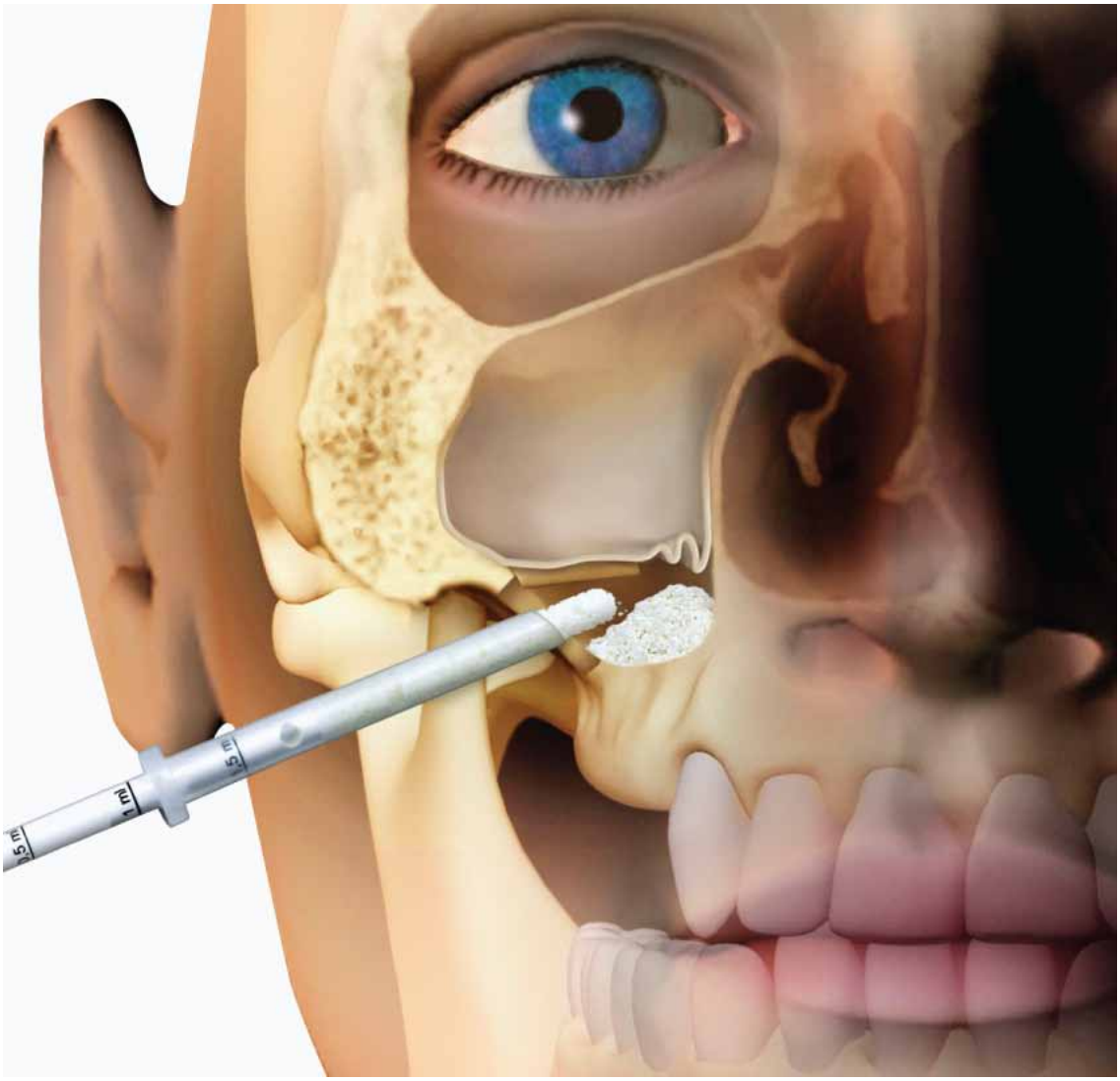
Lateral access sinus lift



OsteoBiol®
by Tecnoss

REGENERATION SCIENCE

INSPIRED BY NATURE

OsteoBiol® by Tecnoss

LATERAL ACCESS SINUS LIFT

004

Maxillary sinus augmentation: histologic and histomorphometric analysis

A Barone[1]
R Crespi[1]
N Nicoli Aldini[2]
M Fini[2]
R Giardino[2]
U Covani[1]

1 | Department of Biophysical, Medical and Dental Sciences and Technologies, Nanoword Institute, School of Dental Medicine, University of Genova, Italy
2 | Experimental Surgery Department, Research Institute, Codivilla Putti-Rizzoli Orthopaedic Institute and Surgical Pathophysiology, Medical School, University of Bologna, Italy

ORIGINAL ARTICLE
The International Journal of Oral & Maxillofacial Implants
2005; Jul-Aug; 20(4):519-25

ABSTRACT

A limited quantity of bone volume, related to an excessive resorption 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 (OsteoBiol® *Gen-Os*®, Tecnoss®, Giaveno, Italy) in the controlateral sinus (test side). The bony sinus windows were covered by a resorbable collagen membrane (OsteoBiol® *Evolution*, Tecnoss®). 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).

Grafted with

BONE SUBSTITUTE
OsteoBiol® *Gen-Os*®

MEMBRANE
OsteoBiol® *Evolution*

OsteoBiol® by Tecnoss

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

A Barone[1]
S Santini[1]
S Marconcini[1]
L Giacomelli[2]
E Gherlone[3]
U Covani[1]

1 | Unit of Oral Pathology and Medicine, University of Genova, Genova, Italy
2 | Nanoworld Institute, CIRNNOB and Biophysics Division, University of Genova, Genova, Italy
3 | University of Milan, Hospital San Raffaele, Milan, Italy

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 (OsteoBiol® *mp3*®, Tecnoss®, Giaveno, Italy). The bony sinus windows were covered with a reabsorbable collagen membrane (OsteoBiol® *Evolution*, Tecnoss®).

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"*.

ORIGINAL ARTICLE
Clinical Oral Implants Research
2008 May;19(5):511-5

Grafted with

BONE SUBSTITUTE
OsteoBiol® *mp3*®

MEMBRANE
OsteoBiol® *Evolution*

LASL

OsteoBiol® by Tecnoss

LATERAL ACCESS SINUS LIFT

034

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

A Scarano[1]
A Piattelli[1]
B Assenza[1,2]
A Quaranta[3]
V Perrotti[1]
M Piattelli[1]
G Iezzi[1]

1 | Dental School, University of Chieti-Pescara, Chieti, Italy
2 | Private Practice, Milan, Italy
3 | Dental School, "Sapienza" University of Rome, Rome, Italy

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 (OsteoBiol® *Apatos*, Tecnoss®, Giaveno, 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 (OsteoBiol® *Evolution*, Tecnoss®) 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.

ORIGINAL ARTICLE
Journal of Oral and Maxillofacial Surgery
2010 Aug;68(8):1869-73

Grafted with

BONE SUBSTITUTE
OsteoBiol® *Apatos*

MEMBRANE
OsteoBiol® *Evolution*

LASL

OsteoBiol® by Tecnoss

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

L Pagliani[1,2]
P Andersson[1,3,4]
M Lanza[1,5]
A Nappo[6]
D Verrocchi[1,4,5]
S Volpe[1,7]
L Sennerby[1,3,8]

1 | The Feltre/Fiera Di Primiero Implant Research Group, Feltre, Italy
2 | Private practice, Milano and Legnano, Italy
3 | Private practice, Feltre, Italy
4 | Private practice, Fiera Di Primiero, Italy
5 | Private practice, San Dona Di Piave, Italy
6 | Private practice, Salerno, Italy
7 | Private practice, Rome, Italy
8 | Department of Biomaterials, Institute Clinical Sciences, Sahlgrenska Academy, University of Gothenburg, Sweden

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 (OsteoBiol® *Gen-Os*® or OsteoBiol® *mp3*®, Tecnoss®, Giaveno, Italy), two types of collagen gel (OsteoBiol® *Gel 40* or OsteoBiol® *Gel 0*, Tecnoss®), and two types of membranes (OsteoBiol® *Evolution Fine* or OsteoBiol® *Lamina Soft X-fine*, Tecnoss®). 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.

ORIGINAL ARTICLE
Clinical Implant Dentistry and Related Research
2012 Oct;14(5):746-58

Grafted with

BONE SUBSTITUTES
OsteoBiol® *Gen-Os*®
OsteoBiol® *Gel 40*
OsteoBiol® *mp3*®

MEMBRANE
OsteoBiol® *Evolution*

BARRIER - BONE SUBSTITUTE
OsteoBiol® *Lamina*

COLLAGEN GEL
OsteoBiol® *Gel 0*

PAG 99

LASL

OsteoBiol® by Tecnoss

LATERAL ACCESS SINUS LIFT

041

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

A Scarano[1]
A Piattelli[1]
V Perrotti[1]
L Manzon[2]
G Iezzi[1]

1 | Dental School, University of Chieti-Pescara, Chieti, Italy
2 | Department of Dental Materials, "Sapienza" University of Rome, Rome, Italy

ORIGINAL ARTICLE
Clinical Implant Dentistry and Related Research
2011; 13(1):13-18

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, OsteoBiol® *Apatos* (Tecnoss®, Giaveno, 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 (OsteoBiol® *Evolution*, Tecnoss®) 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 studies using other graft materials.

Grafted with

BONE SUBSTITUTE
OsteoBiol® *Apatos*

MEMBRANE
OsteoBiol® *Evolution*

LASL

OsteoBiol® by Tecnoss

Zygomatic implant placement in conjunction with sinus bone grafting: the "extended sinus elevation technique." A case-cohort study

M Hinze[1]
L Vrielinck[2]
T Thalmair[1]
H Wachtel[3]
W Bolz[1]

1 | Private practice, Private Institute of Periodontology and Implantology, Munich, Germany
2 | Private practice, Department of Oral and Maxillofacial Surgery, Hospital East Limburg, Genk, Belgium
3 | Department of Restorative Dentistry, Charité - Medical University Berlin, Germany; Private Institute of Periodontology and Implantology, Munich, Germany

ORIGINAL ARTICLE
Oral and Craniofacial Tissue Engineering
2011;1:188-97

ABSTRACT

In case of edentulous patients with an extremely atrophied maxilla, the implant-prosthetic rehabilitation represents a challenge for clinicians. As a matter of fact, the progressive bone resorption in the posterior region, the widening of the sinuses and the anterior alveolar bone resorption can dramatically reduce the possibility to perform a standard implant-prosthetic treatment. The introduction of the zygomatic implants made it possible for clinicians to perform immediate implant placement without bone augmentation for the treatment of such patients. However, although zygomatic implant insertion may have a number of advantages, existing clinical data have shown that the placement of zygomatic implants increases the risk of postoperative complications related to the sinus. The purpose of this cohort study was to introduce a modified surgical technique for the placement of zygomatic implants aiming to minimize the risk of biologic complications. The selected 10 patients, all with an extremely atrophied maxillae, were planned to be treated with one to four zygomatic implants in conjunction with sinus bone grafting. After the integrity of the sinus membrane was confirmed, the established sinus cavity was augmented with a bone graft material (OsteoBiol® *mp3*®, Tecnoss®, Giaveno, Italy) and the augmented area was covered with a resorbable barrier membrane (OsteoBiol® *Soft Cortical Lamina*, Tecnoss®) to prevent soft tissue ingrowth into the sinus and to enable guided bone regeneration. Fixation pins (TitanPin, Geistlich) were used when collapse of the barrier membrane was expected and a second barrier membrane (OsteoBiol® *Evolution*, Tecnoss®) was applied on top of the first membrane to allow optimal soft tissue integration. Implants were inserted after the bone grafting procedure. After 6 months after from the implant insertion, all patients received the definitive prostheses and underwent clinical and radiographic examinations. The overall 6-month implant survival rate was 90,9% for zygomatic implants and 100% for auxiliary implants placed in the anterior area and the clinical indicators, such as probing pocket depth, keratinized tissue and plaque and bleeding indices, were good in all patients. The radiographic examinations showed a substantial gain of radiographic bone around the zygomatic implants.

CONCLUSIONS

The findings of this cohort study demonstrate that the proposed "extended sinus elevation technique" to place zygomatic implants in conjunction with sinus bone grafting may decrease the risk of biologic complications, in contrast with traditional zygomatic implant placement, reducing sinus-related symptoms and complications, avoiding the exposure of implant threads in the maxillary antrum and improving biomechanical properties of the prosthesis.

Grafted with

BONE SUBSTITUTE
OsteoBiol® *mp3*®

MEMBRANE
OsteoBiol® *Evolution*

BARRIER -
BONE SUBSTITUTE
OsteoBiol® *Lamina*

OsteoBiol® by Tecnoss

A 6-month histological analysis on maxillary sinus augmentation with and without use of collagen membranes over the osteotomy window: randomized clinical trial

A Barone[1]
M Ricci[1]
U Covani[1]
RF Grassi[2]
A Quaranta[3]
U Nannmark[4]

1 | Department of Surgery, University of Pisa, Tirrenian Stomatologic Institute, Versilia Hospital, Lido di Camaiore, Italy
2 | Department of Surgery and Dentistry, University of Bari, Bari, Italy
3 | Department of Dentistry, University of Rome "La Sapienza", Rome, Italy
4 | Institute of Biomedicine, The Sahlgrenska Academy Gothenburg University, Gothenburg, Sweden

ABSTRACT

When in the posterior edentulous maxilla the bone volume is insufficient for implant placement, it is necessary to perform a bone augmentation procedure, including the elevation of the sinus membrane from the floor of the maxillary sinus in order to allow the placement of a bone graft. As there are some doubts about the need for using a barrier concurrently with a graft in sinus augmentation procedures, in this randomized clinical trial histological and histomorphometrical analysis were used to assess the effectiveness of the use of a membrane in lateral sinus augmentation procedures, investigating the effect of a resorbable collagen membrane over the osteotomy window on maxillary sinus augmentation healing. After the informed consent was signed, all patients enrolled for this study underwent at least one session of oral hygiene before the sinus elevation procedure. Maxillary sinuses were allocated to either a control (membrane) or test (no membrane) group, using a computerized random allocation process. All the patients were treated with the same surgical technique consisting of sinus floor augmentation via a lateral approach. After the elevation of the sinus membrane, the sinuses were grafted with a mixture of autogenous bone harvested from the lateral bone wall and collagenated cortico-cancellous porcine bone (OsteoBiol® *mp3*®, Tecnoss®, Giaveno, Italy) and the sinuses in the control group were covered with a reabsorbable collagen membrane (OsteoBiol® *Evolution*, Tecnoss®) and the mucoperiosteal flaps were sutured with reabsorbable sutures.
After 6 months and immediately prior to the implant placement, one bone biopsy was harvested from the lateral window and the bone samples were processed and forwarded to the Institute of Biomedicine, the Sahlgrenska Academy Gothenburg University, Sweden for histological examination.

CONCLUSIONS

On the basis of the results of the histological and histomorphometrical analysis, the Authors concluded that compared with sites which were not covered, the use of the membrane may slightly increase the amount of vital bone over a period of 6 months and the use of a membrane seems to reduce the proliferation of the connective tissue and the graft re-absorption rate. Anyway, further studies are needed to explore the advantages of the use of membranes for the sinus augmentation procedure and the influence on the amount and quality of regenerated bone.

ORIGINAL ARTICLE
Clinical Oral Implants Research
2013 Jan; 24(1):1-6

Grafted with

BONE SUBSTITUTE
OsteoBiol® *mp3*®

MEMBRANE
OsteoBiol® *Evolution*

OsteoBiol® by Tecnoss

LATERAL ACCESS SINUS LIFT

051

Ultrastructural study by backscattered electron imaging and elemental microanalysis of bone-to-biomaterial interface and mineral degradation of porcine xenografts used in maxillary sinus floor elevation

MP Ramirez Fernandez[1]
JL Calvo Guirado[1]
JE Maté Sánchez del Val[1]
RA Delgado Ruiz[1]
B Negri[1]
C Barona Dorado[2]

1 | Department of Implant Dentistry, Faculty of Medicine and Dentistry, University of Murcia, Spain
2 | Department of Oral Surgery, Complutense University of Madrid, Madrid, Spain

ORIGINAL ARTICLE
Clinical Oral Implants Research
2013 May;24(5):523-30

ABSTRACT

Adequate alveolar ridges are fundamental to successful rehabilitation with dental implants and different techniques for reconstructing atrophied ridges are available. Bone substitute grafts represent a relevant possibility, provided that the biomaterial for bone substitution is biologically safe and safety depends on the quality of its reproducibility, its biocompatibility, and an absence of toxicity. The aim of this study was to carry out a retrospective investigation of a bone substitute material (BSM) in retrieved bone biopsies from maxillary sinus augmentation in 15 human subjects. The Authors investigated OsteoBiol® *mp3*® (Tecnoss®, Giaveno, Italy), an antigen-free bone consisting 90% porcine granules of dimensions between 600-1000 μm mixed with 10% pure Type-I porcine collagen, used as a bone substitute for sinus augmentation. The investigation was performed by means of an ultrastructural study of the bone-to-biomaterial interface using scanning electron microscopy backscattered electron imaging (SEM-BSE), as well as analysis of the mineral degradation of residual bone substitute graft material using microanalytical system based on energy-dispersive X-ray spectrometry (EDX). In the 15 partially edentulous patients (6 women and 9 men), of ages ranging from 37 to 60 years, the sinus membrane was elevated with curettes of different shapes and after membrane elevation, all sinus cavities were grafted with a BSM. After BSM grafting, an absorbable collagen porcine membrane (OsteoBiol® *Evolution*, Tecnoss®) was placed over the window to minimize soft tissue invasion.
9 months after sinus lifting, bone cores were harvested from the maxillary sinus. The specimens were processed for observation under a SEM-BSE device, then chemical analysis and elemental mapping of the mineral composition were generated using EDX. Scanning electron microscopy revealed that newly formed bone had become closely attached to the xenograft. Elemental analysis (above all, a high Ca/P ratio) showed that there was a gradual diffusion of Ca^{+} ions from the biomaterial to the newly formed bone at the interface.

CONCLUSIONS

From a clinical point of view, after a 9-month follow-up period of these 15 patients the success rate was 100%. No perforation of the sinus membrane or other clinical complications such as sinusitis or pain resulted from surgery. The increased volumes produced by the grafting procedures were stable by the end of the healing period and all planned implants could be placed in the augmented sites. The analysis demonstrated that the biomaterial proved to be biocompatible, bioreabsorbable and osteoconductive when used as a bone substitute for maxillary sinus elevation.

Grafted with

BONE SUBSTITUTE
OsteoBiol® *mp3*®

MEMBRANE
OsteoBiol® *Evolution*

LASL

OsteoBiol® by Tecnoss

Use of piezosurgery during maxillary sinus elevation: clinical results of 40 consecutive cases

LATERAL ACCESS SINUS LIFT

058

M Cassetta[1]
L Ricci[2]
G Iezzi[2]
S Calasso[3]
A Piattelli[2]
V Perrotti[2]

ABSTRACT

Preservation of the sinus membrane is essential for a successful sinus grafting procedure and its integrity is crucial to stabilize grafting materials during the healing period. As perforation occurs most frequently during the rotary osteotomy stage when using a round diamond handpiece, the use of the piezoelectric technique was suggested in order to obtain a greater precision and safety in bone surgery. The aim of this study was to evaluate the performance of piezoelectric devices during sinus elevation to determine the percentage of sinus membrane perforation and the time required to perform the antrostomy and elevation of the membrane. A total of 40 sinuses were included and the elevation procedures were performed by means of a piezosurgery device. The space obtained with the sinus elevation was filled with graft material: either autologous bone or a mixture of 50% autologous bone and 50% deantigenated collagenated bone substitute of porcine origin (OsteoBiol® *Gen-Os*®, Tecnoss®, Giaveno, Italy) was used as a filling material. The total amount of graft material at each site varied according to the extent of maxillary bone resorption and the sinus anatomy. During the sinus elevation procedure, seven perforations occurred, and in those cases, the bony sinus windows were covered with a resorbable membrane (OsteoBiol® *Evolution*, Tecnoss®).

CONCLUSIONS

Postoperative healing was uneventful and free of complications in all patients. After 2 months, at radiographic analysis, an adequate amount of radiopaque material with greater density than the bone was present, and no signs of maxillary sinus infection were observed. Sinus membrane perforation occurred in 7 of 40 cases, representing 17,5% of procedures. These results are similar to those reported by several authors who also found very low perforation percentages using piezoelectric devices. The perforations were repaired using a collagen membrane in direct contact with the sinus membrane.

Based on the results of this study, the Authors affirm that "*sinus augmentation can be successfully performed by means of a piezoelectric device, which was demonstrated to be an attractive alternative to simplify sinus elevation procedures and offer promising results in terms of complications such as sinus membrane perforations*".

1 | Department of Oral and Maxillofacial Sciences, School of Dentistry, University of Rome "La Sapienza", Rome, Italy
2 | Dental School, University of Chieti-Pescara, Chieti, Italy
3 | School of Dentistry, University of Rome "La Sapienza", Rome, Italy

ORIGINAL ARTICLE
International Journal of Periodontics & Restorative Dentistry
2012 Dec;32(6):e182-8

Grafted with

BONE SUBSTITUTE
OsteoBiol® *Gen-Os*®

MEMBRANE
OsteoBiol® *Evolution*

LASL

OsteoBiol® by Tecnoss

The use of resorbable heterologous cortical lamina as a new sinus lift floor: a technical note

M A Lopez[1]
N Manzulli[2]
M Casale[3]
Z Ormianer[4]
F Carinci[5]

1 | Private practice in Rome, Italy
2 | Private practice in Cerignola, Foggia, Italy
3 | Policlinico Universitario Campus Biomedico, Rome, Italy
4 | Department of Oral Rehabilitation, Tel-Aviv University, Tel-Aviv, Israel
5 | Department of Morphology, Surgery and Experimental Medicine, University of Ferrara, Ferrara, Italy

ABSTRACT

In case of necessity of a pre-implant bone regeneration by mean of a grafted biomaterial, it is necessary that such biomaterial remains stable *in situ*, without micro movements, for about six months. Some of these biomaterials, such as pre-hydrated and collagenated cortico-cancellous porcine bone granules promote the formation of good-quality new bone. Unfortunately, they do not have the mechanical characteristics that would allow for stability in terms of shape and size. On the contrary, some grafting materials, such as heterologous porcine cortical lamina, have an excellent capacity in creating recipient sites that can be filled with cortico-spongious collagenated bone paste that reabsorbs, promoting new bone formation.
In this technical note, the Authors propose a technique for the reconstruction of a new rigid artificial sinus floor with the use of resorbable biomaterials of porcine origin: a cortical lamina in connection with pre-hydrated and collagenated cortico-cancellous porcine bone. The prerequisites necessary to carry out the technique are the stability of the lamina and the presence of a sufficient amount of graft granules in the site. For this technique, a rigid porcine cortical lamina was modelled and positioned in the sinus as a new sinus floor without hydration (OsteoBiol® *Lamina*, Tecnoss®, Giaveno, Italy). A pre-hydrated and collagenated cortico-cancellous porcine bone was used as filler in the new space created by OsteoBiol® *Lamina*, palatal wall, mesial and distal bone (OsteoBiol® *mp3*®, Tecnoss®). A porcine resorbable membrane was used to cover the graft in the vestibular side (OsteoBiol® *Evolution*, Tecnoss®).

CONCLUSIONS

The adequate vascularisation of the graft combined with the integration of the lamina, which does not need to be removed, makes possible to propose this technique as a potential alternative to those used so far. The Authors conclude: *"In our experience, it is possible to propose this technique as an alternative to those previously and currently in use. Additional clinical and histological scientific studies are needed to evaluate the effectiveness of the technique and further develop its potential"*.

ORIGINAL ARTICLE
Journal of Biological Regulators and Homeostatic Agents
2016 Apr-Jun;30(2 Suppl 1):75-79

OsteoBiol® by Tecnoss

Immediately loaded zygomatic implants vs conventional dental implants in augmented atrophic maxillae: 4 months post-loading results from a multicentre randomised controlled trial

M Esposito[1]
R Davó[2]
C Marti-Pages[3]
A Ferrer-Fuertes[3]
C Barausse[4]
R Pistilli[5]
DR Ippolito[6]
P Felice[4]

1 | Department of Biomaterials, The Sahlgrenska Academy at Göteborg University, Sweden
2 | Department of Implantology and Maxillofacial Surgery, Medimar International Hospital, Alicante, and Hospital Clinic, Barcelona, Spain
3 | Oral and Maxillo- facial Surgery Unit, Hospital Clinic, Barcelona, Spain
4 | Department of Biomedical and Neuromotor Sciences, Unit of Periodontology and Implantology, University of Bologna, Bologna, Italy
5 | Oral and Maxillo- facial Unit, San Camillo Hospital, Rome, Italy
6| Department of Biomedical and Neuromotor Sciences, Unit of Orthodontics, University of Bologna, Bologna, Italy

ORIGINAL ARTICLE
European Journal Of Oral Implantology
2018;11(1):11-28

ABSTRACT

The presence of insufficient bone volume can limit dental implants placement and so several bone augmentation procedures with different grafting materials have been developed, in order to allow a correct implant anchorage. In case of severely atrophic maxillae, zygomatic implants can be an alternative to conventional bone augmentation and implant rehabilitation. The aim of this randomised controlled trial (RCT) of parallel group design was to compare the clinical outcome of immediately loaded cross-arch maxillary prostheses supported by zygomatic implants vs conventional implants placed in augmented bone. Patients with totally edentulous atrophic maxillae were randomly allocated to bone augmentation with a bone substitute and six to eight conventionally loaded dental implants (augmentation group) or four zygomatic implants, or two zygomatic and two conventional implants to be immediately loaded (zygomatic group). In the augmentation group, collagenated blocks (OsteoBiol® *Sp-Block*, Tecnoss®, Giaveno, Italy) of equine cancellous bone were used as onlays/veneers. The blocks were hydrated before use for 5 to 10 min with sterile, lukewarm physiological solution or with antibiotics. Afterwards, they were modelled to be adapted to the receiving site. To fill the gaps between the recipient bone and the bone blocks, OsteoBiol® *mp3*® bone substitute granules were used. Small defects could only be grafted with bone substitute granules according to clinical indications and the surgeon's preference. Nasal sinus lift procedures using OsteoBiol® *mp3*® bone substitute granules could also be implemented. All the grafted areas and the maxillary windows were covered with OsteoBiol® *Evolution* resorbable barriers from equine pericardium. After implant insertion, the surgeon was allowed to cover exposed implant threads using a paste made of 600 micron to 1000 micron pre-hydrated collagenated cortico-cancellous granules of porcine origin, mixed with OsteoBiol® *Gel 0* in sterile syringe (OsteoBiol® *mp3*®, 1 cc, Tecnoss®) and resorbable collagen barriers (OsteoBiol® *Evolution*, Tecnoss®). Patients were followed up to 4 months after loading, in order to measure outcomes related to prosthesis, implant and augmentation failures, any complications, quality of life (OHIP-14), the number of days that patients experienced total or partial impaired activity, time to function, and number of dental visits. No augmentation procedure failed. Preliminary 4-months post-loading data suggest that zygomatic implants were associated with statistically significantly less prosthetic and implant failures, as well as time needed to functional loading when compared with augmentation procedures and conventionally loaded dental implants. More complications were reported for zygomatic implants, which were solved spontaneously or could be handled.

CONCLUSIONS

Keeping in mind that placement of zygomatic implants is a complex procedure requiring skilled and experienced operators, zygomatic implants proved to be a better rehabilitation modality for severely atrophic maxillae. Anyway, long-term data are essential to confirm or dispute these preliminary results.

OsteoBiol® by Tecnoss

Immediately loaded zygomatic implants vs conventional dental implants in augmented atrophic maxillae: 1-year post-loading results from a multicentre randomised controlled trial

R Davó[1,4]
P Felice[2]
R Pistilli[3]
C Barausse[2]
C Marti-Pages[4]
A Ferrer-Fuertes[4]
DR Ippolito[2]
M Esposito[5]

1 | Department of Implantology and Maxillofacial Surgery, Medimar International Hospital, Alicante, Spain
2 | Department of Biomedical and Neuromotor Sciences, Unit of Periodontology and Implantology, University of Bologna, Bologna, Italy
3 | San Camillo Hospital, Rome, Italy
4 | Hospital Clinic, Barcelona, Spain
5 | Department of Biomaterials, The Sahlgrenska Academy at Göteborg University, Sweden

ORIGINAL ARTICLE
European Journal Of Oral Implantology
2018;11(1):145-161

ABSTRACT

The presence of insufficient bone volume can limit dental implants placement and so several bone augmentation procedures with different grafting materials have been developed in order to allow a correct implant anchorage. In case of severely atrophic maxillae, zygomatic implants can be an alternative to conventional bone augmentation and implant rehabilitation. The aim of this randomised controlled trial (RCT) of parallel group design was to compare the clinical outcome of immediately loaded cross-arch maxillary prostheses supported by zygomatic implants vs conventional implants placed in augmented bone. Patients with totally edentulous atrophic maxillae were randomly allocated to bone augmentation with a bone substitute and six to eight conventionally loaded dental implants (augmentation group), or to receive four zygomatic implants, or two zygomatic and two conventional implants to be immediately loaded (zygomatic group). In the augmentation group, collagenated blocks (OsteoBiol® *Sp-Block*, Tecnoss®, Giaveno, Italy) of equine cancellous bone were used as onlays. To fill the gaps between the recipient bone and the bone blocks, OsteoBiol® *mp3*® bone substitute granules were used. All the grafted areas and the maxillary windows were covered with OsteoBiol® *Evolution* resorbable barriers from equine pericardium. After implant insertion, the surgeon was allowed to cover exposed implant threads using (OsteoBiol® *mp3*®, Tecnoss®) and resorbable collagen barriers (OsteoBiol *Evolution*, Tecnoss®). Patients were followed up to 1 year after loading. No augmentation procedure failed. Five patients dropped out from the augmentation group. Six prostheses could not be delivered or failed in the augmentation group vs one prosthesis in the zygomatic group, with a statistically significant difference. Eight patients lost 35 implants in the augmentation group vs two patients who lost four zygomatic implants, with a statistically significant difference. A total of 14 augmented patients were affected by 22 complications vs 28 zygomatic patients (40 complications), the difference being statistically significant. Both groups had significantly improved quality of life (OHIP-14) scores.

CONCLUSIONS

Based on the results, Authors concluded that "*preliminary 1-year post-loading data suggest that immediately loaded zygomatic implants were associated with statistically significantly fewer prosthetic failures (one vs six patients), implant failures (two vs eight patients) and time needed to functional loading (1.3 days vs 444.3 days) when compared to augmentation procedures and conventionally loaded dental implants. Even if more complications were reported for zygomatic implants, they proved to be a better rehabilitation modality for severely atrophic maxillae. Long-term data are absolutely needed to confirm or dispute these preliminary results*".

OsteoBiol® by Tecnoss

Short (6-mm) dental implants versus sinus floor elevation and placement of longer (≥10-mm) dental implants: randomized controlled trial with a 3-year follow-up

S Bechara[1]
R Kubilius[1]
G Veronesi[2]
JT Pires[3]
JA Shibli[3]
FG Mangano[4]

1 | Department of Oral and Maxillofacial Surgery, Lithuanian University of Health Science, Kaunas, Lithuania
2 | Department of Clinical and Experimental Medicine, University of Varese, Varese, Italy
3 | Department of Periodontology and Oral Implantology, Dental Research Division, Guarulhos University, Guarulhos, Sao Paulo, Brazil
4 | Department of Surgical and Morphological Sciences, Dental School, University of Varese, Varese, Italy

ORIGINAL ARTICLE
Clinical Oral Implants Research
2017;28;1097-1107

ABSTRACT

Edentulous posterior maxilla is often characterized by reduced bone volume, especially due to severe post-extraction alveolar crest resorption, and this anatomic limitation can jeopardize osseointegration and therefore the possibility to have a functional and aesthetic implant-supported restoration. In order to obtain a sufficient bone height for implant insertion, a reconstructive bone surgery is often needed and maxillary sinus floor elevation has become the more reliable and commonly used procedure. As the use of short implant (6-mm) can be an alternative to sinus floor elevation, the aim of this 3-year follow-up randomized clinical trial was to investigate this alternative to sinus floor elevation (SFE) and placement of longer (≥10-mm) implants in the posterior maxilla. Thirty-three patients were included in the study and randomly assigned either to receive one to four short (6-mm) implants (test group) or to undergo augmentation procedures and simultaneous placement of one to four standard-length (≥10-mm) implants (control group). In both groups, tapered implants (AnyRidge, MegaGen, Gyeongbuk, South Korea) were placed. In the control group, the augmentation procedures consisted in the insertion of collagenated porcine particulate bone graft (OsteoBiol® *Gen-Os*®, Tecnoss®, Giaveno, Italy) in a lateral window below the lifted membrane, with simultaneous implant placement. The primary outcomes of the study were implant survival, stability, marginal bone loss, and complications associated with the two treatment options; secondary outcomes included treatment time and cost and patient satisfaction. At 3 years, implant survival rates were 100% and 95.0% for test group and control group, respectively, with a difference that was not statistically significant. The mean ISQ values of both groups did not differ at placement (68.2 vs. 67.8, P = 0.1), at delivery of the final restoration (69.5 vs. 69.4, P = 0.9), and after 1 year (71.0 vs. 71.5, P = 0.1). At the 3 years follow-up, the mean ISQ in the control group was significantly higher than that of the test group (72.4 vs. 71.6, P = 0.004). Mean MBL was significantly higher in the control group both at 1 year (0.14 mm vs. 0.21 mm, P = 0.006) and at 3 years (0.20 mm vs. 0.27 mm, P = 0.01). Surgical time and cost were significantly higher in the control group than in the test one and patient satisfaction was high in both groups.

CONCLUSIONS

In the present randomized clinical trial, both short (6-mm) implants and long (≥10-mm) implants in combination with sinus floor elevation provided good results up to 3 years after loading; however, with 6-mm short implants, the treatment was faster and less expensive. Anyway, in order to confirm these results, long-term randomized controlled trials on larger samples of patients are needed.

OsteoBiol® by Tecnoss

Influence of the position of the antrostomy in sinus floor elevation assessed with cone-beam computed tomography: a randomized clinical trial

S Kawakami[1]
NP Lang[3,4]
T Iida[1,2]
M Ferri[5,6]
KA Apaza Alccayhuaman[2]
D Botticelli[2]

1 | Department of Oral Implantology, Osaka Dental University, Osaka, Japan
2 | ARDEC Academy, Rimini, Italy
3 | University of Bern, Bern, Switzerland
4 | Center for Dental Medicine, University of Zurich, Zurich, Switzerland
5 | ARDEC Foundation, Cartagena de Indias, Bolívar, Colombia
6 | Rafael Núñez University Corporation, Bolívar, Colombia

ABSTRACT

Augmentation procedures in the distal regions of the edentulous maxilla are necessary in order to allow implant rehabilitation. The aim of the present study was to evaluate dimensional variations of augmented sinus volumes after sinus floor elevation using a lateral approach placing the antrostomy close to the sinus floor or more cranially to it. For the purpose of the study, 24 healthy volunteers, presenting an edentulous atrophic zone in the posterior segment of the maxilla requiring sinus floor elevation and a fixed oral rehabilitation, were recruited. The lateral approach was adopted placing the antrostomy randomly either close to the level of the sinus floor (group A) or approximately 3-4 mm cranially (group B). After the window preparation and the sinus mucosa elevation, the elevated space was filled with a resorbable collagenated cortico-cancellous porcine bone (250–1000 μm; OsteoBiol® *Gen-Os*®, Tecnoss®, Giaveno, Italy). A collagen membrane (0,3 mm; OsteoBiol® *Evolution*, Tecnoss®) was placed to cover the access window, and silk sutures were provided to secure the flaps. Cone-beam computed tomography (CBCT) was done before surgery (T0) and after 1 week (T1) and 9 months (T2) in order to analyse the dimensional variations. At T1, the sinus floor was found to be elevated by 9.8 ± 2.1 mm in group A and 10.9 ± 1.9 mm in group B. At T2, shrinkage of 2.0 ± 1.7 mm in group A and 1.4 ± 2.5 mm in group B was observed. The area was reduced approximately 18-24% between T1 and T2. The sinus mucosa width increased by 4.3-5 mm between T0 and T1, and regained the original dimensions at T2.

CONCLUSIONS

As demonstrated in the present study, following the lateral approach for maxillary sinus floor elevation, the volume of the augmentation seems to be dependent on the location of the access antrostomy. After 9 months, it was evident that the more cranial the antrostomy, the greater the augmentation height.

ORIGINAL ARTICLE
Journal Of Investigative And Clinical Dentistry
2018 Nov;9(4):E12362

OsteoBiol® by Tecnoss

Sinus membrane elevation with heterologous cortical lamina: a randomized study of a new surgical technique for maxillary sinus floor augmentation without bone graft

A Scarano[1]
P Santos de Oliveira[2]
T Traini[1]
F Lorusso[3]

1 | Department of Medical, Oral and Biotechnological Sciences and CeSi-Met, "G. D'Annunzio" University of Chieti-Pescara, Chieti, Italy
2 | Department of Oral Implantology, Dental Research Division, College Ingà, UNINGÁ, Cachoeiro de Itapemirim, Espirito Santo, Brazil
3 | Department of Medical, Oral and Biotechnological Sciences University of Chieti-Pescara, Chieti, Italy

ORIGINAL ARTICLE
Materials 2018, 11, 1457

ABSTRACT

In case of edentulism in atrophic posterior maxilla, different surgical techniques have been proposed in order to have a sufficient bone volume for implant supported rehabilitation. Together with the surgical techniques, the use of allografts, xenografts and alloplasts has been reported in the literature to help bone formation, thanks to their osteoinductive, osteoconductive and osteogenic properties. The aim of this randomized controlled clinical trial was to compare the efficacy of two different techniques for maxillary sinus augmentation using a lateral window approach: heterologous cortical lamina without any grafting material versus 100% collagenated granular collagenated porcine bone. Twenty-three patients, requiring maxillary sinus augmentation, were divided in two groups. In Group I, the sinus was filled with collagen porcine bone (OsteoBiol® *Gen-Os*®, Tecnoss®, Giaveno, Italy) and a collagen membrane (OsteoBiol® *Evolution*, Tecnoss®) was used to close the lateral window of the sinus. In Group II, the sinus was treated with heterologous cortical lamina only (OsteoBiol® *Lamina*, Tecnoss®) of 1 mm thickness, modelled and positioned in the sinus as a new sinus roof. Radiographically, in Group I bone grafts showed increased hyperdensity between immediate postoperative and after six months healing, with higher density than native bone. In the second surgical phase, the sinus wall was found to be totally healed in all cases. No gaps were present at the bone–porcine bone interface that was always in close contact with the graft particles. In the cortical lamina group, newly formed bone was present histologically, newly formed vessels and new bone trabeculae were seen throughout the large marrow spaces. The histological results showed new bone formation in both groups. There was a statistically significant difference in the surgical time required to complete the augmentation procedures: 18.3 ± 2.1 min for lamina treated sites versus 12.5 ± 3.1 min for porcine bone treated sites.

CONCLUSIONS

This study has reported good results of sinus membrane elevation, with or without bone graft. Even if sinus treated with bone lamina showed a greater volumetric contraction, the overall results led the Authors to conclude that "*the use of heterologous cortical lamina is a valid technique for the mechanical support of sinus membranes resulting in only bone tissue formation and not mixed with the graft. The graft material was biocompatible and not completely resorbed after six months, although the remains were integrated into the bone*".

Grafted with
BONE SUBSTITUTES
OsteoBiol® *Gen-Os*®
MEMBRANE
OsteoBiol® *Evolution*
OsteoBiol® *Lamina*