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Case report

ATROPHIC POSTERIOR MANDIBLES TREATED WITH SANDWICH OSTEOTOMY WITHOUT MINISCREWS AND MINIPLATES: A CASE REPORT

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ABSTRACT

The posterior mandible may be challenging due to insufficient height and width of the edentulous alveolar crestal bone. The aim of this case report was to use an inlay technique without the use of miniscrews and miniplates for the stabilization of grafted bone fragments. A 54-year-old patient was treated with a horizontal osteotomy performed 2-3 mm above the mandibular canal, and two oblique cuts were made using an ultrasonic. The final phase of the osteotomy was performed with a lever for dental extraction. One miniblock of equine bone was inserted between the coronal osteotomized segment and the mandibular basal bone. Particles of cortical-cancellous equine bone filled the residual space. A resorbable collagen membrane was used for covered the biomaterials and miniblock. Four months after surgery, a panoramic X-ray was taken before implant insertion. No dehiscence of the mucosa was observed at the marginal ridge of the mobilized fragment. Rx showed a mineralized zone between the osteotomized segment's basal bone and coronal portion. This case

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report showed that equine collagenated blocks present higher stability, allowing to eliminate the use of miniscrews and miniplates, thus simplifying the sandwich technique.

KEYWORDS: *inlay, bone, graft, screw, fixation*

INTRODUCTION

The extensive loss in the posterior mandible is challenging for implant placement (1). Vertical augmentation of the alveolar ridge is necessary for patients with extensive resorption. Different regenerative techniques are currently utilized to increase bone volume for the predictable placement of endosseous implants. Many surgical approaches are proposed, such as autogenous bone grafts, alloplastic materials, alveolar distraction osteogenesis and inlay technique (2-7). Vertical bone regeneration in posterior mandibles with onlay bone grafts has been used, but the results have not been promising. Guided bone regeneration was proposed in a 1991 report by Dahlin and colleagues (8). Expanded polytetrafluoroethylene membranes were proposed for posterior mandibular reconstruction (9, 10). However, vertical augmentation is a highly sensitive technique, predictable only when the surgical protocol is followed strictly (11).

Titanium mesh and autogenous bone grafts have been used successfully for vertical ridge augmentation of the atrophic maxilla and mandible and have gained popularity (12, 13). However, the titanium mesh must be fixed with screws. In addition, infection is a common complication that may cause loss of grafted bone, resulting in failure. The visor technique was first described in 1975 by Harle (14) to increase the absolute height of the atrophic edentulous mandible. In this technique, the alveolar ridge of the mandible is osteotomized and moved on the visor principle.

Horizontal osteotomy with the interposition of bone as a 'sandwich' to augment the alveolar ridge has been described. The inlay, which uses a bone block graft positioned between osteotomized bony segments, was developed by Schettler (15) in 1974 Stoelinga and colleagues (16) combined the visor osteotomy and sandwich techniques to augment the severely atrophic edentulous mandible with success. However, this technique involves donor site morbidity (17), as autogenous bone is used as the interpositional material.

The following report describes the treatment outcome after alveolar ridge augmentation by a sandwich osteotomy combined with an interpositional xenograft.

The aim of this report is to show an inlay technique without the use of miniscrews and miniplates for the stabilization of bone fragments.

CASE REPORT

A 54-year-old male presented with a unilateral atrophic mandible and requested implant therapy. The patient was referred to the Oral Surgery Department of the University of Chieti-Pescara for a fixed prosthetic rehabilitation of the posterior mandible. Radiographic examination with cone-beam tomography revealed the insufficient height of mandibular ridges unsuitable for implant placement (Fig. 1).

The patients refused to harvest autogenous bone; therefore, an inlay procedure was proposed using a collagenated cancellous equine bone block to allow subsequent implant placement for prosthetic rehabilitation (18, 19). The surgical procedure was performed under local anaesthesia (articaine 4% and adrenaline 1:100,000) with intravenous sedation (diazepam 0.2 mg/kg). After a paracrestal incision in the buccal vestibule avoiding the emergence of the mental nerve, a subperiosteal tissue dissection limited to the buccal side, a horizontal osteotomy was performed 2-3 mm above the mandibular canal, and two oblique cuts were made using an ultrasonic device (Surgysonic, Esacrom, Imola Italy). The final phase of the osteotomy was performed with a lever for dental extraction.

The osteotomized segment was then raised, sparing the lingual periosteum. Two miniblocks of equine bone (5 x 5 x 3 mm, OsteoBiol Sp-Block, Tecnoss, Coazze, Italy) were inserted between the coronal osteotomized segment and the mandibular basal bone (Fig. 2).

The residual space was filled by particles of cortical-cancellous porcine bone (OsteoBiol Gen-Os, Tecnoss, Coazze, Italy). After periosteal releasing incisions, the flap was sutured carefully with Vicryl 4.0 (Ethicon FS-2; St. Stevens-Woluwe,

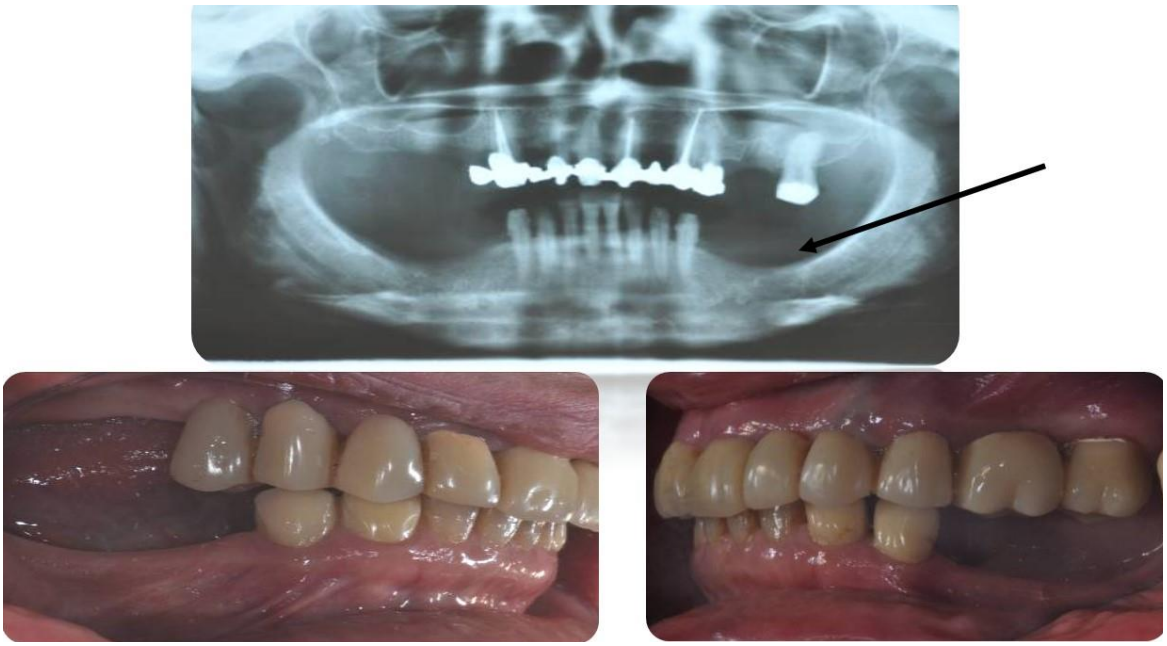

Fig. 1. *Radiograph and photos showing mandible before verticle ridge augmentations.*

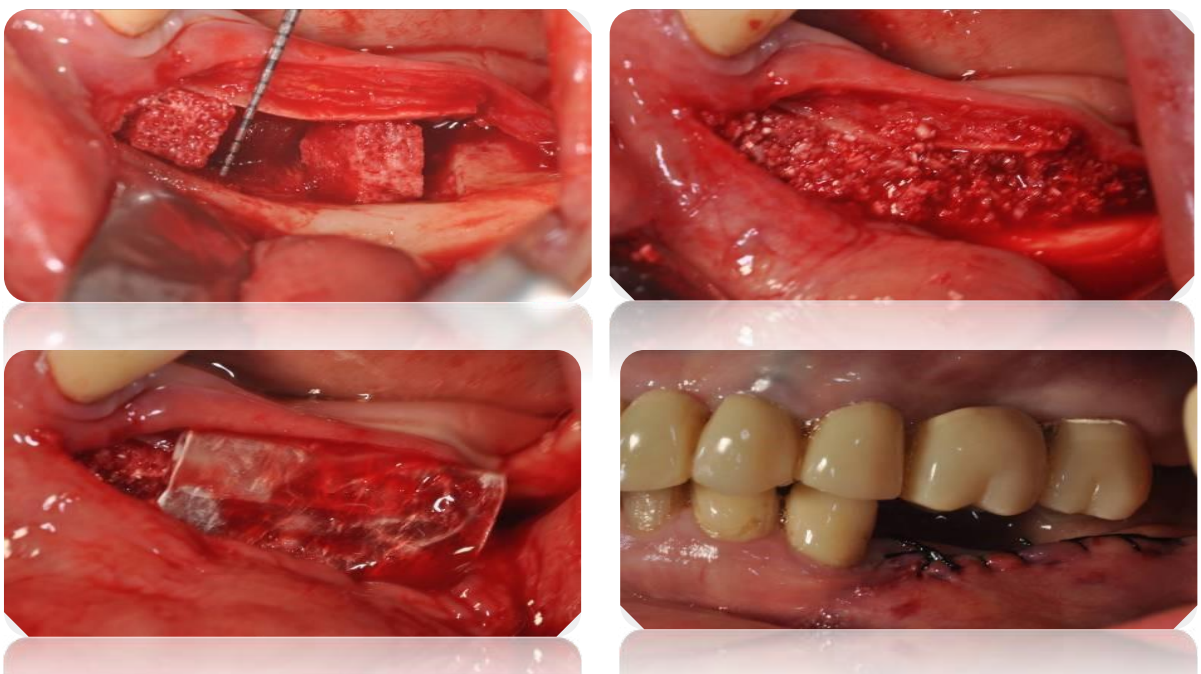

Fig. 2. *The bone segment was moved superiorly after all bone cuts were completed with piezosurgery device. Two blocks of collagenated equine bone interposed between the basal bone and the mobilized fragment.*

Belgium). The patients were followed with a clinical examination every week in the first month after surgery and twice in the subsequent months before implant insertion. The healing process was uneventful. No neurosensory disturbances were recorded. Cone-beam tomography assessments were performed immediately after the surgical procedure.

Four months after surgery, a cone-beam tomography was taken before implant insertion, showing a vertical increase of 7 mm. Two submerged Close BL implants 4mm x 10mm with a screw-retained conical abutment connection (Isomed, DUE CARRARE (PD), Italy) were placed in positions #35 and #37.

DISCUSSION

The reported case of posterior mandibular atrophy was successfully treated with interpositional sandwich osteotomy bone grafts without miniscrews and miniplates.

The inlay technique, recently revisited (18), facilitates implant placement by raising the bone above the nerve, and improves the interocclusal distance, thus reducing the crown-implant ratio. However, many clinical complications are reported after and during bone graftings, such as fracture of the cortical bone, membrane exposure, bone resorption, and neurological impairment (20). The absence of micromovement and the blood supply are key factors for successfully integrating the grafted biomaterials and substituting new bone (8). A high success rate of the inlay graft technique for the treatment of posterior mandible atrophy was reported by Barone et al. and Felice et al. (21, 22). In this case report, the effectiveness was shown by a post-operative course without any adverse event, accompanied by a high level of graft integration reported in the radiographical follow-up. In addition, the piezosurgery device simplified the technique and reduced the incidence of complications (23-25).

The interpositional inlay bone grafting using a fixation device is already used by many researchers. On the contrary, the technique without using a fixation device was used by a few authors and has the advantage of decreased risk of failure and complication for fracture or bone resorption related to the insertion of miniscrews and miniplates.

CONCLUSIONS

In conclusion, the present case report showed that equine collagenated blocks present a higher stability, allow avoiding the use of miniscrews and miniplates and simplify the sandwich technique.

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