

Ridge Augmentation Using Autogenous Block Bone Graft Harvested From Mandibular Symphysis Region Followed By Implant Placement: A Case Report

Dhwani Ranveria^{1*} Shahir Mansuri² Nimisha Desai³ Tushar Makwana⁴

¹PG Student, Department of Oral and Maxillofacial Surgery, Karnavati School of Dentistry, Uvarsad, Gandhinagar, Gujarat, India.

²PG Student, Department of Oral and Maxillofacial Surgery, Karnavati School of Dentistry, Uvarsad, Gandhinagar, Gujarat, India.

³Professor and Head, Department of Oral and Maxillofacial Surgery, Karnavati School of Dentistry, Uvarsad, Gandhinagar, Gujarat, India.

⁴Professor, Department of Oral and Maxillofacial Surgery, Karnavati School of Dentistry, Uvarsad, Gandhinagar, Gujarat, India.

ABSTRACT

Background: Long term success of dental implant is primarily depend on the available bone. Severely resorbed alveolar ridge in aesthetic zone of maxilla can compromise the successful implant placement and aesthetic outcome. This study reports a case of severely deficient maxillary alveolar ridge being only 1.7 mm of bone width and implant site requires a hard tissue base foundation. To fulfill this requirement, mandibular symphysis block bone is used to improve bone width. After 6 months of the graft surgery 2.3 mm gain in bone width was noticed, implant was placed. Significant amounts of autogenous bone can be procured from symphysis region of the mandible. The cortical grafts of this area provide predictable increase in bone volume with a short healing time and yield a highly dense osseous architecture for implant placement. Block bone grafts harvested from the symphysis can be used for predictable bone augmentation up to 6 mm in horizontal and vertical dimensions. The range of this corticocancellous graft thickness is 3 to 11 mm with most sites providing 5 to 8 mm. Then density of the grafts is D-1 or D-2 and up to a three-tooth edentulous site can be grafted. This case report reveals the use and applicability of mandibular symphysis block bone to augment a horizontally deficient maxillary ridge for single dental implant placement.

Keywords: Bone, graft, atrophy, mandible, dental implant.

INTRODUCTION

Resorption of alveolar ridge is a common sequelae of tooth loss¹. It becomes a challenge for the dentist to restore esthetic and function. Various reconstruction techniques have been used (bone grafting, guided bone regeneration, orthognathic surgery or bone distraction) out of which autogenous block bone grafts are considered as gold standard in the repair of bone defects especially as a part of implant site development. Intraoral donor site for autogenous block bone graft are mandibular symphysis, ramus and residule ridge. Among the different available augmentation materials, only autologous bone combines osteoconductive, osteoinductive, and osteogenic characteristics

compared to bone substitute and composite materials^{2,3}. Because of its properties and absence of immunological reactions, autologous bone grafts have been considered as the "gold standard" and most effective material in bone regeneration procedures⁴⁻⁷. Implant placement in augmented areas have reported high success rate⁸.

This case report demonstrates the efficacy of using block bone graft harvested from symphysis region for dental implant placement in region of maxillary central incisor.

CASE REPORT

A 17 year old healthy male patient reported to our department with the chief complain of missing

Received: Oct. 17, 2018; Accepted: Jan. 10, 2019

*Correspondence Dr. Dhwani Ranveria.

Department of Oral and Maxillofacial Surgery, Karnavati School of Dentistry, Uvarsad, Gandhinagar, Gujarat, India.

Email: dhwaniranveria@gmail.com

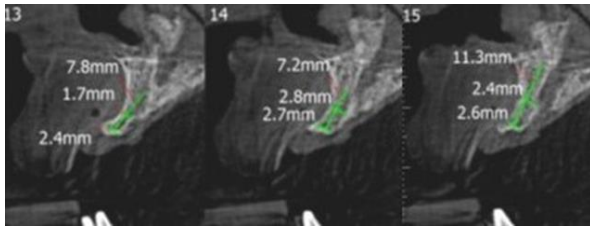


Fig 1: Pre-operative CBCT.



Fig 2: Vestibular incision.



Fig 3: Symphysis block bone graft.



Fig 4: Midcrestal incision.



Fig 5: Graft incision.



Fig 6: PRF placed.



Fig 7: Receptient site closure.

tooth in upper front teeth region since 7-8 years. Maxillary central and lateral incisors were lost following traumatic injury before 7-8 years.

IOPA of 11, 12 tooth region was taken which shows a small root stump in relation to 11 tooth region. On the same day root stump was extracted under local anesthesia.



Fig 8: Donor site closure.



Fig 9: PRF placed.



Fig 10: Maxillary occlusal radiograph.

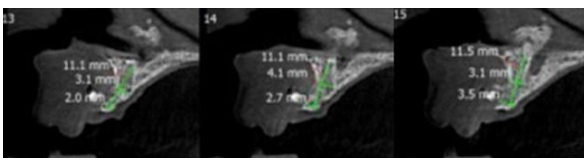


Fig 11: Post-operative CBCT.

The patient was given a detailed explanation pertaining to the present state, alternative treatment plans and the proposed treatment plan for replacement of missing tooth. Diagnostic cast was made and CBCT was advised. CBCT reveals only 1.7 mm bone width which is highly insufficient for implant placement (Figure 1).

A mandibular symphysis block autograft was planned for ridge augmentation and to facilitate implant placement.

Surgical procedure

Donore site

The surgical procedure was performed under local anesthesia. Access to symphysis area was done using vestibular approach. Horizontal incision was made 10 mm below mucogingival junction and extends to each mesial region of canines (Figure 2). Envelope flap was reflected. After exposing symphysis region... A 702L tapered fissure bur in a straight handpiece was used to penetrate the symphysis cortex via a series of holes that outline the graft. It is important not to encroach within 5 mm of the apices of the incisor and canine teeth and the mental neurovascular foramina. The inferior osteotomy is made no closer than 4 mm from the inferior border. All holes are connected to a depth of at least the full extent of the bur flutes, and 4 mm thick graft was harvested using bone osteotomes (Figure 3). The graft was placed in normal saline before contouring and fixation. The donor site was then packed with gauze soaked in saline.

Receipient site

Midcrestal incision with bilateral oblique releasing incisions was made and a full-thickness mucoperiosteal flap was reflected (Figure 4). Decortication and perforations were made using 702L bur this allows for regional accleratory phenomenon to occur, which allows tissue healing two to ten times faster than normal physiologic healing. Graft fixation was done using 6 mm titanium screw (Figure 5). Before closure platelet rich fibrin was placed (Figure 6).

After graft fixation, closure of the donor site was conducted using 4-0 vicryl suture material (Figure 7). Suturing for vestibular incision is done in two levels:

1. The muscle is sutured first,
2. Followed by the mucosal tissue suturing.

Recipient site closure was done using 4-0 vicryl suture material (Figure 8).

Regular follow up was done.

Implant placement:

Six months after the graft surgery, increase in bone width is noticed. Full thickness mucoperiosteal flap was elevated. A 3.3*10 mm implant was placed and closure was done (Figure 9,10). Antibiotics and analgesics were prescribed. After one week suture removal was done. Two months after second surgery radiographs were taken which shows successful implant osteointegration. Follow up was done at regular interval.

DISCUSSION

Osseous defects occur as a result of trauma, prolonged edentulism, congenital anomalies, periodontal disease, and infection, traumatic tooth extraction and they often require hard and soft tissue reconstruction. Block bone grafts from the symphysis offers close proximity of donor and recipient sites, convenient surgical access, decreased donor site morbidity, and decreased cost⁹.

The use of bone graft for alveolar ridge augmentation is widely performed. Intraoral block bone graft surgery is a relatively new era in dental implants. Bone from the mandibular symphysis, retromolar area, mandibular ramus, and the maxillary tuberosity can be used for alveolar ridge augmentation¹⁰. Intraoral onlay bone block graft is a predictable operation with a high success rate for long-span augmentation, up to complete jaw augmentation or extensive bone reconstruction of the maxillary alveolar ridge.

Comparison of pre and post-operative CBCT revealed that there is increase in both width and height. Figure 1 slice 14 shows bone width 2.8 mm apically and bone height 7.2 mm, slice 13 shows bone width 1.7 mm. Figure 11 slice 14 shows bone width 4.1 mm and bone height 11.1 mm. slice 13 shows bone width 3.1 mm. There is increase in bone width of 1.3 mm in slice 14 and 1.4 mm in slice

13. Increase in bone width facilitate implant placement.

Thus, Esthetic and functional compromises in implant restorations can be prevented by ridge augmentation procedures which results in enhanced emergence profile for an implant supported restoration¹¹. A thorough clinical and radiological examination should be done in order to diagnose the exact quantity of bone loss and accordingly plan for various bone augmentation procedures. Autogenous bone grafts are recommended in bone augmentations prior to implant placement because of their osteogenic potential¹².

CONCLUSION

Successful implant placement can be achieved in atrophied maxillary anterior region by using autogenous block bone grafts harvested from mandibular symphysis region. Long term studies would however be required in order to guarantee the success of implant therapy in such atrophied regions.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

REFERENCES

1. Desai AJ, Thomas R, Tarun Kumar AB, Mehta DS. Current concepts and guidelines in chin graft harvesting: A literature review. *Int J Oral Health Sci* 2013; 3:16-25.
2. Andreas Sakkas, Frank Wilde, Marcus Heufelder¹, Karsten Winter and Alexander Schramm, Autogenous bone grafts in oral implantology—is it still a “gold standard”? A consecutive review of 279 patients with 456 clinical procedures. *International Journal of Implant Dentistry* 2017; 3:23
3. Galindo-Moreno P, Avila G, Fernández-Barbero JE, Mesa F, O'Valle-Ravassa F, Wang HL. Clinical and histologic comparison of two different composite grafts for sinus augmentation: a pilot clinical trial. *Clin Oral Implants Res.* 2008;19:755–9.

4. Chiapasco M, Zaniboni M, Rimondini L. Autogenous onlay bone grafts vs.alveolar distraction osteogenesis for the correction of vertically deficient edentulous ridges: a 2–4-year prospective study on humans. Clin Oral Implants Res. 2007;18:432–40.
5. Moses O, Nemcovsky CE, Langer Y, Tal H. Severely resorbed mandible treated with iliac crest autogenous bone graft and dental implants: 17-year follow-up. Int J Oral Maxillofac Implants. 2007;22:1017–21.
6. Zizelmann C, Schoen R, Metzger MC, Schmelzeisen R, Schramm A, Dott B, Bormann KH, Gellrich N-C. Bone formation after sinus augmentation with engineered bone. Clin Oral Implants Res. 2007;18:69–73.
7. Sbordon C, Toti P, Guidetti F, Califano L, Pannone G, Sbordon L. Volumetric changes after sinus augmentation using blocks of autogenous iliac bone or freeze-dried allogeneic bone. A non-randomized study. J Craniomaxillofac Surg. 2014;42:113–8.
8. Prabhakara Rao KV, Pagadala S. Localized ridge augmentation using autogenous block bone graft followed by dental implant placement. J Orofac Sci 2012; 4:148-52.
9. Michael A. Pikos, Mandibular Block Autografts for Alveolar Ridge Augmentation, Atlas Oral Maxillofacial Surg Clin N Am 2005;13: 91–107
10. Deborah Schwartz-Arad and Liran Levin, Intraoral Autogenous Block Onlay Bone Grafting for Extensive Reconstruction of Atrophic Maxillary Alveolar Ridges Journal of Periodontology .2005; 76: 636-41.
11. K Harshakumar, Neenu Mary Varghese, R Ravichandran, S. Lylajam. "Alveolar Ridge Augmentation using Autogenous Block Bone Grafts Harvested From Mandibular Ramus to Facilitate Implant Placement: A Case Report". Int J Sci Stud.2014; 2: 46-50.
12. Gerry M. Raghoobar, Rutger H.K. Batenburg, Arjan Vissink, Augmentation of Localized Defects of the Anterior Maxillary Ridge with Autogenous Bone Before Insertion of Implants, J Oral Maxillofacial Surgery, 1996,54:1180-85.