

# Two-stage maxillary expansion using polypropylene barrier: case report

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**Abstract:** Bone loss after extraction is inevitable. Due to the different factors relative to resorption and bone remodeling, bone ridge will undergo different changes in horizontal and vertical structures until it reaches atrophy, which is a challenge not only for Implantology, but also for Prosthodontics and Aesthetics. As an alternative to restore the natural anatomy of an atrophic maxilla in the region of teeth #11 and #12 of a female, 23-year-old patient, a two-stages surgery was carried out. In the first phase, a buccal flap was performed,

followed by a U-shaped perforation up to the bone marrow. Subsequently, suture was carried out. Twenty-eight days later, a new flap was performed, but at the ridge only, without affecting the periosteum, so as to achieve buccal and palatal bone plates expansion. Afterwards, two Morse taper implants were simultaneously placed, covered with a polypropylene barrier, with closing of the incision performed by means of non-tension mattress suture. Fifteen days later, the barrier was removed, when granulation tissue was iden-

tified and then preserved for four months. Planned outcomes were achieved after a healing period, during which the patient was assessed clinically and tomographically. We concluded that the barrier used in the present study served as scaffold for bone neof ormation and support for the placed implants, thus improving the three-dimensional aesthetics of the right, anterosuperior region of the patient. **Keywords:** Bone regeneration. Polypropylene. Prostheses and implants. Tissue preservation. Granulation tissue.

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» The authors report no commercial, proprietary or financial interest in the products or companies described in this article.

» Patients displayed in this article previously approved the use of their facial and intraoral photographs.

## OBJECTIVE

This paper aims to report a clinical case of anatomical restoration of an atrophic maxilla, through the installation of implants and the use of a polypropylene barrier (Bone Heal®).

## CASE REPORT

Female patient, 23 years old, had a loss of dental elements #11 and #12, resulting in atrophy of the alveolar ridge. Two-stage ridge expansion technique, with implant installation and guided bone regeneration (GBR) with polypropylene barrier, was indicated. In the smile of the patient, it was possible to observe the defects in the transverse and coronal directions, confirmed by tomographic evaluation, in which the atrophy of bone could be seen in the buccal-palatal sense. In the first phase of the two-stage surgery, a flap was made with a wider base in relation to the vestibular, besides in addition to a 'U' drill, until it reaches the bone marrow; then the flap was replaced and sutured. After 28 days, the second surgery was performed through a flap only on the ridge, without relaxing incisions, and a supracrestal perforation, with the intention of separating the buccal and palatine bone plates. This step was done very carefully, preserving the bone structures. After separation

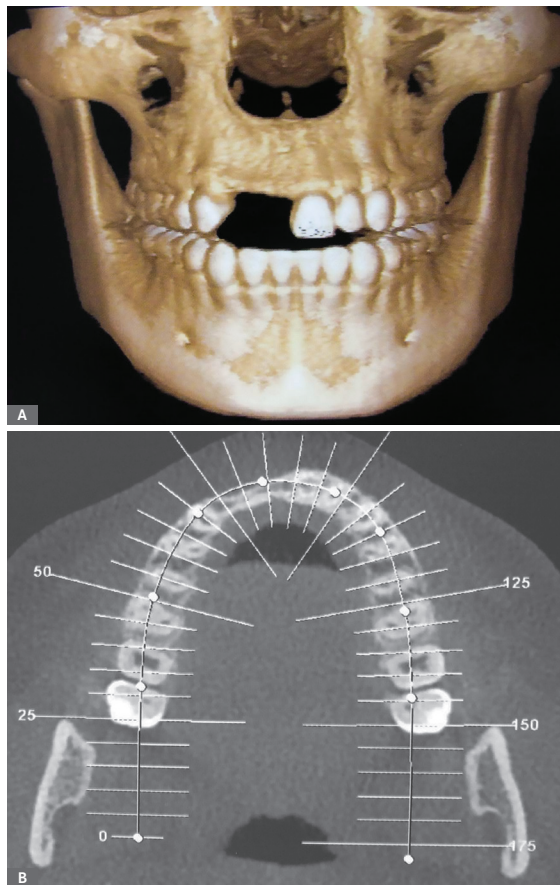
of the bone plates, two 3.8 x 10mm Cone Morse implants (Vinces® Sign) were placed, which were covered with a polypropylene (Bone Heal®) barrier, which remained in contact with at least 2mm of the surrounding bone. The gap between the implants was filled with the patient's own blood, in order to follow the principles of osseopromotion described by Buser et al. The patient was only given analgesic medication for three days, a control tomography was performed and next return was labeled to after 15 days to remove the stitches and the barrier.

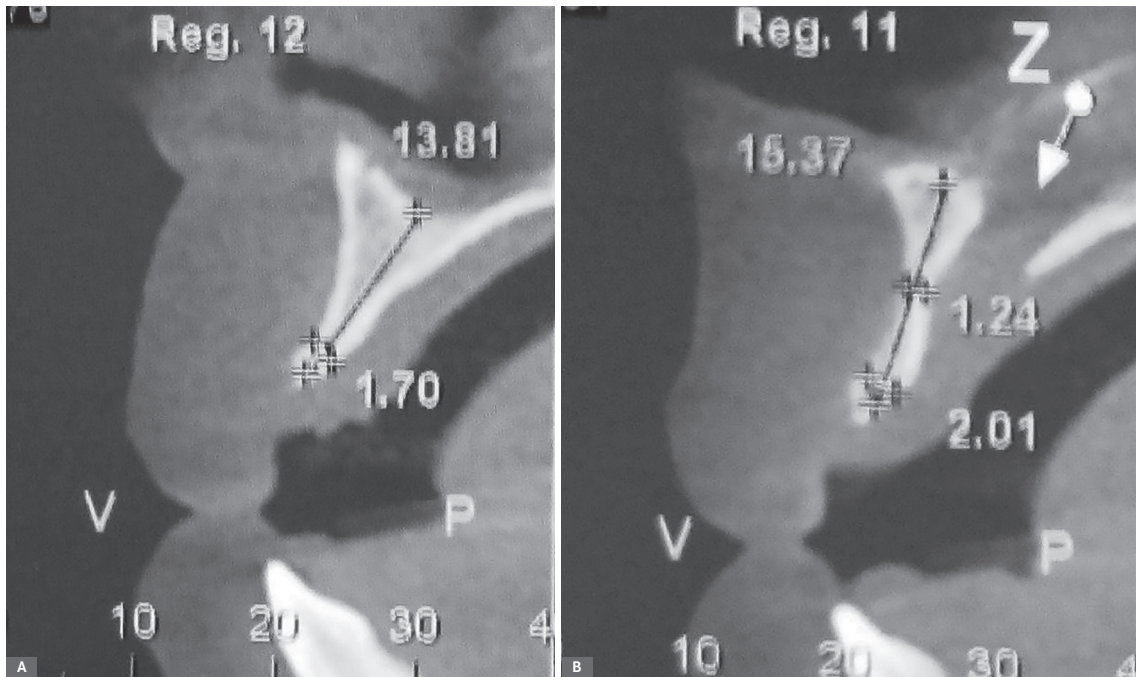
After these 15 days, the patient returned, with some burst stitches and others hanging, but with the barrier still in its initial position. After removal, a granulation tissue was found, which, following the recommendations of the barrier manufacturer, should be left in this way for at least four months, when a new exposure of the implants and prosthetic rehabilitation is made. Histologically, this granulation tissue is highly vascularized. After four months, a new tomography was performed, with the intention of evaluating the effectiveness of the technique and the thickness of the newformed bone. A real bone gain could be observed, and then the implants were exposed and the unitary porcelain crown was placed on each implant.



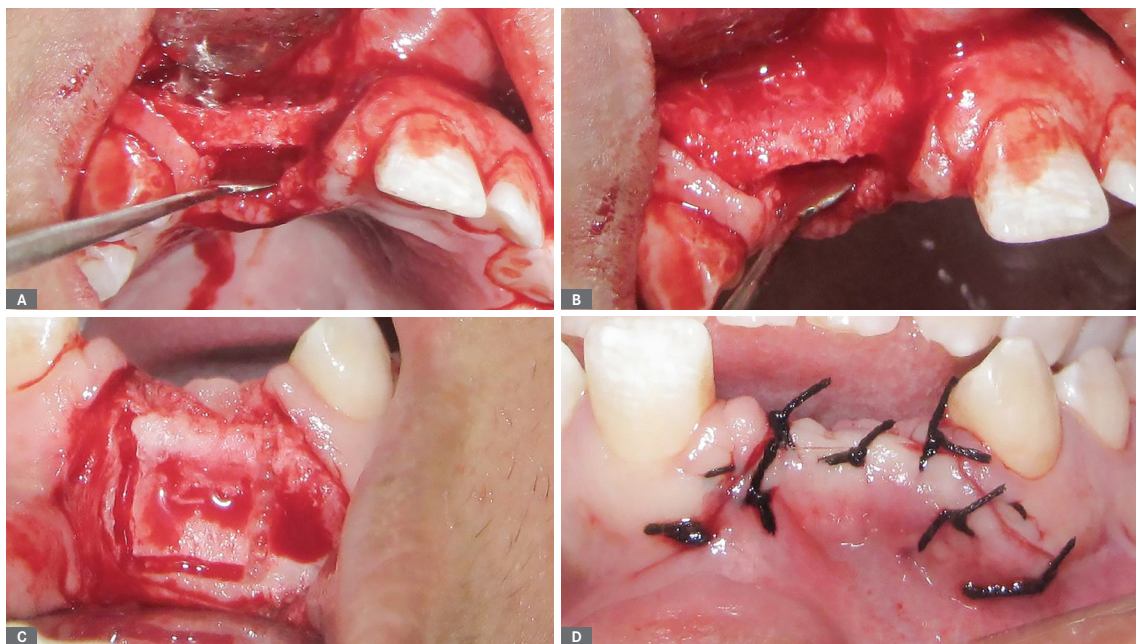
**Figure 1:** A) Initial extraoral photography showing the smile level. B) Presence of defect in the coronal direction. C) Presence of defect in the transverse direction.

**Figure 2:** 3D Tomography showing: A) loss of elements #11 e #12, B) loss of the transverse bone structure.

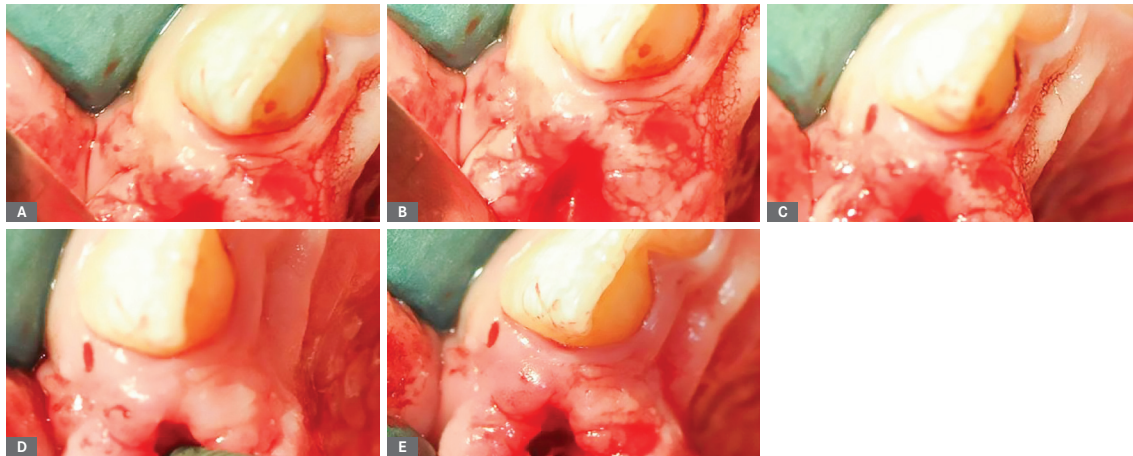




**Figure 3:** A) Dental element #12: confirmation of atrophy level in the vestibulopalatine direction, with width of 1.7mm and height of 13.81mm. B) Dental element #11: confirmation of atrophy level in the vestibulopalatine direction, with width of 2.1mm and height of 15.37mm.

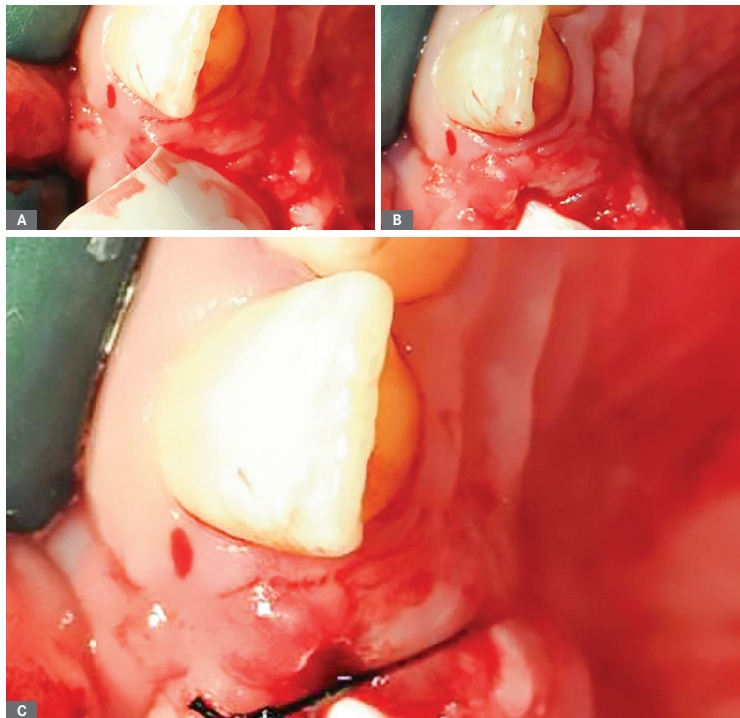


**Figure 4:** A) A broader flap was made to the bottom of the vestibule. B) Drilling with a very thin, 'U'-shaped spherical drill, until the bone marrow. C) Note the thickness of the bone in which the two-step expansion would be made. D) Replacement of the flap and suture.

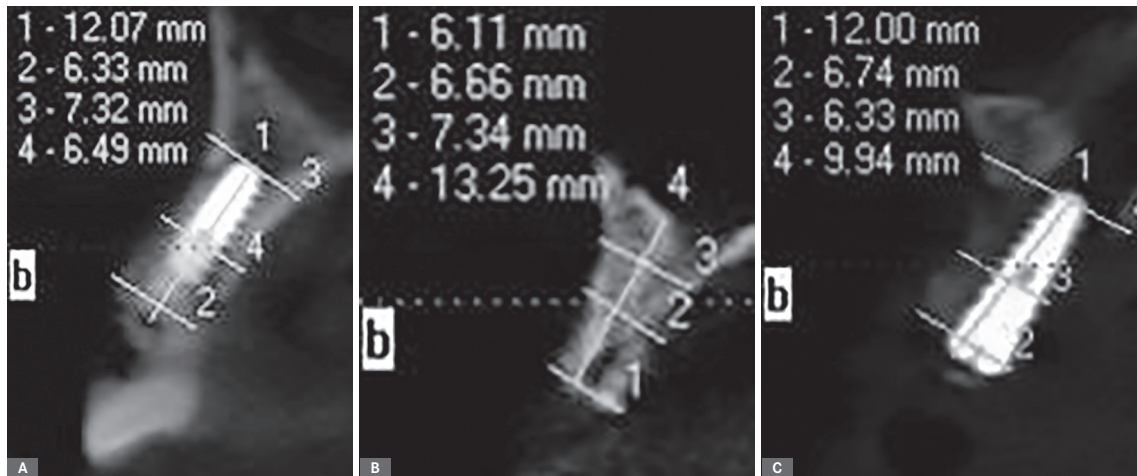


**Figure 5:** **A)** After 28 days, a flap was made in the ridge. **B)** A supracrestal perforation was performed, which can be performed with a very thin spherical drill or a scalpel blade. **C)** After drilling, the two bone plates were fractured. **D)** Immediately, two Cone Morse implants, with a diameter of 3.8mm, were installed. **E)** Implants positioned for installation of prosthetic parts in elements # 11 and # 12.

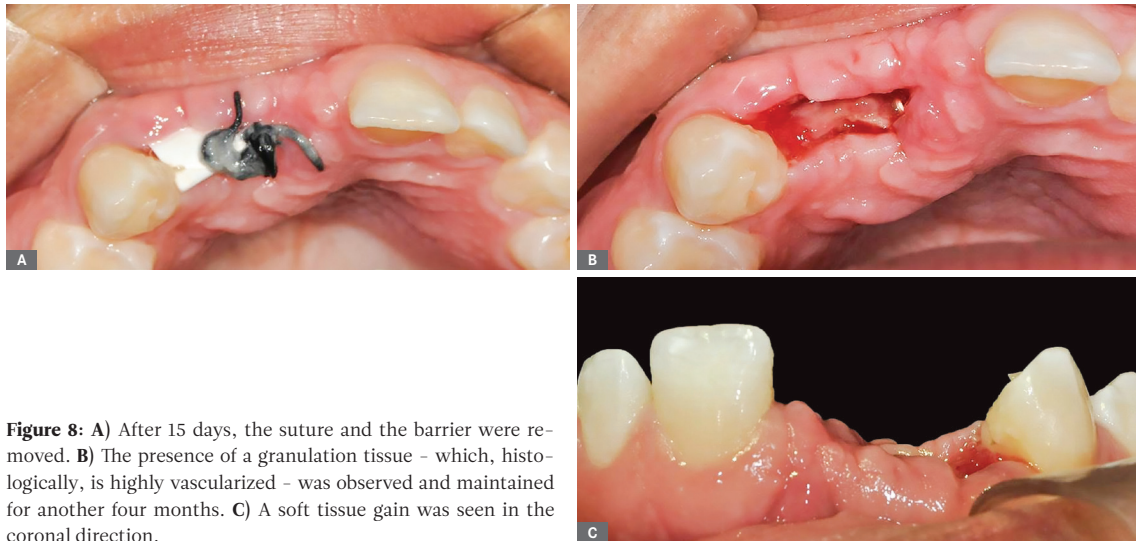
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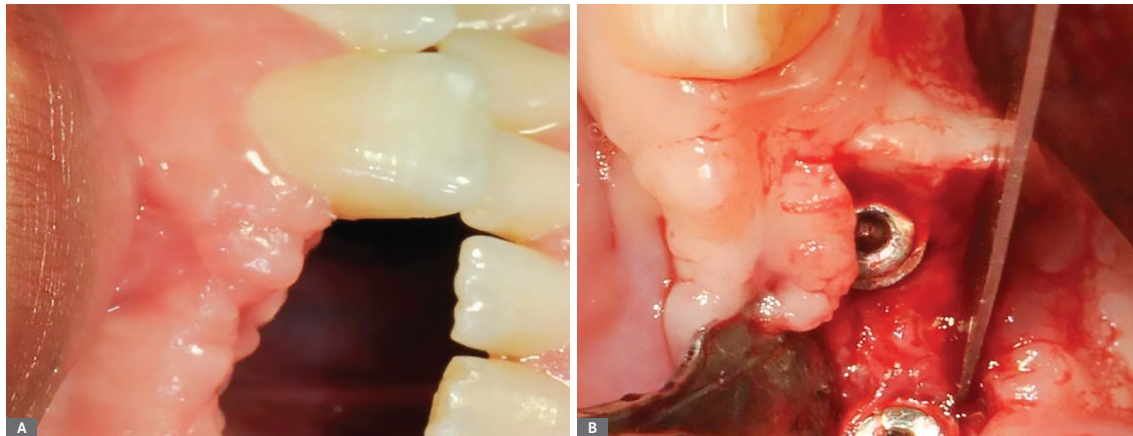
**Figure 6:** **A)** After implant placement, a polypropylene (Bone Heal®) barrier was positioned and fixed with simple sutures. **B)** This barrier was maintained (exposed) for 15 days in the mouth. **C)** The suture was performed without tension.



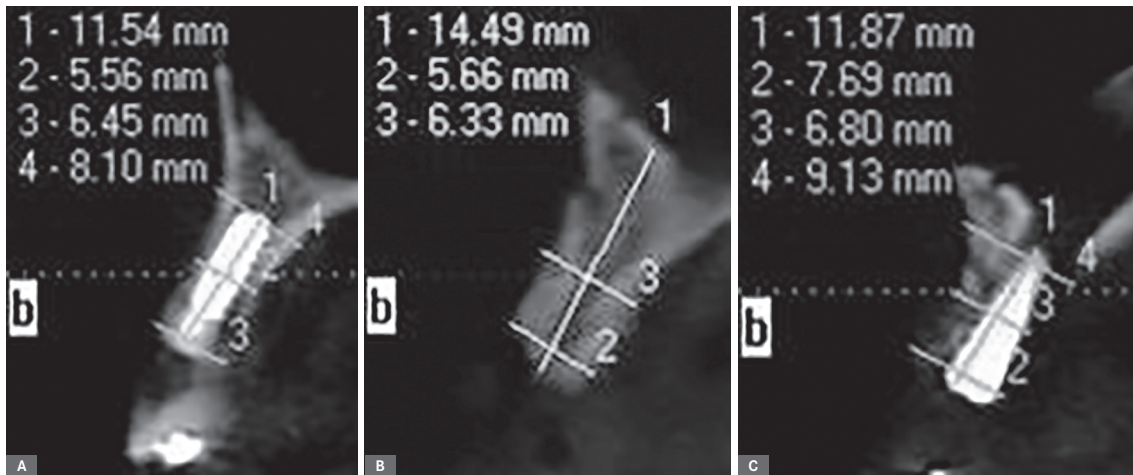
**Figure 7:** Immediately, a tomography was taken to evaluate the thickness obtained with surgery (A), in which the thickness gain (B) and the expansion that the fracture line provided (C) could be verified.



**Figure 8:** A) After 15 days, the suture and the barrier were removed. B) The presence of a granulation tissue - which, histologically, is highly vascularized - was observed and maintained for another four months. C) A soft tissue gain was seen in the coronal direction.



**Figure 9:** In the clinical evaluation after four months, we could observe: **A)** preservation of soft tissues; and **B)** neof ormation of the bone tissue and good gain in the thickness of the ridge.



**Figure 10:** **A)** Confirmation, by tomography, of the thickness gain and bone neof ormation of 6.45 mm, at the most coronal level. **B)** Tomography after four months, confirming the thickness of 6.11 mm, at the most coronal level. **C)** Thickness of 7.69 mm, at the most coronal level.



**Figure 11:** Case finished, with individual porcelain crowns in place.



**Figure 12:** Rehabilitation of element #11, with screwed crown, and element #12, with cemented crown.

## CONCLUSIONS

This case report demonstrates the effectiveness of the polypropylene barrier, which served as a framework for bone neof ormation and support of the implants installed, improving the three-dimensional aesthetics of the patient's right anterosuperior segment.

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