrane (Evolution, OsteoBiol®, Tecnoss®, Coazze, Italy) was positioned while closing the packed sinus window.

The aim of the present study was to perform histologic and histomorphometric evaluation of 77 specimens retrieved 4 or 6 months after sinus augmentation using cortical porcine bone augmentation material. The specimens were processed to be observed under light microscopy. Histomorphometric measurements after 6 months showed: 31,4±2,6% newly formed bone, 34,3±3,1% marrow spaces, 37,6±2,2% residual graft.

The results of the evaluations confirmed the good biocompatibility and high osteoconductivity of this porcine biomaterial. Most of the grafted biomaterial particles were surrounded by newly formed bone, and no gaps or connective, fibrous tissues were found at the biomaterial-bone interface. There were no sign of inflammatory or other adverse reactions in the bone formed.

CONCLUSIONS

The present results show that cortical porcine bone is a biocompatible, osteoconductive biomaterial than can promote the formation of new bone, even in maxillary sinus augmentation procedures, without interfering with bone regeneration.

As this was a histological and histomorphometrical study only, in their conclusions the Authors anticipated that the long-term outcomes - that will be reported in a separate manuscript - were satisfactory in comparison to other studies using other graft materials.

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JClinical Implant Dentistry and Related Research, 2011; 13(1):13-18

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Periodontal regeneration



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PERIODONTAL REGENERATION

013

Soft tissue response to Platelet Rich Fibrin: clinical evidences

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ABSTRACT

The correct management of the extraction site is mandatory for aesthetic reasons and in order to avoid bone resorption following extraction. Often, it is necessary to graft a filler material into the extraction site to maintain the residual bone volume. However, the management of soft tissue over the graft could require flap traction and discharging incisions, which reduce microvascularisation at the margins. In this article, the Author analized the characteristics of PRF, investigating the possibility to use it in combination with filling materials, with the advantage of an effective support for the cellular migration and revascularisation of the grafted site. Actually, it has been suggested to use PRF as a guided tissue regeneration membrane, to cover and protect the bone graft material (Gen-Os, OsteoBiol®, Tecnoss®, Coazze, Italy) and the operative site. The application of a PRF membrane allows the surgical site to be protected from external contaminations and offer a matrix for faster healing of the wound edges. As suggested by the Author, the use of a PRF membrane in the treatment of infrabony defects could be an advantage for an excellent healing. Mixed with graft materials, PRF is able to attract mesenchymal cells and new blood vessels, accelerating the healing times.

CONCLUSIONS

The use of PRF is a valid support in guided tissue regeneration because of its potential for accelerating the processes of tissue healing and this makes the treated site less sensitive to outside contaminations and positively influences the aesthetic result and the patient's postoperative comfort. At deeper levels, PRF increases the cohesion between the grafted biomaterial particles and facilitates the diffusion of growth factors locally at the graft site.

The Author underlines that *"the high concentration of plasmatic cytokines and fibrin exert an osteogenic effect on bone progenitor cells and the concentration of leukocytes contained in the PRF appears to guarantee an immune action that facilitates the success of large grafts"*.

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Cosmetic Dentistry
2008, 3: 16-20

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Abstract author: Cristina Rodighiero, dental journalist, free publication, not for resale. Printed by Tecnoss® Dental s.r.l.



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Healing of gingival recessions using a collagen membrane with a demineralized xenograft: a randomized controlled clinical trial

ABSTRACT

Gingival recessions commonly associated with compromised esthetics, root hypersensitivity, higher incidence of root caries, and compromised plaque control and their treatment is performed via so-called mucogingival therapy. In order to promote the root coverage, it is possible to adopt the principles of guided tissue regeneration (GTR). As a variety of non-resorbable and absorbable barrier membranes has been used with clinical outcomes similar to those achieved by traditional procedures, the aim of this study was to compare the efficacy of two surgical techniques: coronally advanced flap (CAF) alone or in combination with the use of an absorbable membrane plus a demineralized xenograft (GTRF) for the treatment of gingival recession in a prospective randomized controlled clinical trial.

16 nonsmokers with 20 Miller Class I or Class II buccal gingival recessions at canines or premolars were included in the study. 10 defects were randomly assigned by coin toss to be treated by a CAF only (control sites), and the remaining 10 defects were treated by the GTRF method (test sites). The barrier device used was a collagen membrane (Evolution, OsteoBiol®, Tecnoss®, Coazze, Italy) and the bone substitute used was a demineralized xenograft (Gel 40, OsteoBiol®, Tecnoss®, Coazze, Italy).

The results following both procedures appeared equivalent, providing good root coverage, gain in clinical attachment levels, healthy nonbleeding sulcus and increases in keratinized tissue.

CONCLUSIONS

Even if both treatments resulted in a significant reduction in recession and gain in clinical attachment level, the Authors found that the increase in keratinized tissue from baseline to 6 months was slightly greater for the GTRF group than for the CAF group and the test group experienced a statistically significant increase in gingival thickness (+0,71 ± 0,21 mm) from baseline to the 6-month evaluation. Consequently, the Authors concluded that *"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 signifi cant increase in gingival thickness than the CAF-only approach"*.

Abstract author: Cristina Rodighiero, dental journalist, free publication, not for resale. Printed by Tecnoss® Dental s.r.l.

PERIODONTAL REGENERATION

030

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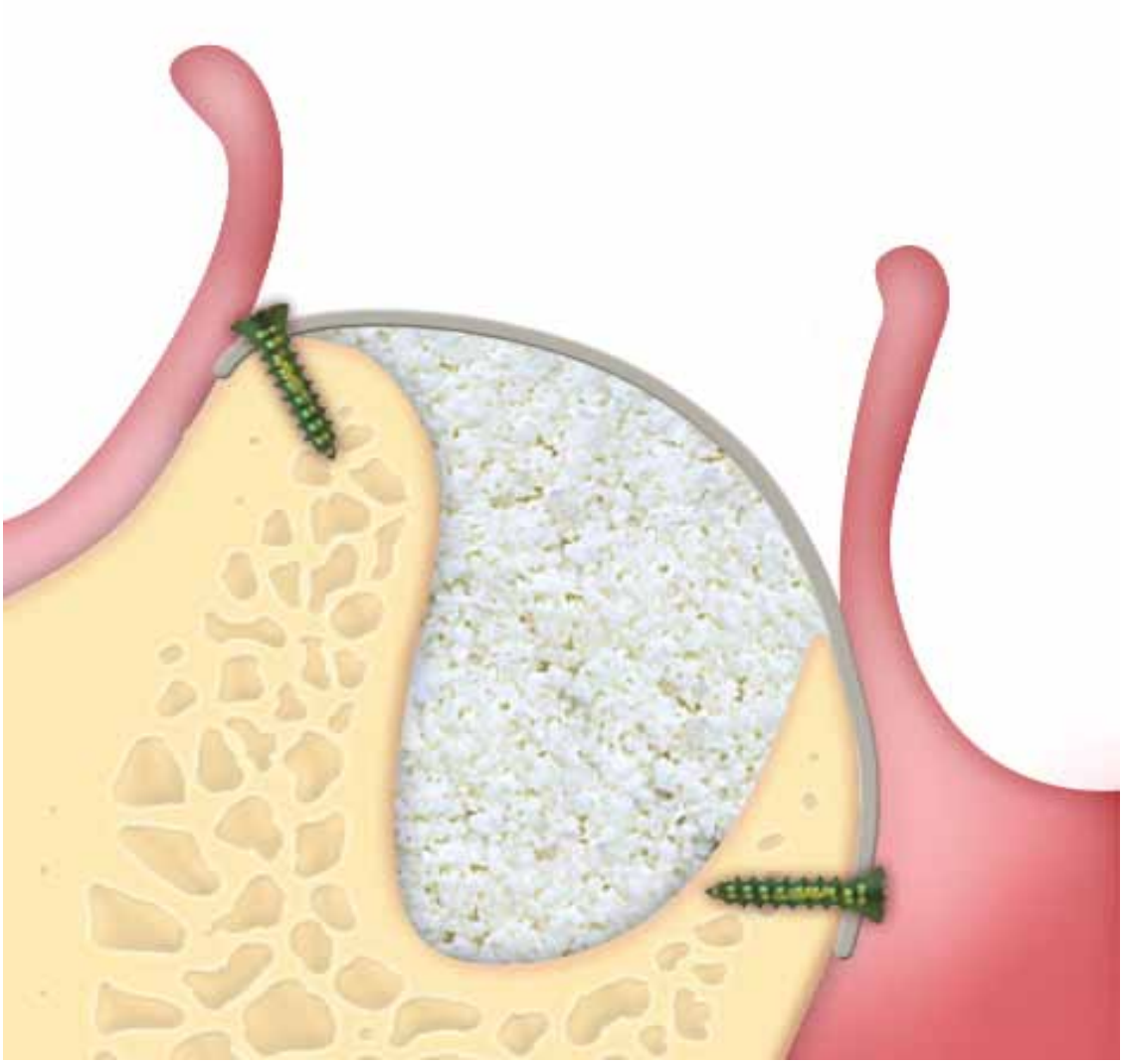
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Horizontal augmentation



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HORIZONTAL AUGMENTATION

002

Rehabilitation of atrophic alveolar crests with cylindrical sandblasted and acid etched implants: a pilot study

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ABSTRACT

One of the fundamental element for a long lasting, aesthetic implant supported prosthetic restoration is the adequate quantity of the residual alveolar bone, in order to receive and surround the fixture, assuring a good stability of the implant that will support the prosthetic rehabilitation. Thanks to bone grafts, aimed to increase the alveolar crest volume both vertically and horizontally, nowadays it is possible to use osseointegrated implants even when a proper bone volume is missing. As the studies performed on bone physiology suggest that the integration of a bone graft in the receiving site takes place in a shorter period than the one supposed in the past, this pilot study aimed to evaluate the effectiveness of this kind of treatment. In this article a case report is presented: a 33-year old patient, missing both upper central incisors due to a trauma, was treated with a bone autograft harvested from the chin to correct the alveolar ridge defect. After the bone block harvesting, the block was fractured and adapted and fixed in the receiving site with synthesis screws. The remaining gaps were filled with heterologous bone fragments (Gen-Os, OsteoBiol®, Tecnoss®, Coazze, Italy). Then, the site was covered with a membrane and closed with sutures.

CONCLUSIONS

The healing occurred without complications and after 2 months the CT-Dentascan showed that bone tissue was enough for the placement of two implants. At the 1 year follow-up, the patient did not show implant mobility, nor peri-implant soft tissue infections. The x-ray examination revealed that the marginal bone level was preserved, without any signs of radiolucency.

ORIGINAL ARTICLE
European Journal of Implant Prosthodontics, 2005;(3)1:133-144

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Maxillary alveolar ridge reconstruction with nonvascularized autogenous block bone: clinical results

HORIZONTAL AUGMENTATION

011

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Ugo Covani[2]

ABSTRACT

Implant treatment of severely resorbed maxillas is considered a demanding procedure, characterized by a higher failure rate compared with the implant treatment of patients with adequate bone volume.

In this study, 56 patients (18 men, 38 women) aged 27 to 63 years, requiring a treatment for maxillary atrophy, were selected and scheduled for onlay bone graft and titanium implants in a 2-stage procedure, with the purpose to evaluate the clinical success of bone reconstruction of the severely atrophic maxilla using autogenous bone harvested from the antero-superior edge of iliac wing. Moreover, the Authors analyzed the clinical success and the marginal bone level of dental implants placed 4 to 5 months after bone grafting and before prosthetic rehabilitation.

A total of 129 onlay bone grafts were used to augment the 56 severely resorbed maxillas. The cortico-cancellous blocks harvested from the iliac wing were adapted to the atrophic maxilla and attached to the residual ridge with self-tapping screws (Cizeta, Milano, Italy). An additional mixture of cortico-cancellous porcine bone particle and collagen (mp3®, OsteoBiol®, Tecnoss®, Coazze, Italy) was placed at the periphery of the block grafts.

The augmentation procedure allowed the insertion of implants in the grafted area 4 to 5 months after surgery. The clinical and radiographic observations showed a satisfactory success rate rate (96,8%) of the block and a very low rate of resorption after bone graft and implant placement.

CONCLUSIONS

The use of iliac bone grafts, harvested from the antero-superior edge of iliac wing, for the reconstruction of severely atrophic maxillas, combined with the supplementary use of a mixture of cortico-cancellous porcine bone particle and collagen, showed to be a reliable treatment procedure.

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Journal of Oral and Maxillofacial Surgery
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HORIZONTAL AUGMENTATION

012

Ridge splitting technique in atrophic anterior maxilla with immediate implants, bone regeneration and immediate temporisation: a case report

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ORIGINAL ARTICLE
Journal of the Irish Dental Association
2007 winter; 53(4); 187-90

ABSTRACT

Although, due to their high success rates, nowadays dental implants have become the standard treatment in order to restore both totally and partially edentulous patients, the successful placement of endosseous implants needs a primary stability that often cannot be reached in narrow alveolar ridges. Actually, an inadequate alveolar ridge width is a major limitation for the successful placement of an implant because, for most of the standard implant designs, a minimum ridge width of 6 mm is normally necessary.
In this article, the Authors describe a method to widen an atrophic ridge by splitting longitudinally the alveolar bone and filling the resultant space with collagenated porcine bone. To demonstrate this technique, they present a case report of a 22-year-old female patient with a significantly reabsorbed anterior maxilla. To treat this patient, Osseotite implants (4 mm wide x 13 mm long) were inserted within the split ridge and a mixture of autogenous tuberous and collagenated porcine bone was grafted between the fixtures. As advantages for the patients, this technique enables the achievement of less surgical traumas and a reduction of the treatment time.
The biomaterial used in this study was an antigen-free cortico-cancellous heterologous bone paste (Putty, OsteoBiol®, Tecnoss®, Coazze, Italy) composed by 80% granulated mix and 20% pure collagen.

CONCLUSIONS

As demonstrated in this case report, the use of immediate tapered implants, bone augmentation and immediate provisionalisation allows the treatment of thinner ridges, a better control during instrumentation, less trauma to the bone, and less risk of fracturing or perforating the expanding plate of bone. The alveolar ridge of the patient, wide only 2,5 mm, showed a net gain of more than 3 mm, enabling the placement of 4 mm wide implants. The collagenated porcine bone maintained the separation between the two cortical plates and led to the new bone formation between implants after 4 months.
With the particular technique here described, the Authors propose the use of collagenated porcine bone to fill in the bone defect, since it reabsorbs in a relatively short time, allowing a new bone to form around the implants. Moreover, such material acts as a scaffold that both prevents the collapse of the cortical plates and stimulates the bone healing process.

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Vertical augmentation



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VERTICAL AUGMENTATION

037

Vertical ridge augmentation of atrophic posterior mandible using an inlay technique with a xenograft without miniscrews and miniplates: case series

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ABSTRACT

Even if the rehabilitation of partially or totally edentulous posterior mandible with implant supported prosthesis has become a common practice, local conditions of the edentulous ridges may be unfavorable for implant placement and a vertical and horizontal augmentation may be necessary. In case of an horizontal osteotomy with the interposition of bone in the form of a ''sandwich'' to augment the alveolar ridge, it has been reported that the use of miniscrews and miniplates increase the risk of fracture of the osteotomy segments. The purpose of this study was to use an inlay technique, without the use of miniscrews and miniplates for stabilization of the transported bone fragments. 9 consecutive patients (6 men and 3 women) aged between 26 and 51 years were enrolled in this study. A horizontal osteotomy was performed 2-3 mm above the mandibular canal, and two oblique cuts were made using a piezosurgery device. As the patients refused the harvesting of autogenous bone, an inlay procedure was proposed using blocks of collagenated cancellous equine bone (Sp-Block, OsteoBiol®, Tecnoss®, Coazze, Italy) without miniscrews and miniplates. The blocks were inserted mesially and distally between the cranial osteotomized segment and the mandibular basal bone. The residual space was filled with particles of cortico-cancellous porcine bone (Gen-Os, OsteoBiol®, Tecnoss®, Coazze, Italy). A resorbable collagen membrane (Evolution, OsteoBiol®, Tecnoss®, Coazze, Italy) was applied above the buccal surface of the surgical site.

4 months after surgery, the Authors proceeded with the implants insertion. The postoperative course was uneventful in 7 of the 9 patients. No dehiscence of the mucosa was observed at the marginal ridge of the mobilized fragment. Newly formed bone was present near the osteotomized segments, and was observed to be in close contact with the particles of biomaterials. No gaps or connective tissue were present at the bone-biomaterial interface. Histomorphometrical results showed: 44±2,1% newly formed bone, 18±0,8% marrow spaces, 33±2,4% residual grafted material.

CONCLUSIONS

From the results of this study, it possible to suggest that the equine collagenated block can be considered as a good material for bone regeneration in inlay grafting procedures in atrophic posterior mandibles. As noted by the Authors, *"the rigidity of the equine collagenated block allowed to eliminate the use of miniscrews and miniplates and simplified the technique. Besides, the rigidity of the block allowed maintenance of the space"*.

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Maxillofacial



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MAXILLOFACIAL

005

Orbital floor restoration

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ABSTRACT

In case of traumas involving the middle-third of the face, the fractures of the orbital floor must be solved by means of a reconstructive surgery, in order to restore the continuity of the orbital floor, to provide support of orbital contents and prevent soft tissues' fibrosis. In this kind of reconstructive surgery, the material for reconstruction plays an important role.

Over the years, different materials have been tested and autogenous grafts have been used as the material of choice. Recently, 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. From January 1995 to December 2003 379 patients with a diagnosis of orbital floor fracture, either pure or combined with other facial fractures were treated with these products.

CONCLUSIONS

In order to reconstruct the fractured orbital floor, autologous, allogenic and alloplastic materials are used and an argument of controversy among the surgeons is the choice of the most suitable material.

Based on the scientific evidence, the Authors suggest that the ideal implant should have the following features: it must be biocompatible and easily applicable; it should provide a good structural support; it should be stable and slightly resorbable. Surgical timing, material's availability and, obviously, costs are critical elements of choice.

Taking all these properties into consideration, alloplastic materials present several advantages due to their wide availability, the opportunity to use them in fractures of any dimension, their molding feature, the reduced surgical timing and the reasonable costs. In their study, among others materials, the Authors used swine bone cortex (Lamina, OsteoBiol®, Tecnoss®, Coazze, Italy), which proved to be a good material. Cortical swine bone allowed the restoration of the bone continuity in a satisfactory way. The main advantage of the swine bone cortex use is the possibility to restore even wide fractures that normally must be treated using a metal mesh support. Actually, the use of a metal mesh implies higher costs, a greater risk of infection and more serious lesions to the eyeball if further orbital trauma occurs. In the cases treated with swine bone cortex, the biocompatibility of the product proved to be good and no intolerance reaction neither any foreign-body reaction were observed.

The Authors concluded: *"At present, swine bone cortex (Lamina, OsteoBiol®) implanted in 11 patients proved excellent results. Its main advantages, despite the modeling properties are not so good as other materials, are an optimal integration to the surrounding tissues and its use in rather wide fractures, thus allowing floor reconstruction without placement of metal mesh support"*.

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Abstract author: Cristina Rodighiero, dental journalist, free publication, not for resale. Printed by Tecnoss® Dental s.r.l.



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Hess area ratio and diplopia: evaluation of 30 patients undergoing surgical repair for orbital blow-out fracture

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ABSTRACT

As diplopia is common occurrence after orbital blow-out fractures, the aim of this study was to determine if the Hess area ratio is effective in predicting postoperative diplopia in patients undergoing surgery for orbital blow-out fracture. In the study were included 30 consecutive cases affected by orbital fractures and diplopia undergoing surgical correction within 7 days after injury. Surgical approaches performed included transpalpebral, Lynch incision, combination of transpalpebral, Lynch incision, subciliary and transconjunctival. Two fractures of the medial wall were treated with endoscopy and in one case the reduction was performed through a previous cutaneous lesion. Orbital wall defects were repaired using bovine pericardium (Tutopatch), titanium mesh covered with bovine pericardium, and decalcified swine bone cortex (Soft Cortical Lamina, OsteoBiol®, Tecnoss®, Coazze, Italy).

To evaluate ocular motility disturbance, the involved ocular motility range was measured 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.

CONCLUSIONS

The clinical cases of this study suggest that 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.

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Ophthalmic Plastic & Reconstructive Surgery
2009 MAr-Apr; 25(2):123-5

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MAXILLOFACIAL

029

Orbital wall reconstruction with swine bone cortex

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ABSTRACT

Orbital fractures are common facial injuries and they can be isolated or associated with other orbital defects arising from maxillofacial fractures. 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. Several kinds of materials have been proposed for the reconstruction of medial orbital wall defects: bone grafts harvested either from calvaria or the mandible, titanium meshes, and resorbable sheets. The use of these materials, alone as well as a combination of autologous bone grafts and alloplastic materials, has been widely reported.

The aim of this study was to describe the Authors' experience with collagenated swine bone cortex (Soft Cortical Lamina, OsteoBiol®, Tecnoss®, Coazze, Italy) for the reconstruction of the fractured medial orbital wall.

In the cases reported, it is underlined the handling advantages of the OsteoBiol® sheet, which can be easily shaped with scissors by the surgeon, before a tepid saline solution bath, assuring the necessary plasticity to adapt the material both to bone and soft tissues.

Postoperative clinical evaluation of the patient, Hess test, ophthalmologic examination and CT have been performed to assess the correct position of the Lamina with satisfactory results.

CONCLUSIONS

Based on their experience, the Authors believe that collagenated swine bone cortex is an excellent option to restore medial wall defects, thanks to its biocompatibility and adaptability. The Lamina does not provide injuries to the orbital soft tissues during its application, and it can be used to restore wide defects.

With reference to its handling properties, they affirm that "*this heterologous implant, thanks to collagen and to superficial decalcification, takes on elastic texture, keeping the density of the bone tissue. In this way, the edges remain soft to prevent microtraumas to the soft tissue, and it can be safely inserted in the orbit, granting a very high resilience. In our department, the use of this material was initially reserved to reconstruct orbital floor fractures; however, the considerable advantages that this material offers made it possible to be used in other situations, such as for the restoration of medial orbital wall fractures*".

ORIGINAL ARTICLE
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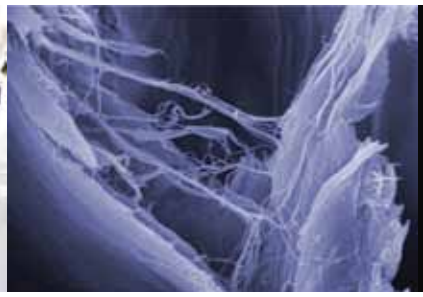
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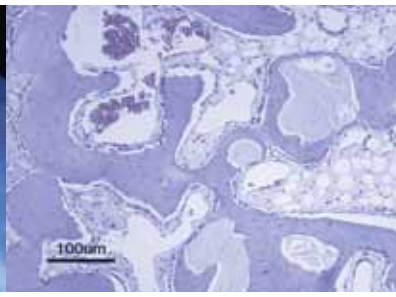
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