



## Minimally Invasive Aesthetic Area Tooth Removal Using Bioextractor® and Immediate Implant Placement with Provisionalization: Case Report

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### Abstract

The tooth removal promotes itself a chain of reaction, leading to bone remodeling and compression of the alveolar ridge. The technique used to extract can both increase or decrease the amount of bone loss, even more when in the anterior area of the maxilla. It is known that incisions and flap elevation associate with the use of traumatic devices, as elevators creates microfractures and loss of blood supply in the buccal plate, in the other hand, minimal traumatic approaches, using vertical extractors device and flapless technique can maintain the ridge architecture. If the minimally invasive technique is also associate with bone grafts, filling the gap between implant and buccal plate with low rate bone substitute and sub epithelial connective tissue graft to improve the amount of peri-implant soft tissue, the probability to achieve excellent aesthetic result is high. This case report an atraumatic approach to remove a fractured tooth in the aesthetic zone, using a new device to anchor and pull, vertically, the root, without compromising the adjacent tissue. In order to decrease the morbidity of the treatment, immediate implant placement was done. The gap between the implant and buccal plate was filled with hidroxiapatite, and the soft tissue amount increased with a connective tissue graft removed from the palate. After 180 days, the prosthetic fase could be realized without complication or need of any surgical complement.

**Keywords:** Tooth Extraction; Minimally Invasive Procedures; Oral Surgical Procedures; Dental Implant; Bone Graft

### Introduction

After tooth removal, both hard and soft tissue will present great resorption, diminishing the alveolar ridge volume. Some papers showed that in histological analysis is possible to observe intense osteoclastic activity happening in the buccal and palatal marginal bone, witch promote the bone remodeling and have the greater activity in the firsts months after the tooth removal. The buccal bone is more affected due to the lower amount of cortical volume, almost through and through bundle bone [1,2]. After 60 days period of wound healing, almost 25% loss is expected, vertically and horizontally [3]. Apart to the gingival biotipe, thick or thin, 51% of dimensional compression occurred in post extraction alveolar ridge in the firsts two weeks [4].

Conventional extraction techniques like the use of forceps, elevators and periostomes creates a bone expansion at first and lead to different trauma rates. Those Conventional approaches with flap release and osteotomy subserve the tooth removal [5]. The use of a flapless technique for tooth removal as a manner to avoid buccal bone loss can ensure lower rates of volumetric compression of the ridge, even in the adjacent teeth, witch could be involved in the incision design for the flap raise [6]. There is a significant diference between the healed marginal bone after flap and flapless procedures, showing lower rates of bone remodeling in the procedures with no incisions [7]. The immediate post extraction implantation is not guarantee of marginal ridge maintenance and similar resorption as occur in the clot healing is expected [8].

The alveolar ridge resorption could be minimized but not suppressed and not all filling biomaterials promote the neobone formation. Yet, alveolar ridge preservation diminish the need of bone augmentation after the healing time [9]. Xenografts is a predictable low cost biomaterial and have showed better results when compared to aloplastic fillers for the alveolar ridge preservation [10].

Several factors negatively contributes to the post extraction bone resorption as systemic condition and habits, position of the root in the ridge and area of the tooth, if posterior or anterior site, amount of involved teeth and the technique utilized for removal [5]. Alternative therapies as a mechanism of bone preservation are effective although need of a long time treatment and increase costs as orthodontic extrusion. Thus, trying to preserve the periodontal system many minimally traumatic extraction devices and surgical extrusion equipments have been developed [11]. The less trauma we cause the less bone we lose, and the use of alternative techniques, with flapless approaches associated to socket preservation prevent the marginal bone loss or minimize the bone remodeling and permit the installation of an implant besides guarantee sufficient soft and hard tissue to obtain aesthetic prosthetic result [12].

The immediate post extraction implant installation is predictable when evaluating the Osseointegration, presenting high rates of survival. Same cannot be found when comparing aesthetic result and ridge architecture maintenance, and a risk of 16% of gingival retraction occur. The need of adjuvant approaches for the gap filling and increase of soft tissue are essential for a good esthetic result.

**Case Report**

PSP, male, 56 years old, presenting commitment of tooth 11, with the indication for removal (Figure 1 and 2). Diagnosis based on cbct scan (Figure 3).



**Figure 1:** Initial clinical aspect.



**Figure 2:** Clinical view of dental fracture.



**Figure 3:** Tomography indicating the level of destruction of surrounding tissue.

Profilaxis was made with prescription of amoxicillin 2g and dexamethasone 4 mg both 01 hour before procedure.

Surgical site preparation with skin decontamination using clohrexidine 2% and mouth washing with clohrexidine 0,12% for one minute. Articaine 4% was used for the anesthesia.

Was chosen a flapless approach with a minimally traumatic extraction device to remove the root (Bioextractor® - Quinelato, Av. Pennwalt, 285, Distrito Industrial, Rio Claro, SP. Brazil CEP 13505-650). The initial carbide FG2 burr was used in the pulp channel, allowing to instal the 2 mm fixation screw with the support of a torquemeter. Was achieved the torque of 20 N.cm. The Bioextractor® was adapted adjusting the rubber coated flexible arms on tooth 12 and adjacent site of tooth 21. Following manufacturing instructions, the equipment was activated promoting the extraction (Figure 4). Curettage of the socket was done and any granulation tissue was removed, besides the bleeding was stimulated.

An 13 x 3.5 mm black fix profile (Figure 5) (Titanium fix, R. Profª Ana Isabel Barbosa, 207, Jardim Diamante, São José dos Campos, SP. Brazil CEP 12223-180) implant was installed following the



Figure 4: Tooth removed with the bioextractor®.



Figure 6: Filling the gap with lumina bone porous large®.

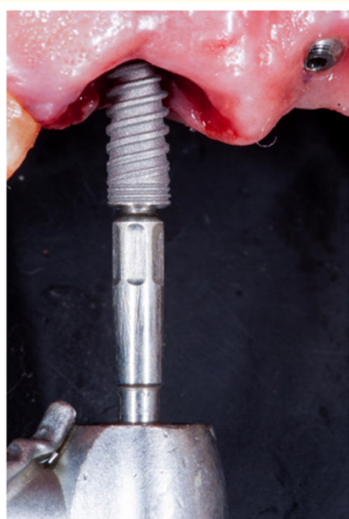


Figure 5: Implantation of the titanium fix black fix profile®.



Figure 7: Covering the graft with collagen membrane lumina coat double time®.



Figure 8: Sub epithelial connective graft removed from palate.

burr sequence, until 2.8 mm helicoidal burr, 40 N.cm torque was achieved and a 3.5 mm diameter with 4mm high healing cap was installed. Large granules of Demineralized bovine bone matrix (Figure 6) (Lumina Bone Porous® - Criteria Biomateriais, Rua Sebastião Sampaio Osório, 1063, São Carlos, SP. Brazil CEP 13563-320) associated with non reticulated collagen type 1 and 3 membrane (Figure 7) (Lumina Coat® - Criteria Biomateriais, Rua Sebastião Sampaio Osório, 1063, São Carlos, SP. Brazil CEP 13563-320) and sub epithelial connective tissue graft removed from palate was used in order to prevent bone resorption and marginal gingival migration (Figure 8).

The palatal incision where the graft was removed was closed using 5-0 polipropilen (Micropoli® - Microsutura Ind Com Imp Exp e Rep de Mat Cir LTDA, Rua Lavinio Salles Arcuri, 791, Casa Verde

Alta, SP. Brazil CEP 02564-000) in continuous suture. A Maryland bridge was made as provisionalisation.

Post operative control was made at day 3, 7, 15, 30 and 60. New tomography was made 180 days after first procedure (Figure 9) to initiate prosthetic treatment (Figure 10-12).





**Figure 9:** Orthopantomography 180 days after first procedure.



**Figure 10:** Clinical aspect of healed tissue after 180 days after first procedure.



**Figure 11:** Closer view of final restoration.



**Figure 12:** Final restoration in occlusion.

## Discussion

The tooth extraction is a routine procedure in the dental office and most of time is associate with local trauma, leading to ridge bone resorption, increased by open flap technique [1]. The minimal trauma showed in this case report is the main objective of the minimal invasive tooth removal device known as Bioextractor®, that apply a vertical force to remove the root without damaging the adjacent tissue and no need of flap elevation or periotomy.

The concept of ridge maintenance and soft tissue preservation is well documented in literature, differentiating the gingival phenotypes and different response after bone loss. In some cases are expected predictability in results, even in the aesthetic area [3]. The possibility of immediate implant after tooth extraction and the provisionalization, when the primary stability can be achieved, improves the results, even more when associate with xenograft, maintaining the volume in the buccal side [4]. The sub epithelial connective graft removed from the palate can be largely used in the anterior area of the maxilla, increasing the soft tissue volume and creating a favorable phenotype [3]. The immediate temporization of the implant supported prosthesis can preserve the natural architecture of the socket and is the best technique to maintain the papillae high [7].

## Conclusion

The authors can conclude, after the literature review and case reported, that the bioextractor® device maintain integrate the adjacent tissue. The device also facilitate the tooth removal, reducing the procedure length at the same time that preserve the buccal bone and soft tissue.

## Conflict of Interest

We have no conflicts of interest to disclose.

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