

## An Appendage to Alveolar Ridge Augmentation Using Allograft Bone Block – A Case Report

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### Abstract

Patients with insufficient width of ridge for implant rehabilitation can go for block grafting prior to implant placement. Block grafting gives volume for Guided bone regeneration along the ridge.

**Keywords:** Ridge augmentation, Block grafting, Titanium screws, Implants, Guided bone regeneration.

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### INTRODUCTION

Dental extraction many a time is ensued by bone remodeling process resulting in horizontal and vertical bone ridge reduction [1]. In cases where these ridges have been edentulous for a long time, insufficient residual bone volume may menace the optimal dental implant rehabilitation [2]. Hence, subsidiary surgical procedures may be executed to dispense the alveolar ridge with ample width and height to allow for the prosthetically driven implant placement. Therefore, several surgical techniques have been used to increase the residual bone volume, prior to or during implant placement [3]. Among these techniques, guided bone regeneration (GBR), ridge splitting, block graft (BG), or distraction osteogenesis remain the main methods to reconstruct atrophic ridges [4].

Autogenous bone is account to be the gold standard for grafting materials as it brings forth osteoconductive effects from growth factors contained in the graft [5]. For large autogenous grafts, intraoral and extra-oral donor sites have been used. These include the iliac crest, tibia, ramus and chin [4]. Harvest of autogenous bone from these sites requires a second surgery site and involves significant risk of neurological and vascular adverse events and post-surgery outcome [6]. Mandibular fracture has been reported during ramus and chin block grafting [7].

Allograft bone blocks (cortical or cancellous) are among one of the most foreseen procedures [8]. They can also be used in patients with congenitally missing tooth who may present with underdeveloped alveolar ridges [9].

Advantages are as follows:

- They do not require a second surgery for autogenous bone block.
- Quantity of bone block is not limited like in autogenous blocks.
- Discomfort and morbidity to the donor site are avoided.
- Therefore, it can be used as an alternative to autogenous bone which requires another surgery to harvest the graft and thus long chairside time.

### CASE REPORT

A 22year male patient reported to the department with a chief complaint of missing teeth in maxillary anterior region which he wanted to get replaced with an implant. On clinical examination deficient horizontal defect was seen with a depth of 4mm and width of 8mm, so it was determined that horizontal ridge augmentation was needed to allow implant placement in a desired position in this site.

The FDBA block graft was procured from the tissue bank of TATA Memorial Hospital, Mumbai. It was a corticocancellous bone block measuring 1 cm × 1 cm × 0.5 cm.

Mid-crestal incision with bilateral oblique releasing incisions was given in the maxillary anterior region at the implant site and full thickness mucoperiosteal flap was raised. Intra-marrow penetration was performed at the recipient site with 0.5-mm round bur. Intra-marrow penetration improves the blood supply to the graft from the trabecular bone blood vessels thereby accelerating revascularization. Surgical trauma also accelerates regional acceleratory phenomenon which results in 2–10 times faster healing [10].

The FDBA block graft after it was trimmed to the required dimensions and care was taken to round off any sharp border or edges was fixed to the recipient site with 1.5 mm diameter titanium screws. It was made sure that the block is seated properly to the recipient bone without any rocking movement and is having intimate contact with natural bone. The area between the block graft and recipient site and on the lateral aspects of the recipient site was filled with particulate graft.

Meanwhile, the patient's blood is withdrawn and was centrifuged at 3000rpm for 10 minutes for PRF preparation and it was placed over the graft and the area was sutured with 4.0 mersilk suture. The patient was given postoperative instructions and medications. The patient was advised to rinse with 0.12% chlorhexidene gluconate for a period of 14 days. Oral hygiene instructions were reinforced.



**Figure 1 – Preoperative View**



**Figure 2 – Measurement of Defect Depth**



**Figure 3 - Incision Design**



**Figure 4 – Reflection of the Flap**



**Figure 5 – Fdba Bone Graft**



**Figure 6 – Placement of Graft**



**Figure 7- Placement of PRF Membrane**



**Figure 8 – Suturing**



**Figure 9 – Post Operative 2 Weeks**

## DISCUSSION

For the management and augmentation of the deficient alveolar ridges osseous grafting is an entrenched treatment technique. Concurrent revascularization and substitution of the graft material with host bone are the requisites of successful bone regeneration. The pattern, rate, and quality of the new bone substitution are determined, in part, by complex reactions between the healing processes of the biological host and the nature of the graft material [11].

Allogenic bone block graft reduces the chairside time as compared with the gold standard autogenous grafts. Recent researches [13], confirm high success rates of using allogenic bone blocks. Esser *et al.*, [14] regarded FDBA allo blocks to be effective for the reconstructive pre-implant surgical site procedures in the alveolar ridge. Due to the osteo inductive and osteo conductive potential, allogenic grafts have proven

to be successful in terms of integration with the host bone.

Although clinical studies have proven the reliability of allografts, there is also concern about disease transmission which has not been ruled out [15]. A rigid fixation of the blocks is mandatory [16]. A movement of 10–20  $\mu\text{m}$  during the early stages of wound healing is enough to direct differentiation of mesenchymal cells into fibroblasts instead of osteoblasts [17], ultimately leading to failure of the allograft. To obtain the maximum stability of the graft, osteosynthesis screws should be screwed up to palatal cortical plate. Accuracy must also be taken into account during edge shaping to avoid soft tissue laceration. A study from Rothamel *et al.*, [18] showed that the pericardium membrane promoted the proliferation of human osteoblasts.

It would seem that cancellous block allografts may have some advantages over the cortical block grafts due to faster early wound healing. Controlled studies comparing cancellous block grafts with cortical block grafts in large enough samples to be statistically significant would be needed to determine the potential for utilization of cancellous block allografts in ridge augmentation procedures.

## CONCLUSION

From this case report it can be concluded that allogenic bone block graft can be successfully used for maxillary alveolar ridge augmentation. PRF provides slower release of growth factor and it has better healing properties. Therefore, it can be used with block graft for augmentation of ridge defect as it provides added benefits.

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