

Vertical augmentation



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REGENERATION SCIENCE

INSPIRED BY NATURE



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ORIGINAL ARTICLE

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

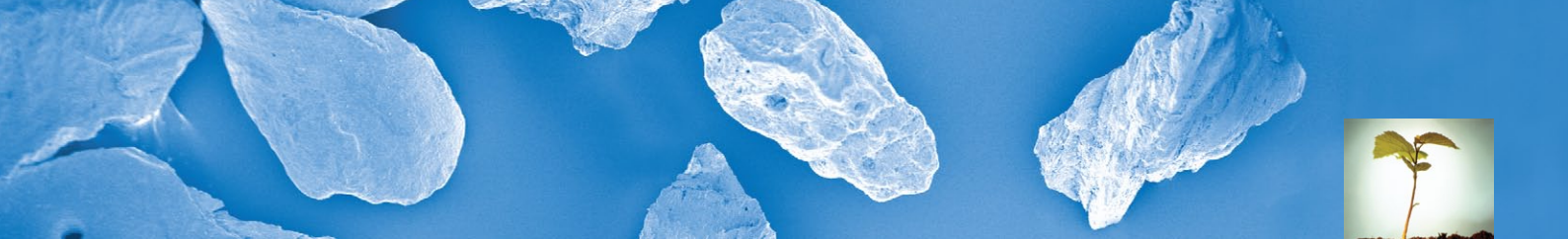
ABSTRACT

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 increases 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 (OsteoBiol® Sp-Block, TecnoSS®, Giaveno, 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 (OsteoBiol® Gen-Os®, TecnoSS®). A resorbable collagen membrane (OsteoBiol® Evolution, TecnoSS®) 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 is 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".



Vertical ridge augmentation of the atrophic posterior mandible with a 2-stage inlay technique: a case report

ABSTRACT

In case of atrophic posterior mandible, the application of the inlay technique showed to be able to achieve good augmentation results. Instead of using autogenous bone, some authors have suggested to use inorganic bovine bone blocks for inlay bone grafting in atrophic posterior mandibles, obtaining histological and clinical outcomes comparable to those achieved using autogenous bone.

In this article, the use of a 2-stage inlay technique in atrophic posterior mandible with more than 10-mm thickness and less than 5-mm height above the inferior alveolar nerve is described. The Authors performed an inlay procedure using a cancellous equine bone block (OsteoBiol® Sp-Block, Tecnos®, Giaveno, Italy) in order to allow the subsequent implant placement for prosthetic rehabilitation of the affected region. The first surgical procedure was a basic corticotomy of the buccal and lingual bone. One month later, a complete inlay procedure was performed. The cancellous equine bone block graft material was shaped and placed between the cranial osteotomized segment and the mandibular basal bone and a resorbable collagen membrane (OsteoBiol® Evolution, Tecnos®) was applied to the buccal surface of the surgical site.

CONCLUSIONS

After the inlay technique application, computed tomography and conventional radiography showed a mean vertical bone gain of 11,5 mm. This 2-stage inlay technique avoids the use of chisels to complete bone osteotomy and reduces postsurgical nerve disturbances in atrophic posterior mandibles.

The Authors concluded that *“a randomized controlled clinical trial is necessary to compare outcomes using this modification of the inlay technique with those obtained using the original procedure.”*

VERTICAL AUGMENTATION

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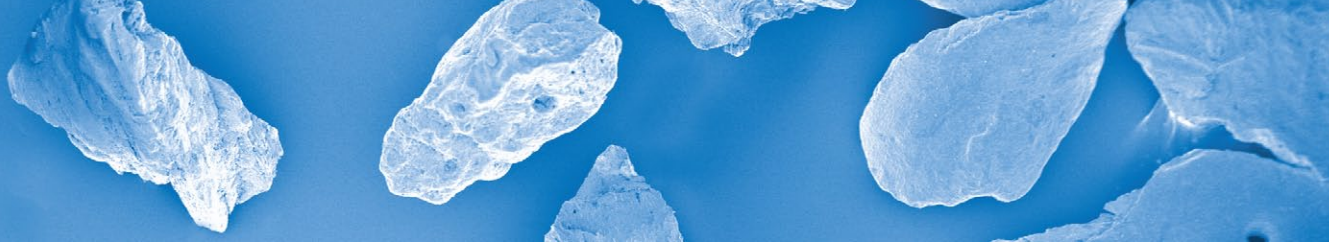
ORIGINAL ARTICLE

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VERTICAL AUGMENTATION

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ORIGINAL ARTICLE

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Vertical ridge augmentation of an atrophic posterior mandible with an inlay technique and cancellous equine bone block: a case report

ABSTRACT

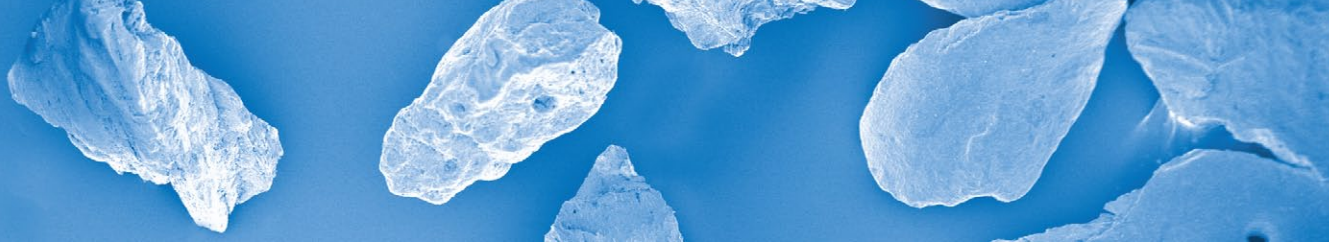
In the augmentation of atrophic posterior mandible, the inlay technique proved to be reliable and successful. For this technique, both autogenous bone and xenografts are used with similar results. Nevertheless, the use of xenografts has been associated with some disadvantages, such as persistence of residual material due to their slow rate of resorption and the need of their stabilization by means of titanium bone plates and miniscrews. In order to overcome the postsurgical patient morbidity, researchers have examined new graft materials, for examples a cancellous equine bone graft that does not require miniplates or miniscrews, thereby avoiding the need for subsequent surgery to remove these components.

In this article, the Authors describe a successful implant prosthetic rehabilitation in an atrophic left posterior mandible in a 62 year old man using a cancellous equine bone block as grafting material. In order to allow subsequent implant placement for the prosthetic rehabilitation, an inlay procedure using a cancellous equine bone block (OsteoBiol® Sp-Block, TecnoSS®, Giaveno, Italy) was proposed. After the cancellous equine bone block graft material have been shaped and placed between the cranial osteotomized segment and the mandibular basal bone, a resorbable collagen membrane (OsteoBiol® Evolution, TecnoSS®) was applied to the buccal surface of the surgical site. As underlined by the Authors, *“the block used in the present study was produced following a method that avoids a ceramic coating of hydroxyapatite crystals, thereby enhancing the speed of physiologic resorption. The presence of collagen makes these blocks more compact and less fragile than other commercial blocks, allowing them to be shaped and fixed without a high risk of breakage and placed without bone plate fixing. Furthermore, the presence of collagen promotes blood clotting and invasion of regenerative and reparative blood cells”*.

CONCLUSIONS

The histological evaluation showed new bone formation within the cancellous portion of the blocks and no foreign body reaction and the computed tomography and conventional radiography showed a 5 mm mean vertical bone gain. The new bone was in intimate contact with the biomaterial at all sites; no empty space was observed between the bone and the biomaterial at high magnification. The vertical bone gain obtained allowed the surgeon to insert an implant of adequate length for a reliable fixed prosthetic rehabilitation.

Based on these results, the Authors concluded that *“Cancellous equine bone grafts may be an effective alternative to autogenous bone and inorganic bovine bone grafting for reconstruction of the posterior mandible using the inlay technique”*.



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VERTICAL AUGMENTATION

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ORIGINAL ARTICLE

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Interpositional augmentation technique in the treatment of posterior mandibular atrophies: a retrospective study comparing 129 autogenous and heterologous bone blocks with 2-7 years follow-up

ABSTRACT

In case of insufficient bone height following tooth loss, the implant rehabilitation of atrophic posterior mandible is challenging. The ideal approach seems to be the vertical bone augmentation performed with different techniques, as guided bone regeneration, alveolar distraction osteogenesis and onlay bone grafting. The aim of this retrospective study was to evaluate the clinical and radiological results of inlay augmentation procedure with three different types of block bone graft: autogenous bone block harvested from iliac crest (ABB), deproteinized bovine bone mineral block (BBB) and collagenated equine bone block (EBB). Following osteotomy, the different types of blocks were shaped and placed between the cranial osteotomized segment and the mandibular basal bone. Residual gaps were filled with particulated ABB, BBB or EBB taken from the respective blocks. The grafted areas were then covered with a resorbable collagen membrane (Bio-Gide®, Geistlich, Wolhusen, Switzerland; OsteoBiol® Evolution, Tecnos®, Giaveno, Italy). A total of 115 patients were treated and 129 inlay surgeries were performed (10 surgeries with ABB, 61 with BBB and 58 with EBB). The results showed a mean postoperative vertical bone gain of 5,55 mm, with the greatest augmentation obtained in the EBB group, followed by BBB and ABB. Anyway, these differences were not statistically significant. The Authors underline that EBB probably allows for a greater augmentation for its rigidity, due to the presence of a collagen matrix. At 7 years after loading, ABB and BBB showed 1.34 and 1.37 mm of peri-implant marginal bone loss respectively, while EBB lost 0.61 mm 3 years after loading. The result on implant survival rates with a 4.2-year mean follow-up were comparable (94.4% for ABB, 91,1% for BBB and 96.0% for EBB).

CONCLUSIONS

Within the limitations of this study, the Authors concluded that: *“the use of collagenated blocks should be considered with this technique involving a lower adjustment of the coronal segment on the block itself. As a consequence, heterologous biomaterials might be considered ideal in the inlay technique for the posterior mandible”*.