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Case Report

Ridge augmentation with titanium mesh: A case report

H. Jegham *, R. Masmoudi, H. Ouertani, I. Blouza, S. Turki, M.B. Khattech

Military Hospital, No 8, Univers street, Tunis, Tunisia

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ABSTRACT

Insufficient bone volume for dental implant placement in the maxillary anterior segment is a constant challenge in oral surgery. Several techniques have been suggested to reconstruct deficient alveolar ridges and to facilitate dental implant placement. These techniques include bone splitting osteotomy, distraction osteogenesis, inlay and onlay bone grafting. Guided bone regeneration (GBR) is also a promising alternative that increases the bone volume by the use of a subperiosteal barrier.

Aim: The aim of this case was to demonstrate that the use of rigid titanium occlusive barrier is a reliable alternative to perform a lateral alveolar bone augmentation and treat localized ridge deformities before reaching an ideal implant placement.

Observation: A 25-year-old healthy male was referred for implant placement in the maxillary central incisor. The alveolar bone width at the implant site 21 was less than 5 mm. Hard tissue augmentation was accomplished using guided bone regeneration. A rigid titanium occlusive barrier was customized to desired shape of future alveolar ridge then secured with tent and fixing screws. Autogenous bone graft harvested with an auto-chip-maker adjacent to the surgical site were mixed with a xenograft and putted under the barrier. The wound was closed using a vestibular mucoperiosteal flap. At 4 months, the rigid barrier was removed, and a 7 mm crestal width transversal bone was observed. At the same time, a fixture (4×10 mm) was placed. A definitive ceramometal crown was completed after full osseointegration with periodical clinical maintenance. The exposure of the titanium mesh occurred in this case and was visible with a circular flap dehiscence at 1-month follow-up visit. This exposure did not affect the successful regenerative outcomes. After removal of the titanium mesh from the grafted defects, the space beneath the membrane enclosure was seen to be almost completely filled with new hard tissue covered by a thin layer of soft tissue. The postoperative follow-ups revealed that the implant was stable with excellent osseointegration and the buccal depression of the surgical area was reconstructed.

Conclusion: The use of rigid titanium occlusive screwed barrier with autogenous and bovine bone graft might be a reliable technique for alveolar ridge reconstruction. This approach achieve excellent final esthetic outcome of the implant-supported restoration.

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1. Introduction

Insufficient bone volume for dental implant placement in the maxillary anterior segment leads to functional and esthetic problems and can be difficult to solve. Several techniques have been suggested to reconstruct deficient alveolar ridges and to facilitate dental implant placement. These techniques include bone splitting osteotomy, distraction osteogenesis, inlay and onlay bone grafting [1].

Guided bone regeneration (GBR) is also a promising alternative that increases the bone volume by the use of a subperiosteal barrier [2].

Expanded polytetrafluoroethylen (ePTFE) was the first non-resorbable membrane proposed to allow spontaneous bone growth after the formation of a coagulum below the barrier and then permitting guided bone regeneration [3].

Besides, PTFE membrane, titanium mesh is another non-resorbable material used in multiple medical applications and, more recently, for dental bone repair. The use of titanium mesh was first introduced by Boyne in 1969, for the reconstruction of large osseous defects [4].

The stiffness of this membrane makes it easy to customize and to shape. Hence, the creation and the maintenance of a space for graft placement could prevent the collapse of the biomaterial and provide GBR.

The aim of this case was to demonstrate that the use of rigid titanium occlusive barrier is a reliable alternative to perform a

* Corresponding author.
E-mail address: hela.jegham@yahoo.fr (H. Jegham).

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lateral alveolar bone augmentation and treat localized ridge deformities before reaching an ideal implant placement.

2. Observation

A 25-year-old healthy man was referred for implant placement in the maxillary central incisor.

The patient reported a history of trauma and inadequate endodontic treatments leading to the loss of the tooth 21 (Figs. 1 and 2).

The cone-beam reveals at the implant site horizontal bone resorption, the width of the alveolar ridge was less than 5 mm (class H-m according to Wang HVC classification [2002]) [5] (Fig. 3).

Therefore, we decided to perform lateral bone augmentation before implant placement by the use of a titanium mesh for GBR.

After reflection of a full thickness flap, a rigid titanium occlusive barrier (CTi-mem Type B, Neobiotech, Seoul, Korea) was trimmed and contoured to desired shape of future alveolar ridge, then secured with tent screws. Autogenous bone graft harvested with an auto-chip-maker (ACM, Neobiotech, Seoul, Korea) adjacent to the surgical site were mixed with a xenograft (Cerabone®, Biomaterials GmbH, Germany) and placed under the barrier. Next, fixing screw was used to secure the mesh and the bone graft material. The wound was closed using a buccal mucoperiosteal flap coronally repositioned (Figs. 4–9).

The postoperative care includes use of antibiotic (amoxicillin 500 mg orally 3 times daily for 7 days) and an analgesic. Patient was instructed to rinse with chlorhexidine 0, 12% twice daily for 2 weeks. Sutures were removed 10 days after surgery.

At 4 months of healing, the augmented site was reopened using a crestal incision. Once it is fully exposed, the rigid barrier was removed, and a 7 mm crestal width transversal bone was observed. At the same time, a fixture (4×10 mm, NeoCMI implant, Neobiotech, Seoul, South Korea) was placed. Six months later, we undertake the second time surgery and an adequate healing

Fig. 1. Preoperative view of the site.

Fig. 2. Occlusal view with vestibular tissue loss.

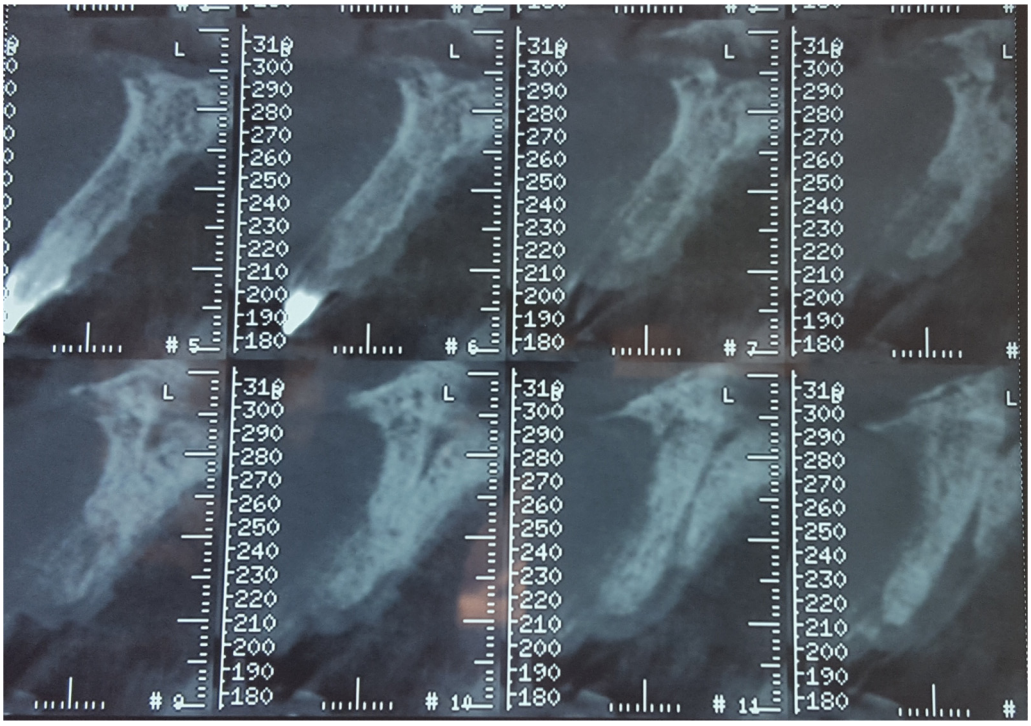

Fig. 3. Bone defect on site 11 observed on the cone beam.