

VERTICAL RIDGE OF ATROPHIC MANDIBLES WITH SANDWICH OSTEOTOMY WITHOUT MINI-SCREWS AND MINI-PLATES: A TECHNICAL NOTE

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ABSTRACT

The insufficient height and width of the edentulous alveolar ridge can complicate the implant rehabilitation of the posterior mandible. The aim of this technical note is to describe an inlay technique without the use of mini-screws and miniplates for the stabilization of the transported bone fragments. The inlay technique involves the first horizontal osteotomy performed 2-3 mm above the mandibular canal, and two oblique cuts are made using an ultrasonic device. The final phase of the vertical augmentation is performed with a dedicated instrument. The space between basal bone and coronal osteotomies segment is maintained by a hard equine block. The residual space is filled by particles of cortical-cancellous equine bone. This technique showed that equine collagenated blocks presented higher stability, allowed the elimination of the use of mini-screws and miniplates, and simplified the sandwich technique.

KEYWORDS: *inlay, regeneration, graft, augmentation, bone*

INTRODUCTION

The extensive loss in the posterior mandible presents a complex case for implant placement (1). For patients with extensive resorption, vertical augmentation of the alveolar ridge is necessary. Different regenerative techniques are currently utilized to achieve good bone volume for the predictable placement of endosseous implants in such cases.

Different surgical approaches are proposed, such as autogenous bone grafts, alloplastic materials (2-5), alveolar distraction osteogenesis, and recently inlay technique (6). Vertical bone regeneration in posterior mandibles with onlay bone grafts has been used, but the results have not been promising (7).

Guided bone regeneration was proposed in a 1991 report by Dahlin and colleagues (8). Expanded polytetrafluoroethylene membranes were proposed for posterior mandibular reconstruction and have been used with a high success rate (9, 10). However, vertical augmentation is a highly sensitive technique, predictable only when the surgical protocol is followed strictly (11). Also, titanium mesh and autogenous bone grafts have been used successfully

for vertical ridge augmentation of the atrophic maxilla and mandible and have gained popularity since their introduction (12, 13).

Titanium screws must fix the titanium mesh used, and infection is a common complication that may cause loss of grafted bone, resulting in failure. The inlay, which uses a bone block graft positioned between osteotomized bony segments, was developed by Schettler (14) in 1974. Stoelting and colleagues (15) combined the visor osteotomy and sandwich techniques to augment the severely atrophic edentulous mandible with success. However, this technique involves donor site morbidity (16), as autogenous bone is used as the interpositional material.

The following technical note describes the protocol for alveolar ridge augmentation by a sandwich osteotomy combined with an interpositional xenograft without using mini-screws and miniplates to stabilize the transported bone fragments.

TECHNICAL NOTE

After a paracrestal incision in the buccal vestibule, avoiding with care the emergence of the mental nerve and a subperiosteal tissue dissection limited to the buccal side, a horizontal osteotomy is performed 2-3 mm above the mandibular canal, and two oblique cuts are made using an ultrasonic device (Surgysonic, Esacrom, Imola Italy). The final phase of the osteotomy is performed with a lever for dental extraction. The osteotomized segment is then raised in the coronal direction, sparing the lingual periosteum. Two miniblocks of equine bone (OsteoBiol Sp-Block, Tecnos, Coazze, Italy) are inserted between the coronal osteotomized segment and the mandibular basal bone (Fig. 1). Particles of cortical-cancellous porcine bone filled the residual space. After periosteal releasing incisions, the flap is sutured carefully with Vicryl 4.0 (Ethicon FS-2; St. Stevens-Woluwe, Belgium).

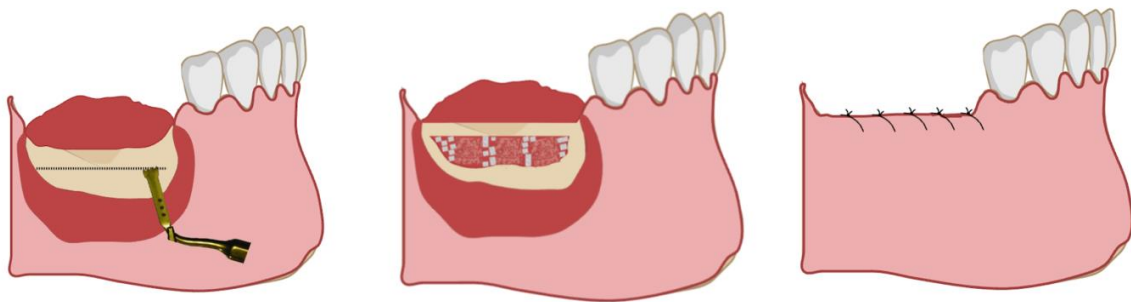


Fig. 1. The bone segment was moved superiorly after all bone cuts were completed with a piezosurgery device. Two blocks of collagenated equine bone were interposed between the basal bone and the mobilized fragment.

DISCUSSION

In this technical note, we describe the treatment of posterior mandibular atrophy with interpositional sandwich osteotomy bone grafts without using the mini-screws and miniplates.

The inlay technique, recently revisited (17), facilitates implant placement by raising the bone above the nerve and reducing the interocclusal distance and the crown-implant ratio. Many clinical complications are reported after and during bone grafting, such as fracture of the cortical bone, membrane exposure, bone resorption, and neurological impairment (18).

The absence of micromovement and the blood supply are key factors for successfully integrating the grafted biomaterials and substituting new bone (8). Two research groups reported a high success rate of the inlay graft technique for treating posterior mandible atrophy (19, 20). In these case reports, 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. The piezosurgery device simplified the technique and reduced the incidence of complications (21, 22).

Many researchers have already used interpositional inlay bone grafting using a fixation device. On the contrary, a few authors have used the technique without using a fixation device. It has the advantage of decreased risk of failure and complication for fracture or bone resorption related to the application of mini-screws and miniplates. In conclusion, the present technique showed that equine collagenated blocks presented higher stability, allowed the elimination of the use of mini-screws and miniplates, and simplified the sandwich technique.

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