

Alveolar Ridge Augmentation Procedures Using Mandibular Autograft Prior to Implant Rehabilitation: A Case Report

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Abstract: Deformities in the upper or lower jaw can leave you with inadequate bone in which to place dental implants. This defect may have been caused by healing following extraction, periodontal disease, wearing dentures, developmental defects, injury or trauma. This case report describes about the hard tissue augmentation procedure with autogenous block bone graft from symphysis region. A Significant increase in bone height and bone width was observed.

Key words: Ridge Augmentation • Autogenous Block Bone Graft • Osseo Integration

INTRODUCTION

Osseous defects result from a variety of causes, such as periodontal infection, trauma and tooth loss. Reconstruction of alveolar ridge deficiency is often necessary before placement of implant. For prosthetic-driven dental implant therapy, reconstruction of the alveolar bone through a variety of regenerative surgical procedures has become predictable. Bone augmentation techniques can be used in extraction sockets, sinus lift augmentation procedures, vertical augmentation and horizontal augmentation. This case report describes about hard tissue augmentation to improve the ridge height and width before placement of implant. We augmented the height and width of the ridge using an autogenous bone graft involving the chin and lower border of the mandible. A significant increase in the ridge dimensions was achieved.

Advantages of Intraoral Harvested Block Bone from Mandibular Symphysis Region:

- Horizontal bone volume increases documented up to 7.5 when compared only up to 4.5mm increase documented with particulate GBR technique.
- Rapid Integration allows early re-entry for implant Placement often in 3 to 4 months compared to 6 to 9 months required for particulate GBR techniques.

- Optimal Bone Density for Implant Stability due to cortical nature of the graft
- Reliable space maintenance during healing ensures the shape; stability of block bone is retained without collapse.
- Local available donor sites avoid the need for extra oral autogenous bone sources

Classification of Ridge Defects: Soft/hard Tissue Defects: Seibert 1983 classified the various types of ridge loss into 3 classes [1]:

Class I: Buccolingual loss of tissue with normal ridge height in apicocoronal dimension

Class II: Apicocoronal loss of tissue with normal ridge width in a Buccolingual dimension

Class III: Combination Buccolingual and apicocoronal loss of tissue resulting in loss of normal height and width.

In 1985 Allen *et al.* [2] classified the ridges as to the depth of deformity in relation to the adjacent alveolar level, as:

- Mild: depth less than 3 mm
- Moderate: ranging from 3-6 mm
- Severe: More than 6 mm

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Hard Tissue Defects: Lekholm and Zarb [3]:

- Virtually intact alveolar ridge
- Minor resorption of alveolar ridge
- Advanced resorption of alveolar ridge to base of dental arch
- Initial resorption of base of dental arch
- Extreme resorption of base of dental arch

Misch and Judy [4]:

- Abundant bone
- Barely sufficient bone
- Compromised bone (C-h; Compromised height C- W: Compromised Width)
- Deficient bone

A Case Report: A 33 years old man reported with the chief complaint of replacement of missing left maxillary lateral incisor and canine (Fig. 1). History of presenting illness reveals the teeth was loss due to accident 2 years before. The Patient had a no contributory medical history.

Dental history reveals there was a spacing seen between 31 and 41. (Fig. 2) Pulp testing was done on the adjacent teeth to ensure no pre-existing pulpal necrosis. He was advised that if implant is the treatment of choice it requires multiple surgical treatments including augmentation of unfavourable ridges. For a symphysis graft the assessment of periodontal health, dental caries & endodontic health is assessed. Width and thickness of attached gingiva is assessed for better incision.

Radiographic Evaluation: The panoramic radiograph was taken and computerised tomography was also taken to access the bone height and bone width. There was a insufficient amount of bone height and bone width and there was a buccal bone defect (Fig. 3).

Surgical Procedure: Thorough scaling was done. The patient oral hygiene was good. The next stage of treatment was aimed at hard tissue ridge augmentation.. Under local anaesthesia (2% xylocaine with 1:80,000 adrenalin) two vertical releasing incision were made adjacent to the recipient area and full thickness flap was reflected at the facial site (Fig. 4).

Maxillary Region: Vestibular incisions were placed extending from 33-43 region (Fig. 4). Chin was de-gloved (intra-oral surgical exposure of the bony mandibular chin)



Fig. 1: Pre-Operative Recipient



Fig. 2: Mandibular symphysis donar site site



Fig. 3: Preoperative radiograph

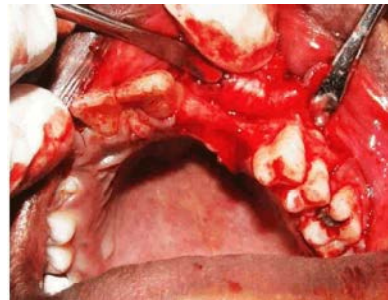


Fig. 4: Supracrestal incision done



Fig. 5: Crestal incision mucoperiosteal flap is reflected in is reflected in the mandibular region

till the inferior border of the mandible. Incision was also done in the 1-2 mm below the mucogingival junction to expose symphysis and mental foramina (Fig. 5).

Indications of Vestibular incisions for symphysis block graft harvest (Gapski 2001) [5].

- Periodontally compromised lower incisors
- Crown margins on lower incisors
- Deep Vestibule

Advantages: Least Potential for periodontal compromise

Disadvantages:

- More complicated suturing
- Increased Dehiscence
- Increased Bleeding
- Increased oedema

Reflection of soft tissues away from the anterior mandible is performed by blunt dissection below the periosteum. Elevation should be proceed until the mental foramina are located and inferior border of mandible is reached (Fig. 6).

For the symphysis graft the rule of “5’s” is assessed and performed in block harvest. The rule requires at least 5 mm of uninvolved bone is present beyond the proposed osteotomy margins of the block and the surrounding structures, providing a margin of safety to prevent potential morbidity. Pikos recommended that the block outline be 2mm larger than the target size to allow for contouring of the block after removal [6]. Osteotomy can be performed with a rotary bur. Osteotomies should penetrate the cortical layer with depth of each cut relative to the width of symphysis. Once cuts are complete, narrow chisels can be used to refine the outline of the block and begin to shear the cortico-cancellous block off of the underlying trabecular bed (Fig. 6) Care must be taken to the while releasing the block from the site.

After the block is removed the donar site is packed with absorbable collagen sponge to control blood. After the graft is removed the block grafts carefully trimmed and shaped to for the better adaption to the recipient site in 22 and 23 region. Care should be taken not to over reduce the block graft. The block graft is fixed on the recipient site with 2 fixation screws to ensure stability and anti rotation (Fig. 7, 8).

Use of at least two screws is recommended, since total immobility of the block graft during healing is a critical factor in successful bone integration [7]. Closure of the donar site and recipient with sutures are done (Fig. 9, 10).



Fig. 6: Bleeding site is exposed bone block harvesting & cortical bone began to shear off from underlying trabecular bed



Fig. 7 & Fig. 8: Block graft is fixed on the recipient with 2 fixation screws



Fig. 9 & Fig. 10: Sutures placed on both the maxillary and mandibular region



Fig. 11 & Fig. 12: Post operative photograph

Post-Operative Management: Post operative medication is aimed to control swelling, pain and infection. Prescription include NSAIDS and CORTICO STEROIDS with ANTIBIOTICS are given. The patients were asked to report after a week for review. Suture removal is done based on the healing (Fig. 11) Post operative photograph was also taken (Fig. 12). The Post –operative radiograph shows increase in bone height after augmentation.



Post operative Radiograph

DISCUSSION

Many different techniques are available for predictable bone augmentation. The approach is largely dependent upon the extent of the defect and specific procedures to be performed for the implant reconstruction.

Surgical techniques to enhance alveolar bone volume include:

- Grafting techniques
- Distraction osteogenesis,
- Bone splitting.
- Guided Bone Regeneration.

Although intraoral or extra oral harvesting procedures are possible, the intraoral sites have been preferred especially for the treatment of localized bone defects in partially edentulous jaws [8]. One main disadvantage of using autogenous bone grafts is the morbidity associated with the harvesting procedure. Intraorally, common donor sites include the chin and the area of the retromolar region in the mandible. However, intraoral harvesting procedures also have disadvantages, such as limited availability of bone grafts, complications including altered sensation of teeth, neurosensory disturbances, wound dehiscence and infection.

CONCLUSION

Alveolar ridge augmentation procedure prior to the implant placement improves bone volume and bone height. This technique will definitely improve the desired outcome and reduce post morbidity.

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