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Localised Ridge Augmentation with Mandibular Block Autograft: A Case Report

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Abstract

Background: Post extraction of teeth may result in various alveolar ridge defects, surgical interventions are required for long standing periodontal disease before doing any prosthetic rehabilitation. Reconstruction is always required because alveolar bone defects affect the prognosis of the dental implants. Although a wide variety of options have been invented recently the autogenous bone is still known as the gold standard and that produces promising results.

Patient Concerns: The patient gave a history of mobility for the past 6 months. Clinical examination revealed grade III and grade II mobility in 31,41 and 32,42respectively. Radiographic examination inferred horizontal and vertical ridgeresorption in 31,41 regions. **Treatment:** Hence, vertical and horizontal ridge resorption was augmented using autogenous block bone graft along with GBR (Fix Oss by Syner Heal Pharmaceuticals & Osseo graft by Advanced Biotech products [P] ltd) was done. In the present case, an autogenous bone block with resorbable membrane yielded predictable good results.

Keywords: Bone Resorption, Ridge Augmentation, Block Graft, Osseous regeneration, Guided Bone Regeneration.

Introduction

Reconstruction of alveolar ridge deficiencies requires bone augmentation before implant placement. The major causes of osseous defects include trauma, prolonged edentulous, congenital anomalies, periodontal disease, and infection, and these factors compromise the outcomes of prosthetic treatment.¹ Soft tissue and hard tissue augmentation procedures along with bone substitutes are used in order to reconstruct the lost bone structure prior to prosthetic replacement. Ridge augmentation techniques include the use of bone grafts, guided bone regeneration with bio-resorbable or nonresorbable membrane, alveolar distraction osteogenesis and ridge splitting.² Guided bone regeneration is a surgical procedure that uses barrier membranes with or without particulate bone grafts or/and bone substitutes. Osseous regeneration by GBR depends on the migration of pluripotential and osteogenic cells (e.g. osteoblasts derived from the periosteum and/or adjacent bone and/or bone marrow) to the bone defect site and exclusion of cells impeding bone formation (e.g. epithelial cells and fibroblasts).³

Autogenous bone grafts are considered to be the gold standard for bonetransplantation.⁴ The use of autogenous bone grafts with osseo-integrated implants originally was discussed by Bran mark and colleagues, who often used the iliac crest as the donor site. Other external donor sites include calvarium, rib, and tibia.⁵ For repair of most localised alveolar defects, however, block bone grafts from the symphysis and ramus buccal shelf offer advantages over iliac crest grafts, including close proximity of donor and recipient sites, convenient surgical access, decreased donor site morbidity, and

decreased cost.⁶ This article presents case report of localised ridge augmentation with mandibular block autograft and guided bone regeneration.

Case report

A 27 year old male reported to the dept of Periodontology, Meenakshi Ammal Dental College, Chennai for management of mobile teeth in his lower front teeth region. The patient gave a history of mobility for the past 6 months. The patient was in good health with non-contributory medical history.

Clinical examination revealed grade III and grade II mobility in 31,41 and 32,42 respectively (Figure 1a). Radiographic examination inferred horizontal and vertical ridge resorption in 31,41 regions (Figure 1b & 1c). Hence, vertical and horizontal ridge augmentation using autogenous block bone graft along with GBR (Fix Oss by Syner Heal Pharmaceuticals & Osseo graft by Advanced Biotech products [P] ltd) was planned.



Figure 1a: Clinical examination revealed grade III mobility in 31, 41 and grade II mobility in 32, 42.



Figure 1b: Shows CBCT of the mandibular arch



Figure 1c: Shows radiographic examination inferred horizontal and vertical bone loss extending to the apex irt 31, 41

Pre-surgical preparation

The patient was given a pre-procedural mouth rinse followed by scaling and root planing and oral hygiene instructions.

Surgical procedure

Surgical procedure was performed under proper aseptic precautions to keep the surgical site clean. The surgical procedure was initiated after adequate infiltration of a local anaesthesia (2% Lidocaine with 1:100,000 epinephrine). Full thickness mucoperiosteal flap was reflected to expose the alveolar bone (Figure 2). Extraction of 31 and 41 was done using mandibular anterior extraction forceps (Figure 3).



Figure 2: Full thickness mucoperiosteal flap was reflected to expose the alveolar bone.



Figure 3: Extraction of 31 and 41 was done using mandibular anterior extraction forceps.

Harvesting of chin graft

The donor site selected was mandibular symphysis region. The dimension of the block graft was outlined (Figure 4a) and following the connection of drill holes with fissure bur, the block graft of dimensions $6mm \times 10mm$ was mobilised(Figure 4b & 4c) and procured (Figure 4d). The bone block was slightly adapted to the defect site measuring $4mm \times 9mm$. The holes for the

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bone block fixation screw were made with a spiral drill.

A tenting screw of diameter 1.7 mm was used to stabilise the graft (Figure 5a & 5b). Voids around the block graft were filled with bone grafts (Fix Oss by Syner Heal Pharmaceuticals & Osseo graft by Advanced Biotech products [P] ltd). This mixture was applied to cover the applied block graft entirely (Figure 6a). The augmented site was further protected with a collagen membrane (Eucare PerioCol - GTR) using the doublelayer technique to improve membrane stability (Figure 6b). A tension-free primary wound closure was desired and wound adaptation was accomplished with simple interrupted sutures (Figure 7). The surgical site was covered with zinc oxideeugenol periodontal dressing.



Figure 4a: Outlined block graft dimension



Figure 4b & 4c: Connection of drill holes with fissure bur was done and block graft of dimensions ($6mm \times 10mm$) was mobilised.



Figure 4d: Bone block procured



Figure 5a: Autogenous bone block.



Figure 5b: Bone block adapted to the defect



Figure 6a: Donor block graft site filled with Allograft (Fix Oss by Syner Heal Pharmaceuticals & Osseo graft by Advanced Biotech products [P] ltd.



Figure 6b: Augmented site was further protected with a collagen membrane (Eucare PerioCol -GTR) using the double-layer technique to improve membrane stability.



Figure 7: Tension-free closure with simple interrupted sutures.

Post operative care

Peri-operative antibiotics and analgesics (Amoxicillin 500 mg t.d.s and Aceclofenac & Paracetamol b.d) were routinely practised for 5 days. Patients were also chlorhexidine digluconate (0.1%) for chemical plaque control. The patient was instructed not to brush in the surgical area. Patient was recalled for suture removal after 15 days. On review after 2 weeks (Figure 8a), the patient was found to be comfortable and well satisfied with the procedure. The patient was recalled after 2 months (Figure 8b). Healing was satisfactory. Temporary crown cementation (Figure 9) was done and Implant placement was planned after 6 months.



Figure 8a: 2 weeks Post operative.



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Figure 8b: 2 months Post operative.



Figure 9: Temporary crown cementation was done. **Discussion**

A variety of techniques have been employed till date for horizontal ridge augmentation including the use of numerous bone grafts, guided bone regeneration with resorbable and non-resorbable membranes and also with titanium mesh, ridge splitting, alveolar distraction osteogenesis and use of blockgraft.⁷ The space maintenance requirement for many of the intraoral bone augmentation procedures allows the correct cells to populate the regenerate zone. Osteo-induction involves the principle of converting pluripotential, mesenchymalderived cells along an osteoblast pathway with the subsequent formation of bone.8 This concept was established in 1965, with heterotopicossicle formation induced by the glycoprotein family of morphogens known as the bone morphogenetic proteins (BMPs). Although, a variety of bone grafting and bone substitute materials have been available now, intra membranous autogenous bone grafting remains gold standard till date due to its inherent osteogenic, osteoconductive and osteo-inductive properties.9 In the present case report, the reason behind selection of chin as the bone harvesting site was mainly because of ease of access to chin and was closer to recipient site making second

surgical site avoidable, along with that sufficient amount of cortico-cancellous nature of the symphyseal bone help in enhancing revascularizing property of the cancellous bone and mechanical support with rigidity of the cortical bone.

Despite the many advantages auto grafts offer in such procedures, there are certain limitations to be considered. Secondary surgical site, post-operative bleeding, nerve injury and fracture of the harvested bone grafts are some of the postoperative complications.¹⁰

Conclusion

Many techniques exist for effective bone augmentation. The approach largely depends on the extent of the defect and specific procedures to be performed for the implant reconstruction. It is most appropriate to use an evidenced-based approach when a treatment plan is being developed for bone augmentation cases.

In the present case, an autogenous bone block with resorbable membrane also yielded predictable results.

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