

DENTAL IMPLANT PLACEMENT IN A CASE OF ALVEOLAR RIDGE DEFECT AUGMENTED BY AUTOGENOUS CHIN GRAFT

¹Lt Col Satisha TS, ²Lt Col Manab Kosala, ³Col M Panwar, ⁴Col AK Jha

¹Graded Specialist (Periodontics), ²Assoc Prof AFMC, ³Assoc Prof AFMC, ⁴Officer Commanding, MDC Barielly

¹15 Corps Dental Unit

¹ BB Cantt, Srinagar - 190004

Abstract: Loss of teeth causes many problems including psychological trauma and social stigma to young individuals. Trauma is one of the major loss of anterior permanent dentition. Rehabilitation of such defects involves placement of dental implants to support the fixed prosthesis. The placement of dental implants is often limited by unfavorable bone due to loss of teeth, extraction due to trauma, which eventually poses difficulty for the placement of implant in appropriate position to accept a reasonable prosthetic option. To place an implant in these cases, implant site needs to be prepared in both horizontal and vertical dimensions. This case report presents successful management of a deficient bone in the upper anterior teeth by harvesting autogenous chin graft and immediate loading implant placement in a second stage.

IndexTerms - Dental Implant, Alveolar Ridge Defect, Autogenous, Block Graft

I. INTRODUCTION

Adequate bone volume is essential for placing dental implant which is often reduced due to trauma, pathology, periodontal disease, and tooth loss. (Wiens JP 1992) Numerous bone grafts and graft substitute materials are available in the market for use in regenerative periodontics. However, autogenous bone, serves best possible to achieve predictable results and has been documented to be highly effective in reconstructing jaw anatomy, restoring aesthetic and providing mechanical support for the placement of dental implants (Misch CM, 1992). The use of block autografts is indicated primarily when an increase in ridge volume both horizontal and vertical dimensions is desired for implant site development. The management of such cases involves 2-staged surgery, where in the first stage is developing the implant site and the second stage involves implant placement after a period of 5-6 month healing and graft uptake. This staged technique using Autogenous bone block harvested at the time of surgery is the most frequently used grafting technique because of its general clinical success and predictability in implant site development (Buser D, 1999 & Palmer 1994). Success rates for dental implants placed in augmented areas have been reported to be similar to implants placed in normal bone. The case presented in this article clinically demonstrates the efficacy of using a block graft for immediate loading dental implant placement.

II. CASE REPORT

A male 22 year old patient reported with a chief complaint of missing upper front teeth. Upon eliciting the history, patient sustained a fall from motor bike around 01 year back and broke 02 teeth. He visited a local dentist and surgical extraction of the teeth were carried out. The patient had a non-contributory medical history. On intraoral examination, all the complement of teeth were present with missing upper right lateral incisor and canine. Examination of the defect on palpation revealed that the buccal plate was deficient(Fig-1). Ridge mapping was undertaken to assess the bony dimensions. the width of the bone was found to be only 3 mm wide in buccopalatal dimension which was insufficient for implant placement. The patient was presented with all options for rehabilitating the missing teeth including Fixed partial dentures but he opted for dental implants. A comprehensive treatment plan was formulated based on clinical and radiological findings which included implant site development using block graft harvest from patients own chin. Patient was informed about the procedure, possible complications of surgery and informed consent was taken.



Figure - 1 Patient Presentation

III. SURGICAL PHASE

3.1 Stage- 1 (Ridge Augmentation Using Autogenous Block Chin Graft)

Patient underwent routine hematological and biochemical investigations and values were found to be within normal limits. Patient was prepared for the surgery. Pre-op Rinses of Chlorhexidine 0.12% was done for 1 minute and extra-oral application of Betadine was carried out. The surgery was planned in 02 phases, first involving recipient bed preparation followed by harvest of chin graft and placing it in the deficient ridge. Adequate Local anesthesia was achieved using lignocaine 2 % with (1:80,000) Adrenaline in both sites. Mucoperiosteal flap was elevated following the mid crestal incision in edentulous area and extending the incision to adjacent teeth by giving intracrevicular incision. Then the defect was visualized and the bone mapping readings were confirmed. A Surgical template was made from aluminum foil, to mark the dimensions needed for block harvest. In the donor area, a vestibular incision was placed in the symphysis region after locating the mental foramina. A Ultrasonic piezotome (EMS) was used to outline a rectangle of the required size of the harvest.using the template as a guide. The superior aspect of the rectangle was 3 mm below the tooth apex, and the integrity of the lower border of the mandible was maintained. Laterally, the osteotomy performed was ≥ 5 mm anterior to the mental foramina. Chisels were used finally to free the block graft.

The closure of the donor site was done following placement the Hydroxyapatite bone substitute material in the area. After trimming the sharp borders and to make the recipient site fresh by increasing blood supply, cortical perforations were done. the bone block was stabilized at the recipient site with the help of screw 1.2 X 15 mm micro screws. The remaining defect was filled with Hydroxyapatite bone grafting material and a collagen barrier membrane was tucked inside the palatal and the buccal flap to completely cover the bone graft. A periosteal releasing incision was placed at the flap to adequately mobilise the flap to achieve primary closure. The recipient site was sutured. Post operative antibiotic and analgesics were prescribed. Oral hygiene instructions were reinforced. The healing period of six months was given for adequate bone remodeling.



Figure - 2 Ridge Augmentation using Chin Block Graft



Figure -3 Pre & Post Augmentation results

3.2 Stage - 2 (Implant Placement with Immediate Loading)

The patient was recalled on regular interval and an IOPA radiographs was taken to confirm the uptake of the graft. At 06 months bone mapping was done and confirmation of increase in bone width. Following this the patient was taken up for implant placement. After achieving optimal local anesthesia, Careful palpation of the screws were done from the buccal side and marked with a probe. With the help of small nick with a blade, the screws were taken out using a surgical screw driver. With the help of a prefabricated stent

exact position of the implants in desired location. Endosseous implants of 3.7 mm × 10mm and 4.5 X 10 mm (Hi-tech Implants) were inserted using a transmucosal flapless technique. Primary stability of implants were assessed. Radiographs confirmed the satisfactory position of the implants. Immediately after the surgery an impression was made and a prosthetic Temporization; was fabricated and inserted within the next one hour providing optimal and satisfactory results.



Figure- 4 Implant placement with immediate loading

IV. DISCUSSION

Dental implants have revolutionized the provision of dental treatment. The use of dental implants to support restorations enhancing the patient's quality of life (Bowen CG, 2015). The placement of dental implants needs availability of adequate bone volume in horizontal and vertical dimensions. Deficient bone presenting as ridge deformity can be severe if there is damage to the buccal cortical plate in cases of tooth extraction following trauma and the natural bone modeling and remodeling that occurs during healing following tooth extraction, the possibility of placing dental implants can often only be created with the implementation of reconstructive ridge augmentation procedures, which allow for adequate development of the future implant site. These augmentation procedures may enable implant fixture installation to satisfy the biological, functional, and aesthetic needs of the restoration. The autogenous bone can be harvested from intra as well as extra-oral sites. Intraoral sources include maxillary tuberosity, a healed edentulous area, lower retromolar/ramus, exostoses/tori, as well as other locations. Intraoral sources are a more practical alternative when compared with extraoral areas. The main advantages of autogenous grafts are their osteogenic, osteoinductive and osteoconductive capabilities. Because of these qualities, autogenous grafts are considered by many to be the gold standard for bone regeneration (Lundquist, 2004).



Successful bone regeneration requires a concurrent vascularization and integration of the bone block which is aided by the help of cortical perforations. The pattern, rate, and quality of 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. Application of collagen membrane makes the procedure more predictable as it allows the selective re-population of the cells by confining the defect and grafts and prevents epithelial migration. This technique of Guided bone regeneration has a success rate of 93% [Benic GI, 2014]

Compared to extra oral sites the intra oral sites have no cutaneous scarring, minimal discomfort, and less morbidity. When extensive resorption occurs, or when there is a need for further bone augmentation in another area, combination approach is best utilised and important for the operator to understand the mechanism of bone reformation in the donor site. (Schwartz, 2009). Graft stability and donor site morbidity are clinical concerns associated with autogenous grafting procedures. No complications were encountered in this case while following up.

Membranous grafts have shown less resorption than endochondral bone grafts, which suggests that intraoral donor sites may provide an advantage in harvesting block grafts for augmentation of the alveolar ridge, and they can be easily accessed in an office setting. [9] Survival of dental implants in grafted bone is similar to that of placed in non grafted bone. (Tran DT, 2016) Although the technique of seems simple, a patient centric multidisciplinary team approach will yield best possible results.

V. CONCLUSION

Successful immediate loading implant placement can be achieved in deformed maxillary anterior region by using block autografts taken from mandibular symphysis region in staged procedures. The application of autogenous bone grafts shows a promising results, as the bone can be harvested from the same patient and significantly reduces the cost with predictable results.

REFERENCES

- [1] Benic GI, Hämmerle CHF: Horizontal bone augmentation by means of guided bone regeneration. *Periodontol* 2000, 2014 Oct; 66(1):13–40.
- [2] Boven GC, Raghoobar GM, Vissink A, Meijer HJ: Improving masticatory performance, bite force, nutritional state and patient's satisfaction with implant overdentures: a systematic review of the literature. *J Oral Rehabil* 2015;42 (3):220–233.
- [3] Buser D, Dula K, Belser U, Hirt HP, Berthold H. Localized ridge augmentation using guided bone regeneration for surgical procedure in the maxilla. *Int J Periodontics Restorative Dent* 1993;13:29-45.
- [4] Leonetti JA, Koup R. Localized maxillary ridge augmentation with a block allograft for dental implant placement: Case reports. *Implant Dent* 2003;12:217-26.
- [5] Misch CM, Misch CE, Resnik RR, Ismail YH. Reconstruction of maxillary alveolar defects with mandibular symphysis grafts for dental implants: A preliminary procedural report. *Int J Oral Maxillofac Implants* 1992;7:360-6.
- [6] Palmer RM, Floyd PD, Palmer PJ, Smith BJ, Johansson CB, Albrektsson T. Healing of implant dehiscence defects with and without expanded polytetrafluoroethylene membranes: A controlled clinical and histological study. *Clin Oral Implants Res* 1994;5:98-104
- [7] Schwartz-Arad D, Levin L. Symphysis revisited: Clinical and histologic evaluation of newly formed bone and reharvesting potential of previously used symphysial donor sites for onlay bone grafting. *J Periodontol* 2009;80:865-9.
- [8] Simion M, Fontana F: Autogenous and xenogeneic bone grafts for the boneregeneration. A literature review. *Minerva Stomatologica* 2004;53(5):191–206.
- [9] Tran DT, Gay IC, Diaz-Rodriguez J, Parthasarathy K, Weltman R, Friedman L. Survival of Dental Implants Placed in Grafted and Nongrafted Bone: A Retrospective Study in a University Setting. *Int J Oral Maxillofac Implants*. 2016 Mar-Apr;31(2):310-7.
- [10] Wiens JP. The use of osseointegrated implants in the treatment of patients with trauma. *J Prosthet Dent* 1992;67:670-8.