

Case Report

Use of Membranes and Heterologous Bone with Atelocollagen in the Regeneration of the Post-Extraction Alveolus

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Abstract

The masticatory mucosa width as well as the vestibular bone thickness have a key role in the aesthetic and functional success of the implant-prosthetic rehabilitation. Driving the healing of hard and soft tissues in a post-extractive site can be a critical phase of treatment. In this case, we are going to show we propose a mini-invasive technique that it is well tolerated by the patient even in the post-operative phase.

Keywords: Guided Tissue Regeneration; Atelocollagen; Flap Less Regeneration; Post-Extraction Alveolus

Introduction

The extraction of periodontally compromised elements determines a significant reduction of bone volume, as to the lack of bone caused by periodontal disease there is a loss of tissue for the subsequent remodeling of the healing processes. In the untreated post-extraction alveolus, there is a 2-3 mm resorption of the vestibular wall in the first 4-6 weeks [1,2] while we will have a reduction of the lingual vestibule width of 25% during the first year [3].

Today the height and thickness of the bone crest have a key role for the success of the implant-prosthetic post-surgical rehabilitation, as well as the horizontal and vertical dimensions of the adherent mucosa improve the predictive ability of the aesthetic and functional result.

Grunder et al suggest a minimum of 2 mm vestibular thickness to offset the effects of the re-absorption and consequent soft tissue recession [4]. From this point of view, it is evident how the guided tissue regeneration plays an important role in the post-extraction implant therapy both immediate and delayed. The guided tissue regeneration (GBR) for the localized defects allows an increase of the bone of 1,5-5,5 mm [5,6]. The aim of this study is to propose a mini-invasive technique for the post-extractive bone regeneration with the minimum discomfort for the patients.

Case Report

Under observation we have Mrs. F.A., 54 years old, with the element 3.6 seriously compromised by a periodontal pocket that affects the vestibular furcation with grade III mobility, probably caused by the extrusion due to the absence of the 2.5 antagonist. We decide in agreement with patient to immediately perform an a traumatic extraction of this element, regenerate the bone defect, position two implants on 3.6 and 2.5, kill 3.8 and 2.6 and prosthetically restore the occlusal plane with zirconia-based ceramic crowns.

After 7 days, the site presents a masticatory mucosa rather small with a width of 3 mm and a vestibular bone crest with a vertical defect of 5 mm. For an implant-prosthetic rehabilitation we decide to proceed with a tissue regeneration to prepare the implant site, then position the implant after the regeneration (figures 1&2).

As bone substitute I decided to use Hypro-oss® with a granulometry of 0,5-1 mm, a natural bone substitute of bovine origin with atelocollagen, lyophilized and atelopeptized collagen with bacteriostatic and osteo inductive power. The membrane used will be Hypro-sorb® M with a thickness of 0,8 mm composed of multilayer pure atelocollagen, characterized by a remarkable mechanical resistance (stable for 6 weeks on site), bacteriostatic power, high biocompatibility, handy, fully resorbable within 6 months after placement. The atelocollagen is a bovine origin connective with antibacterial and anti-edema power and it can stimulate the production of growth factors as IGF-G, TGF-beta and PDGF.

With antibiotic coverage of amoxicillin and clavulanic acid for 2 days we proceed to the surgery.

We make a triangular flap with full thickness extended from the gingival sulcus of the 35 to the incisura of the parasulcus drainage of the 3.8 (figure 3).

Once we have discovered the bone defect we proceed with the curettage of the post-extraction alveolus taking care to remove each of granulation tissue present, then we complete the preparation of the alveolus with wash of saline (figure. 4).

The bone substitute is prepared by moistening the granules in a bowl with saline water and is positioned in a bloody alveolus. The membrane is cut according to the size and shape of the bone defect to be filled.

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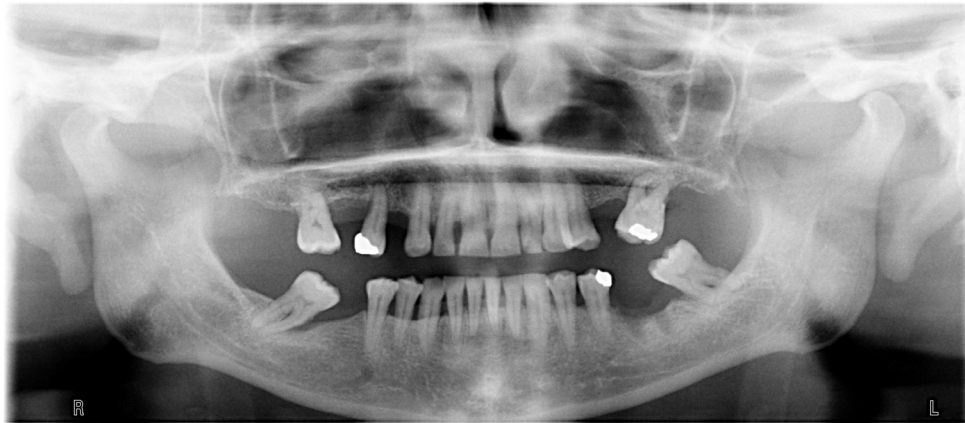


Fig 1: ortopantomografia post extraction



Fig 2: width of masticatory mucous membrane 3mm

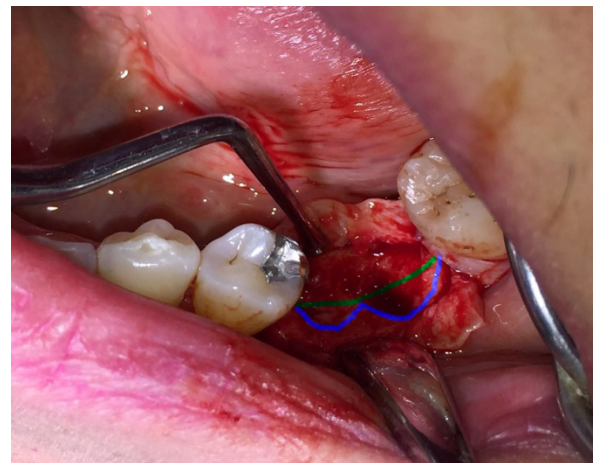


Fig 4: The real height is highlighted in blue, the desired height is in green.

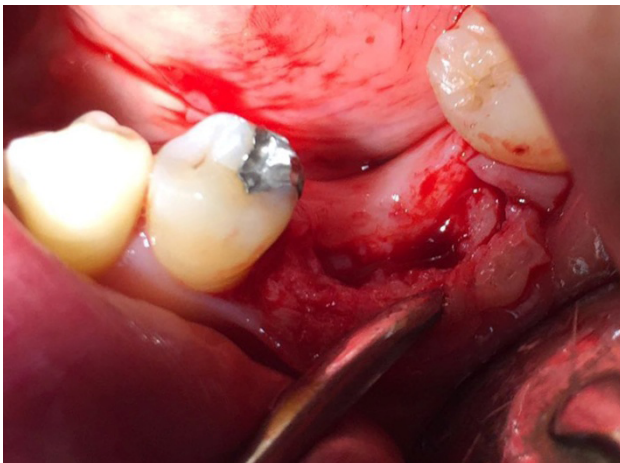


Fig 3: Uncovering of defect



Fig 5: Compacting of the bone substitute inside the socket, the membrane is inserted under the lingual flap

Before proceeding with the positioning of the bone substitute we put the membrane under the lingual flap to create a barrier against it is possible to compact the granular material (figures 5 and 6), once the alveolus is filled we moisten the membrane with saline water to soften it and it reclines positioning it with the rough surface facing the bone.

Before suturing to avoid sliding flaps or gum grafts must position two more membranes, the first with the rough side facing the bone crest (figure 7), the other with the rough side facing the gingival flaps, to guide in this way the vascularization along the surface of the membrane itself.

After this third membrane layer, we can proceed to suture the flaps, the first stitch stabilizes the membrane, the other stitches stabilize



Fig 6: The membrane is folded to cover the defect



Fig 7: The second membrane is positioned over the first for increasing the mechanical strength

the flaps without creating tensions (figure 8).



Fig 8: The third membrane is placed with the rough surface facing the oral cavity and secured with the suture

As we can see in the picture the gum flaps remain separate and the membranes exposed, in fact the aim of this surgery is to try heal by second intention driving the

regeneration of the bone as well as also of masticatory mucosa, for this reason we made triple membrane layer to protect the wound.

The patient is discharged recommending a semi liquid diet until the checkup in 7 days, continue the antibiotic for 4 days and chlorhexidine spray 0.2% for 7 days and bromelinecp 0.2 g for 6 days.



Fig 9: Control three months

The sutures will be removed after 14 days, the 3-month follow-up shows an increase of the masticatory mucosa width (figure. 9), the



Fig 10: Control six months



Fig 11: Exposure

6-month follow-up shows the presence of mature bone adapted to receive the implants (figures 10 and 11).

Conclusion

The width of the bony crest is critical to predictability of implant-prosthetic success, as well as it's important is a width of the adherent mucosa. The GBR on the post-extractive site produces better results as the inflammatory processes bring in the site all the necessary growth factors for a bone remodeling that assisted with an heterologous bone support leads to an increase in volume. The use of a triple layer of anti collagen membranes allows an healing by second intension that leads to the formation of the masticatory mucosa without the flaps transposition or explants from donor area that determine a less comfortable post-operative by the patient. The atelocollagen supports the controlled neovascularization and the integration of the soft tissues and a safe alternative to the removal of the soft tissue from the patient. The bacteriostatic effect decreases the risks of infection and has a high mechanical strength that prevents the exposure of the wound.

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