

## Alveolar Ridge Preservation through the Use of Polypropylene Barrier for Implant Insertion: A Case Report

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### Abstract

Osseointegration and aesthetics are desirable for the rehabilitation with dental implants which are obtained with the disponibility of healthy and adequate alveolar bone structure. After tooth extraction, in a few months is observed the bone resorption, also affecting the gingival contour, impairing aesthetics. Many techniques are related in the literature to prevent the bone resorption, such as bone grafts (horizontal and vertical), guided bone regeneration, split crest techniques among others. The objective of this article is to report a clinical case of bone preservation of the alveolar structure mantaning the bone width and height to install dental implants throught the use of a polipropilene barrier. Throught this work we may conclude that the polypropilane barrier is a satisfactory biomaterial that prevents bacterial colonization, bone resorption and mucosa invagination facilitating a second stage of treatment for dental implant insertion.

**Keywords:** alveolar ridge preservation; polypropylane membrane; dental implants.

### Introduction

The bone resorption after the teeth extraction is a major concerne for dental surgeons that must rehabilitate patients with oral implants<sup>1</sup>. The lack of bone structure to install implants may lead professionals to use other alternatives as bone grafting, guided bone regeneration, split crest which increases the morbidity, costs and treatment time<sup>2</sup>.

The resorption of tridimensional bone structure is well documented and can decrease the bone volume in width of up to 50% in the first year and 0.4-3.9 mm in height of healed sockets<sup>1</sup>. Therefore, the act of exodontia must be revisited to perform it in a less traumatic way and biomaterials must be used to preserve the alveolar structure<sup>2</sup>.

The preservation of alveoli structure after the teeth extraction throught a alveolar ridge preservation, should be considered as an easier alternative to maintain the width and height of the bone and also the contour of the buccal plate to provide a more aesthetic rehabilitation<sup>2,3</sup>.

The alveolar ridge preservation, may provide a more appropriate bone and gingival regeneration assuring a more aesthetical and functional teeth reabilitation. In order to achieve the maintenance of the alveolar structure many materials can be used<sup>2</sup>.

The purpose of this study is to present a clinical case of the use of a polypropylane membrane to prevent bone resorption to get more adequate bone structure to support the implant insertion with a better bone contour.

## Case Report

A Caucasian female patient, 67 years-old, with satisfactory systemic health, attended the Institute clinic with the maxillary left second pre molar with a extensive caries cavity and the maxillary left first molar with infiltration under the prosthetic crown and the furcation involved with indication of exodontia. The treatment planning for the affected area was teeth extraction and the insertion of oral implants (Figure 1).

Non-traumatic exodontia of the teeth was performed in order to maintain the alveolar bone structure, followed by curettage of the alveoli to promote bone bleeding and abundant irrigation with saline solution. A polypropylene barrier (Polyprop™, Consulmat, São Carlos, Brazil) was installed over the alveoli of both teeth, retaining the blood clot to promote bone regeneration. The barrier was maintained with 5-0 nylon sutures (Figure 2).



**Figure 1:** Initial radiographic aspects, showing the large destruction by caries and periodontal disease of the maxillary left second pre molar and maxillary left first molar, respectively.



**Figure 2:** Immediate post-operative, showing polypropylene barrier and sutures on the alveoli.

The barrier was kept in place for 15 days, being removed with the sutures (Figure 3). After removal, inflammatory tissue of healing was observed, with no signs of contamination or infection (Figure 4). After 3 weeks, satisfactory tissue repair was observed, although still incomplete (Figure 5).

After 2 months, the computed tomography showed the maintenance and preservation of the ridge, verifying the viability for the implant installation surgery (Figure 6). Clinically, satisfactory soft tissue healing was observed (Figure 7).

Under local anaesthesia, the mesiodistal distance between the implants was measured with drilling template for implant installation (Figure 8), followed by mucogingival incision and exposure of the alveolar ridge (Figure 9). Two perforations were made for the installation of the implants (Figure 10). Two 4.0 x 10.0mm cone morse implants (Black Fix Profile™, Titanium Fix, São José dos Campos, Brazil) were installed (Figure 11). The flap was sutured (Figure 12), and remained so for 15 days. No complaints or complications were reported. Radiographically, the adequate positioning of the implants was observed (Figure 13). The patient is waiting for the osseointegration time to finish the prosthesis on the implants.



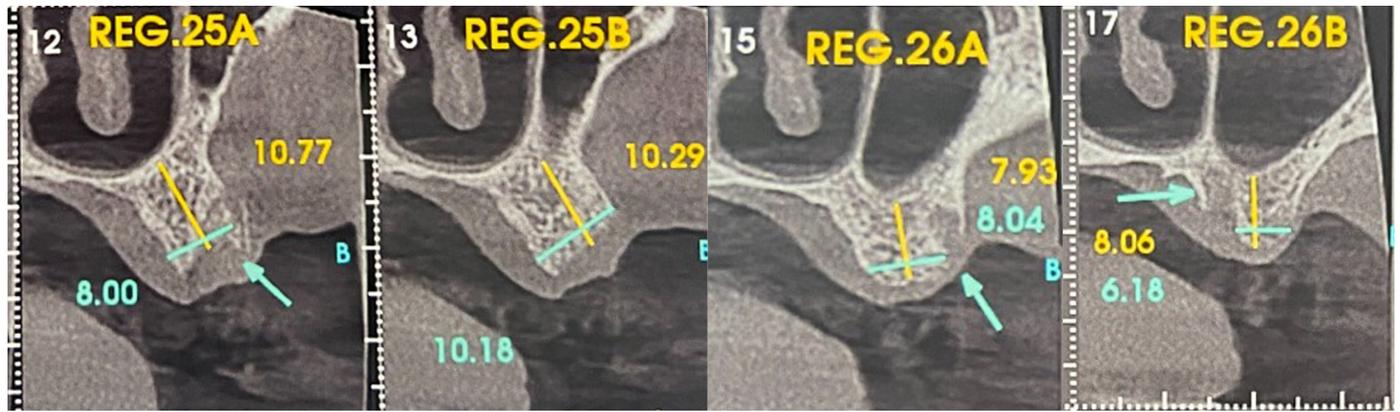
**Figure 3:** Removal of the polypropylene barrier and sutures.



**Figure 4:** Presence of inflammatory tissue of healing.



**Figure 5:** Satisfactory partial tissue repair.



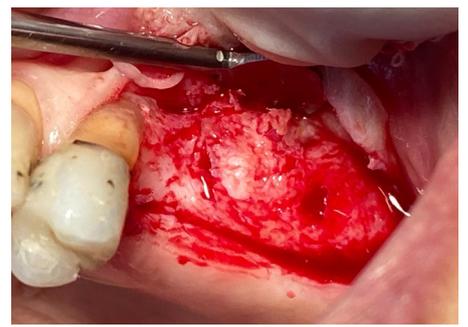
**Figure 6:** Computed tomography showing the maintenance and preservation of the ridge (after 2 months).



**Figure 7:** Satisfactory soft tissue healing.



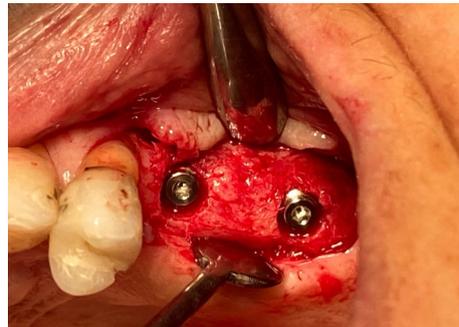
**Figure 8:** Mesiodistal distance between the implants was measured with drilling template for implant installation.



**Figure 9:** Mucogingival incision and exposure of the alveolar ridge.



**Figure 10:** Two perforations were made for the installation of the implants.



**Figure 11:** Installation of two 4.0 x 10.0mm cone morse implants.



**Figure 12:** Flap sutured.



**Figure 13:** Adequate positioning of the implants.

## Discussion

Bone resorption occurs after tooth extraction as a result of a physiological process of atrophy by disuse<sup>2,3</sup>. This resorption and soft tissue invagination process begins a few weeks after tooth extraction<sup>2</sup>. It is progressive and more significant in the first 3 to 6 months<sup>3</sup>. During this period, if any procedure is performed soon after tooth extraction, it may compromise aesthetics. Sometimes, it may be necessary to perform some procedure of guided bone regeneration, increasing morbidity, treatment time and costs<sup>2</sup>.

Therefore, maintaining alveolar ridge volume after extractions is essential for the success, esthetics and predictability of treatment involving dental implants<sup>3</sup>.

In this study, the polypropylene barrier was used as biomaterial to promote alveolar ridge preservation, according to several studies<sup>4-6,8</sup>.

The polypropylene membrane meets several characteristics of an ideal biomaterial, such as ease of cutting, modeling and adaptation to the surgical site; resistance compatible with the loads applied; malleability; no need for relaxing incisions; unnecessary fixation resources (screws or drawing pins); low cost; in addition to osteopromotion<sup>5,8</sup>. However, in the present case, two main qualities were observed that have also been reported in other studies, but are really important to facilitate the rehabilitation of the area where extraction occurred. The maintenance of the blood clot by the polypropylene membrane allowed the body to regenerate bone tissue for implant installation, as well as the possibility of being exposed to the oral cavity with less retention of dental biofilm<sup>5,7,8</sup>.

## Conclusion

The use of the polypropylene barrier facilitates the maintenance of the clot in the alveolus, leading to bone regeneration and favoring the future installation of dental implants. It was also verified, as an important characteristic, the possibility of exposure to the oral environment, with reduced accumulation of dental biofilm and absence of contamination of the clot.

## Conflict of Interest

The authors declare no conflict of interest.

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