

Successful bone regeneration before implantation with R.T.R.+ Membrane

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| Summary

Introduction: Replacing a compromised front tooth is always a challenge, requiring a thorough knowledge of periodontal tissue preservation and regeneration techniques at the implant site.

Clinical Case: A 45-year-old male patient presented with pain and mobility on tooth 11. On inspection, tooth 11 was sensitive to horizontal and vertical percussion and presented an increase in mobility. An extraction was performed with a concomitant bone regeneration using R.T.R.+ Membrane and B.D.X (Bovine Derived Xenograft).

Discussion: Many other procedures could have been used, but the simplicity of handling of the membrane, its resistance to exposure, and its ability to guide healing meant that the bone volume for the placement of an implant could be obtained while maintaining the ideal gingival volume and texture.

Conclusion: The use of a synthetic membrane such as R.T.R.+ Membrane improves the effectiveness of GBR for class 3 bone defects as defined in the Benic system of classification.

Introduction

When a tooth in the maxillary anterior region is compromised and needs to be replaced by an implant, we are faced with a complex challenge.⁽¹⁾ In all cases, we know that esthetic objectives are difficult to achieve due to existing bone deficits or alveolar resorption following avulsion. Further, the vast range of reconstructive techniques available leaves practitioners with a wide choice of materials and equipment.

The Benic and Hamerlé classification system offers indications according to the number of missing bone walls and the horizontal and

vertical deficit of the crest.⁽²⁾ However, despite advances in imaging, it is not always easy to predict the extent of the deficit and the technique to be used on the day of extraction, especially since soft tissue regeneration must also be considered in the anterior sector. In cases where the situation appears favorable, immediate extraction and implantation with guided bone regeneration during implantation is an attractive option, but when the tooth has been chronically infected for some time, alveolar preservation can help to preserve the required bone volume and the correct positioning of the keratinized soft tissues.

Case report

Clinical signs and symptoms

A 45-year-old non-smoking patient presented with chewing pain on tooth 11. He reported having had the impression of a slightly mobile tooth for some time. He recounted that his two central incisors had been pulpless and crowned for some twenty years following a sports accident.

Diagnosis

Clinical examination revealed pain on axial and lateral percussion, as well as mobility level two on the Muhlemann scale. Retroalveolar radiology showed a radiolucent image at the apex of tooth 11, indicative of a chronic apical infection that has been evolving despite an attempted apical resection with retrofilling a few years before (*Fig. 1, 2*).

In this context, given the poor intrinsic condition of this tooth due to the treatments already carried out, the option of an extraction with the placement of an implant and the creation



Fig. 1



Fig. 2

of a screw-retained crown to replace it was proposed, with the initial intention of carrying out an early implantation.

Procedure and treatment

An impression was taken beforehand to provide a transitional removable fixture prior to extraction. On the day of extraction, during curettage of the alveolus, a vestibular and apical alveolar bone defect was found, and a flap was lifted to visualize the extent of the defect (Fig. 3). There was no longer any vestibular wall, nor was there an alveolar ceiling.

Guided bone regeneration was performed with B.D.X (0.25-1mm) and synthetic

R.T.R.+ Membrane 15x25mm (Septodont; Saint-Maur-des-Fossés, France) (Fig. 4). The postoperative control radiograph showed the alveolus filled to the top of the ridge (Fig. 5).

A circular punch of gingiva taken from the tuberosity area was sutured to the gingiva bordering the alveolus to cover the membrane with a non-absorbable 4.0 diameter thread (Fig. 6).

Stitches were removed after two weeks (Fig. 7) and the wound was observed to be healing by primary intention. The punch was almost completely resorbed, leaving the membrane slightly exposed (Fig. 8). At eight weeks, the epithelium covered the entire alveolus, and the tissue was healthy and non-inflammatory (Fig. 9).



Fig. 3



Fig. 4



Fig. 5



Fig. 6



Fig. 7



Fig. 8



Fig. 9



Fig. 10



Fig. 11

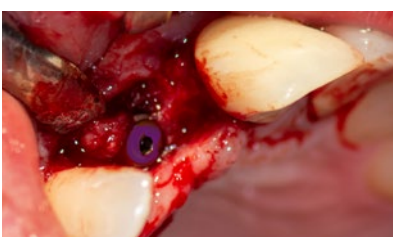


Fig. 12

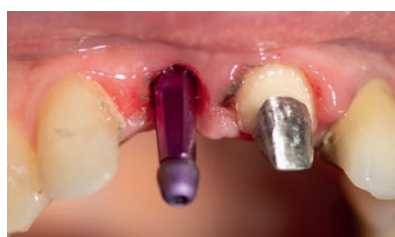


Fig. 13



Fig. 14

At twenty-six weeks, implant surgery was commenced. The full-thickness flap showed a regular ridge of sufficient volume to allow placement of a 3.6-diameter bone level implant (*Fig. 10, 11, 12*).

After two months of osseointegration, a provisional crown was fabricated. After the soft tissues had matured, the regular crown was placed (*Fig. 13, 14, 15*).

Follow-up

The patient was seen regularly, and the results were maintained from an esthetic and functional point of view, as shown by images taken six years later (*Fig. 16, 17*).



Fig. 15



Fig. 16



Fig. 17

Discussion

Replacing a maxillary incisor with an implant-supported prosthesis is always a challenge. The conditions for obtaining esthetic similarity with the corresponding tooth, along with functional and esthetic integration at periodontal level, are difficult to achieve in terms of both hard tissue volume and soft tissue quality.

In the present case, the bone defect is borderline between class 3 and 4, as described by Benic et al. The question then arises of whether to perform guided bone regeneration on the day of extraction, or to defer the procedure to achieve soft tissue closure before performing bone augmentation. The advantage of performing the procedure on the same day as the extraction is that it saves time and

allows the procedure to be performed without displacing the soft-tissue contour, although it does require the use of a membrane that can ensure the barrier effect while remaining partially exposed. This is the advantage of the synthetic membrane used, since, as can be seen from the images of the various stages, the gingival contour has been preserved from extraction to the final prosthesis, even after six years of follow-up.^(3,4)

An autologous apposition graft would probably have provided superior bone gain, but would also have required different soft tissue remodeling, since generally the flap traction required to cover the graft volume would alter the gingival zenith in the palatal position.

Conclusion

The ease of use and resistance to exposure of R.T.R.+ Membrane have made it possible to successfully apply a simple tissue regeneration technique in a difficult clinical context.



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