

## Autogenous Spilt Bone Block Technique for Maxillary Bone Augmentation

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### Abstract

The aim of the present case report was to demonstrate the vertical gain in the anterior maxilla utilizing the use of an autogenous bone block.

A 22-year-old female patient was referred with a previous history of loss of upper right central incisor during a failed attempt to remove an impacted super numerary in relation with it by her previous treating dentist, resulting in a reduced buccal-palatal bone thickness, loss of aesthetics, damage to the root apex of the upper right lateral incisor and compromise of the gingival margin of the anterior maxilla.

The use of autologous bone is considered the “gold-standard” in guided bone regeneration, however in 2007, Prof. Fouad Khoury introduced a new method for grafting ridge defects.

This technique involved using thin cortical plates harvested from the ramus, and in a ‘sandwich’ type manner, interposed these bone plates with cancellous bone harvested from the same site. The treatment plan consisted of an autologous bone block from retromolar area into the maxilla, which allows a predictable volumetric bone regeneration.

**Keywords:** *Autologous Bone; Bone Block; Guided Bone Regeneration; CBCT; Vertical Bone Augmentation; Implantology*

### Introduction

Extraction of a tooth often leads to alveolar defects, which may present a difficult challenge to overcome before the placement of implants, especially in the aesthetic zone.

Autogenous or autologous bone possesses osteoinductive, osteogenic, and osteoconductive properties, with a higher capacity of regeneration, when compared to other bone substitute materials.

Various donor sites are available for autologous bone extraction. When it comes to intraoral sites, the mandibular retromolar area is considered to be a preferable donor site, due to both the quality and the quantity of the bone. The bone extracted from such sites is thick and provides large grafts, suitable for vertical and horizontal augmentation. Autologous bone is still considered the “gold standard” for bone augmentation, especially in cases of large and/or severe bone defects.

### Case Report

Patient, female, aged 22 years was referred for anterior maxillary rehabilitation with a H/O loss of tooth # 8 in a failed attempt to remove an impacted supernumerary tooth in relation to it by the treating dentist.

Upon clinical examination and cone beam computed tomography (CBCT), missing # 8 with vertical and horizontal bone loss and distal tipping, non-vitality, apical root damage and recession in relation to tooth # 7 seen.

### Treatment plan

Extraction with tooth # 7, autogenous bone split block augmentation with teeth #8&#7. Delayed implant placement with #7 & #8.

Missing Tooth #8 with alveolar bone loss, Discoloured Teeth #9 #10 pre-existing RCT treatment that was done in another facility, Labially Tipped #7 with Recession seen (Figure 1-3).



Figure 1

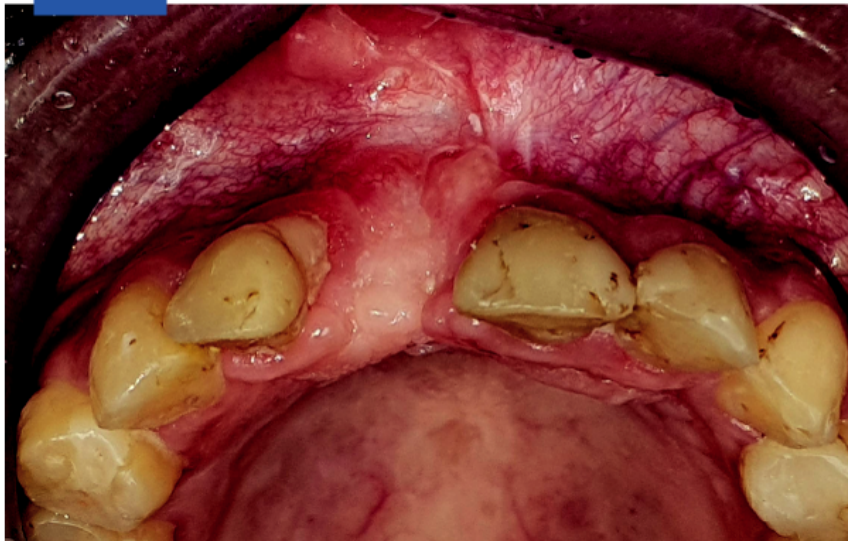


Figure 2



Figure 3

#### X-Ray, OPG and CBCT

On radiographic examination with teeth # 8 & # 7, vertical and horizontal bone loss with tooth # 8 apical root damage with tooth # 7 seen (Figure 4-7).



Figure 4

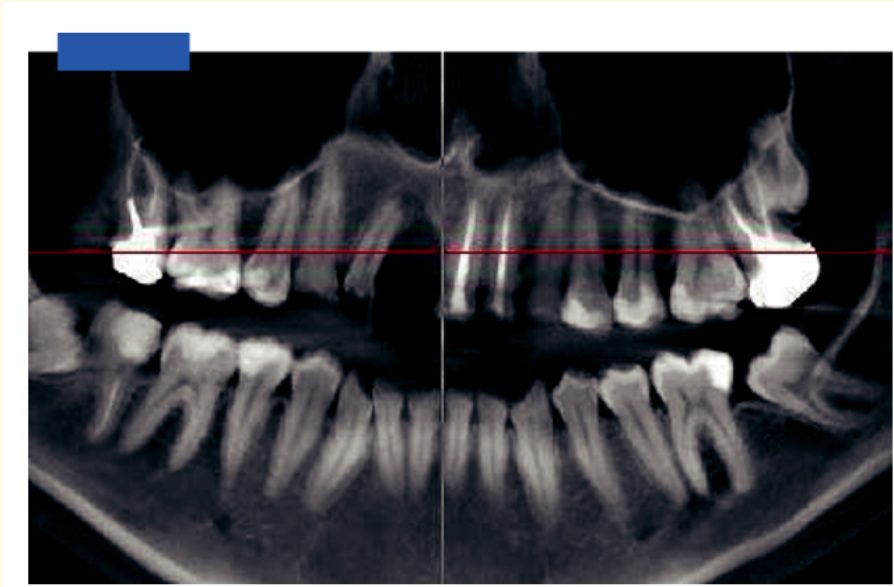


Figure 5

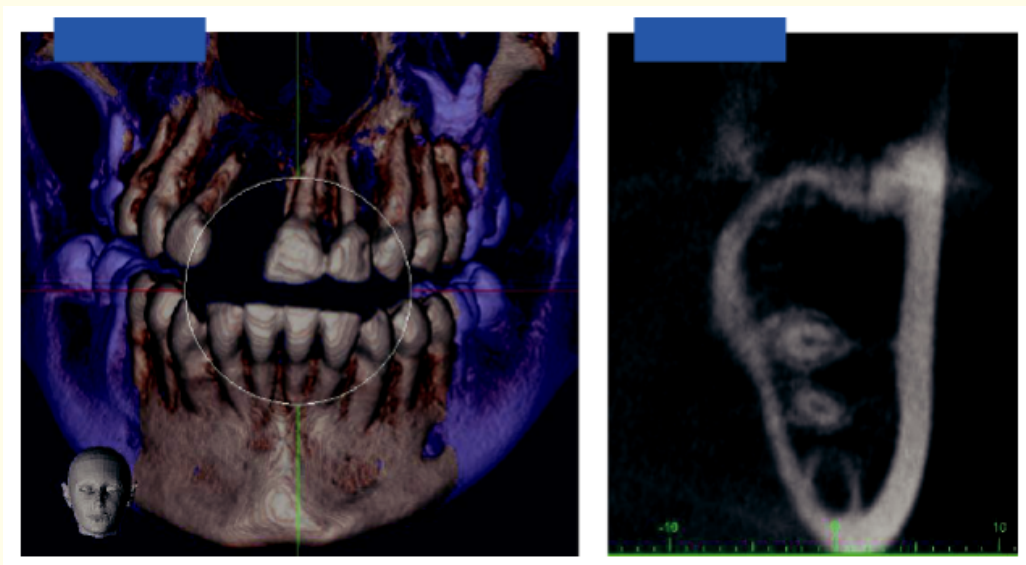


Figure 6

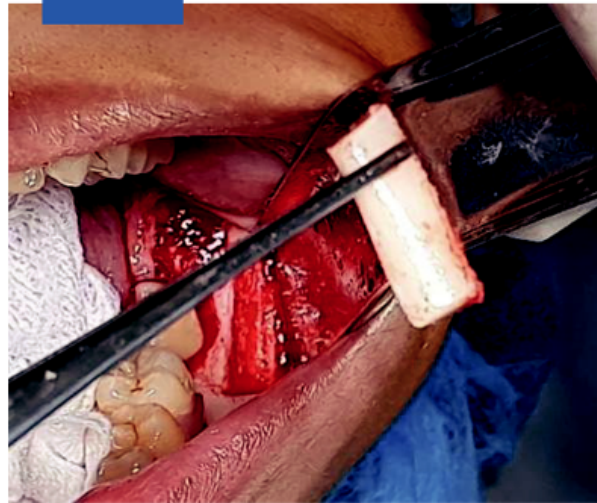
Figure 7

### Surgical procedure

Patient underwent a thorough session of oral hygiene instructions as well as ultrasonic debridement and rinsing for 2 minutes preoperatively with chlorhexidine mouthwash 0.2%. Preoperative antibiotic was prescribed, with amoxicillin + clavulanate 1g, one day prior to surgery. Antibiotics were continued for 10 days postoperatively at  $2 \times 1$  g/day. In the case of an amoxicillin allergy, clindamycin 300/600 mg will be prescribed.

The surgery was performed under local anaesthesia. Local vestibular and palatal/lingual infiltration with 4% Articaine and 1:100,000 epinephrine (Septanest - N) was administered at the bone donor site in the mandibular retromolar area as well at the recipient site in the anterior maxilla.

Bone blocks were harvested from the mandibular retromolar area using Piezo Surgery Unit. The dimension of the harvested block was determined by measuring the length of the area of reconstruction. The width had a minimum of 1 cm. The harvesting protocol included three osteotomies performed with the diamond disk: two proximo vertical made Piezo Surgery unit the final osteotomy, on the occlusal crestal site parallel to the external oblique ridge at the level of the crestal platform of the external oblique ridge, at a distance approximately 4 mm from the external border of the external oblique line and between the two vertical incisions, leading to an easy lateral dislocation of the bone block. The donor site was usually sealed with collagen fleece.



**Figure 8**

The harvested bone blocks were split longitudinally into two bone blocks with the diamond disk. The two blocks were scraped with a bone scraper until a thickness of approximately 1 mm.

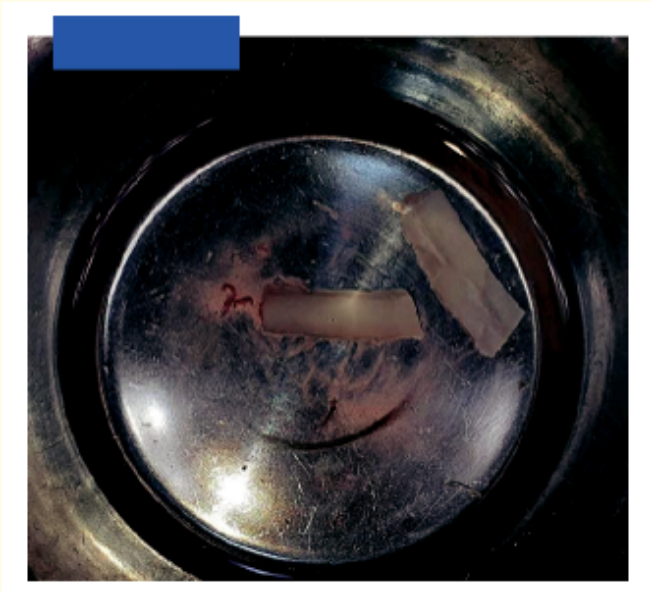


Figure 9

The bone scraper was used to harvest bone chips from the Doner Site.

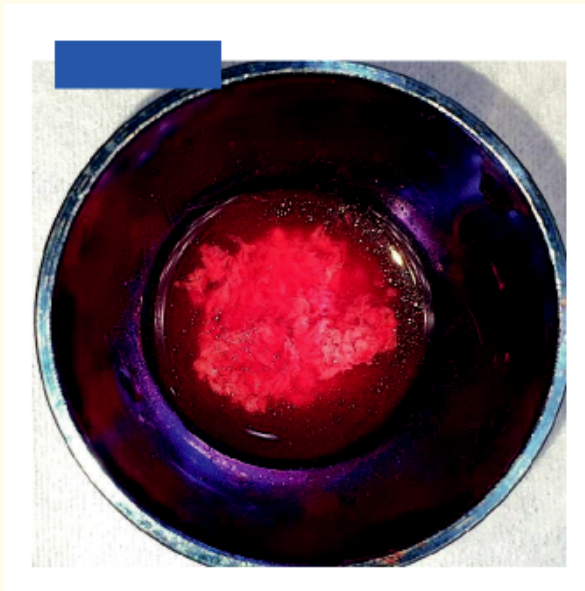


Figure 10

Extraction with #7 done



Figure 11



Figure 12

Mid crestal incision placed, full thickness flap elevated, ridge exposed and recipient site curated



Figure 13



Figure 14

This crestal block was stabilized in the planned position on the distance to the native alveolar crest with bone microscrews (Figure 15).

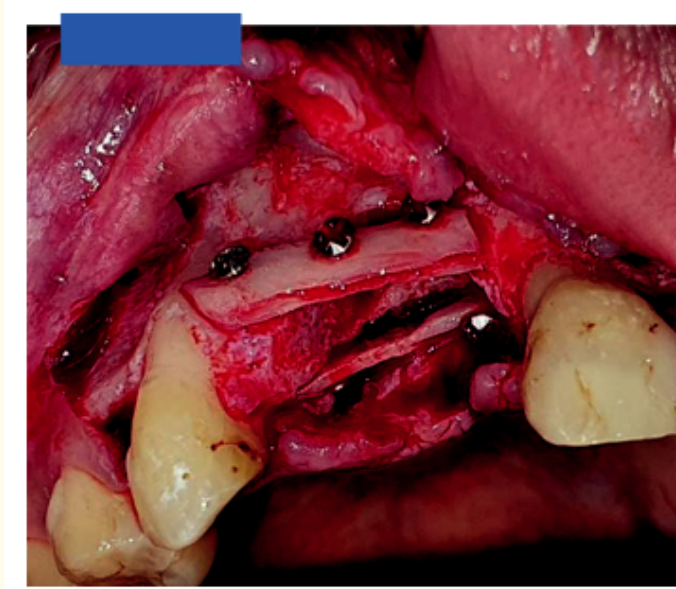


Figure 15

The space between the thin block and the alveolar crest was filled with autogenous bone chips and particulate bone (Figure 16 and 17).



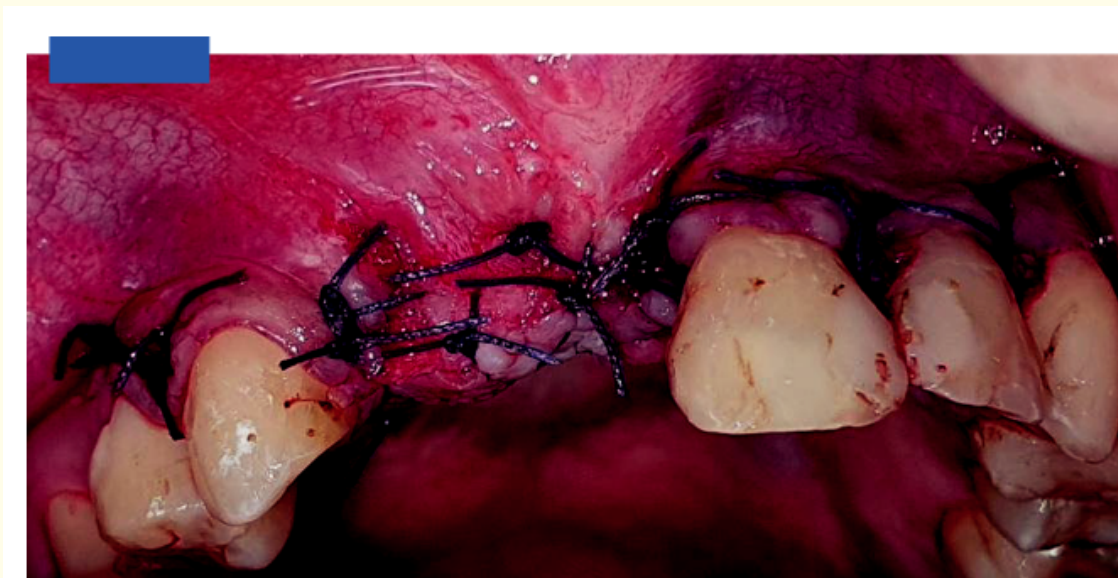
Figure 16





*Figure 17*

At the end, the vertical incision was closed in a single layer resorbable sutures.



*Figure 18*

6 months post operative



Figure 19



Figure 20

Six months after the grafting surgery, Site reopened, the screws were removed and the implants were inserted as planned. During this re-entry, the width of the augmented crest was measured and a good bone volume was seen (Figure 21-24).



Figure 21



Figure 22

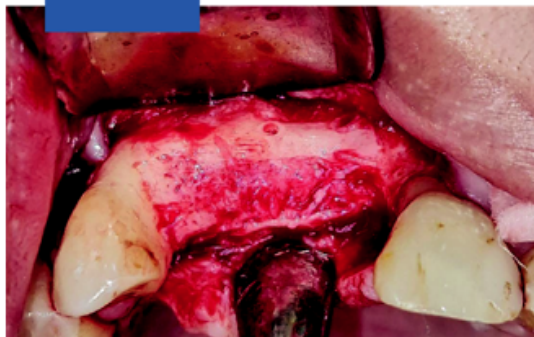


Figure 23



Figure 24

Implant osteotomy performed and implants where placed (Nobel Biocare Parallel design 3.75/13 mm with #7 and 3.75/10 mm with #10 placed) (Figure 25-27).



Figure 25

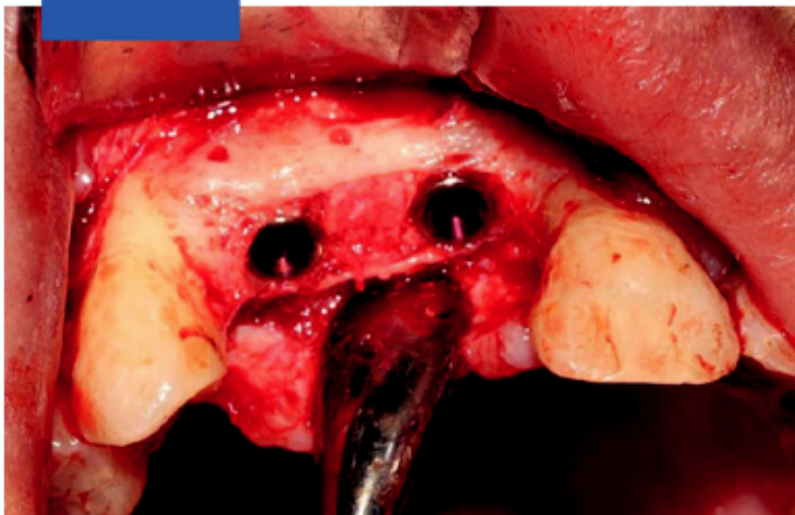


Figure 26

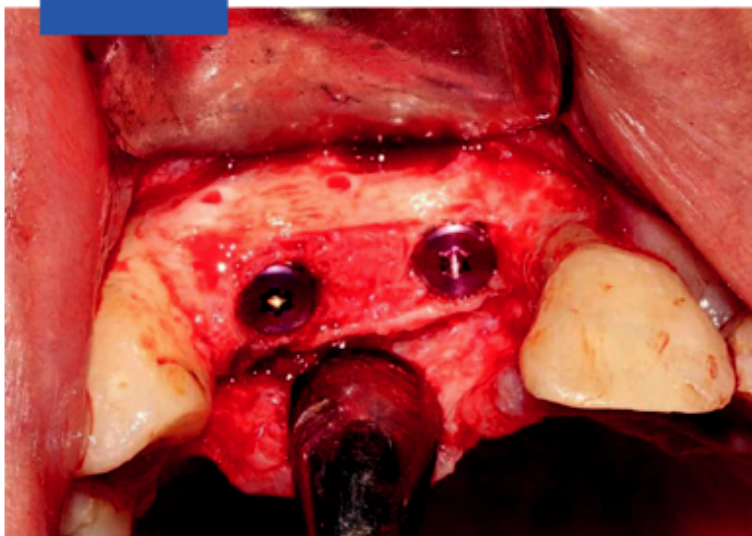


Figure 27

3 months post implants placement, Implants were exposed, Teeth #9 #10 which were already RCT treated prepared and impression made.



Figure 28

Final result



Figure 29

Final crowns seated in relation with #7 #8 #9 #10



Figure 30

End result



Figure 31

### Discussion

After the initial documentation, the first part of the surgery involved the exposure of the defect with a full thickness mucoperiosteal flap and measurement, facilitating the harvesting of bone.

Using the same method, the donor site was exposed, and an osteotomy was performed on the left retromolar region, to remove the bone block. Afterwards, haemostasis was achieved, and the donor site along with collagen fleece was sutured.

Due to the multi-dimensional defect present, the use of an autologous bone block was crucial, both to stabilize the grafting materials, as well as to ensure the maximum regenerative ability both vertically and in buccal-palatal thickness, thus confirming, that the use of autologous bone in large bone defects remains one of the best options for bone augmentation [1-7].

### Conclusion

The described vertical augmentation technique in the anterior maxilla performed according to the Khoury technique, uses a combination of thin autogenous bone blocks and bone particles allowing graft regeneration which in turn promotes 3D volumetric bone stability in the area of the vertically reconstructed anterior maxilla.

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