



## Autogenous Bone Graft from Mandibular Symphysis as Donor Site

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### Abstract

Patient at certain ages of their life loose tooth due to alveolar bone loss, caused by trauma, tooth extraction or periodontal diseases. The loss of width of alveolar ridge makes difficulty in placement of fixed appliances. The solution of such situations lies in re-establishment of ridge height consistent with prosthetic design and with suitable load bearing lamellar bone. here, we report the successful management of such condition where placement of bone block obtained from mandibular symphysis region. Despite recent advances in bone graft and bone substitute technology the autogenous bone graft continue to represent the 'gold standard' in reconstructive surgery. The mandibular symphysis a favourable donor site as it has excellent risk-benefit ratio.

**Keywords:** Autogenous Bone Graft; Mandibular Symphysis; Donor Site

### Introduction

Trauma, pathology, periodontal disease are some factors causing early tooth loss diminishing the availability of the adequate alveolar bone for prosthesis affecting the esthetics. Autogenous grafts are being widely used and documented proving their effectiveness in restoring the defects providing good esthetics, bio-mechanical support for implants and prosthesis. The use of block autografts is indicated primarily when an increase in ridge volume is desired, especially as part of implant site development [1].

The ridge augmentation procedure, designed to reconstruct the alveolar ridge defects were introduced in dental profession between 1971 to 1985 [2-4]. For implantation of prosthesis a watch period of approx 6 months is given for healing regardless of the donor site and the size.

A high survival rate have been reported in the intraoral autogenous grafted sites particularly from the mandibular symphysis

region than endochondral bone graft as it provides good bone quality, less resorption rate and shorter healing period. However some post operative complications are also associated as size and shape of the graft, increased operating time and donor site morbidity. The cases presented in this article will be demonstrating the efficacy of symphyseal bone graft in ridge augmentation in maxillary central incisors.

### Case Report

A 25-year-old male patient reported to Oral and Maxillofacial Surgery Department of PDM Dental college and research institute, Bahadurgarh, Haryana with chief complaint of missing left maxillary central incisor from past 4 years and requested for replacement of his missing tooth with fixed appliance. Complete medical history of the patient was taken which was noncontributory. Blood investigations including (Hb, BT, CT, RBS) was done to overrule any systemic findings. Intraoral examination was done and it showed that there was missing left maxillary central incisor [21].

Intraoral periapical and Orthopantomogram radiographs were taken to make the radiographic investigations. (Figure 1). Examination of the radiographs ensure that a bone block harvest and fixation of the desired thickness and size will not encroach on surrounding vital structures including the mental foramina (including anterior loops), inferior alveolar nerve (including mental foramen), the apices of the mandibular incisors and canines, the inferior border of the mandible [5]. With the help of alginate impression material maxillary and mandibular arch impression was made to obtain diagnostic cast.



Figure 1: OPG.

The option of treatment was explained to patient and the patient chose rehabilitation with dental implant, for that amount of alveolar bone needed. A mandibular symphysis block autograft was planned with ridge augmentation in left maxillary central incisor region.

**Surgical procedure**

The patient was prepared and Infraorbital nerve block was given in upper left quadrant and right side was infiltrated. Sulcular incision was given with 2 vertical release incisions at recipient site. A full thickness mucoperiosteal flap was elevated on labial aspect. Receiving bed was prepared by making grooves in buccal cortical plate (Figure 2 and 3).

Inferior alveolar nerve block and mental nerve block was given on both sides of lower arch. Trapezoidal incision was placed from canine to canine with blade no 15 and a full thickness mucoperiosteal flap was elevated from donor site. Peizo Saw was used to out-



Figure 2: Deficient bone in left maxillary incisor region.



Figure 3: Exposed recipient site.

line a rectangle of required size (Figure 4). Superior aspect of rectangle was about 4-5 mm below tooth apex, and integrity of lower border of mandible was maintained. Laterally osteotomy was performed about 4 mm anterior to mental foramen. Osteotomes were used to free the bone block (Figure 5).



Figure 4: Donor site.



**Figure 5:** Removal of bone block.



**Figure 8:** Placement of suture at donor site.

After trimming the sharp borders and making the recipient site fresh with blood supply, bone block was stabilized with the help of screws (Figure 6). Recipient site was sutured with help of 3-0 BBS. Donor defect was filled with bone wax and sutured (Figure 7 and 8).

Amoxicillin 500mg thrice daily was prescribed for 5 days and Diclofenac sodium was prescribed thrice daily for 5 days. Patient was advised to maintain oral hygiene with chlorhexidine mouth wash. Patient was recalled after 7 days and healing was satisfactory (Figure 9 and 10).



**Figure 6:** Stabilization of the graft with screw.



**Figure 9:** Day 7 follow up.



**Figure 7:** Placement of suture at recipient site.



**Figure 10:** Day 7 follow-up.



## Discussion

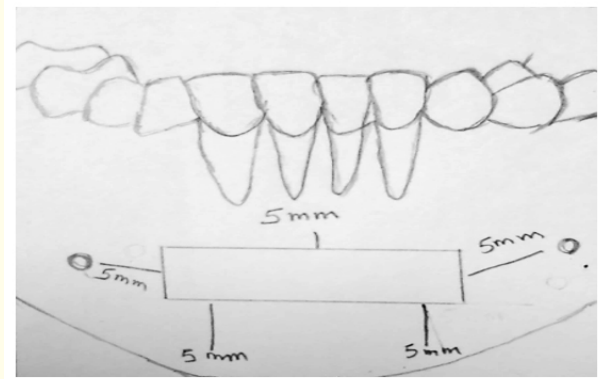
After tooth extraction patients have varying degrees of alveolar ridge resorption, this resorption can lead to compromise in placement of fixed appliances and implants. So bone augmentation is considered by using variable bone grafts. Augmentation at recipient site occurs through one or more of the following mechanisms-osteoconduction, osteoinduction and osteogenesis.

Bone grafts can be divided into following subtypes-autograft, allograft, xenograft and alloplast which can be used in solitary or in combination. Among the above mentioned, autograft has the advantage of retaining atleast some osteogenic cells and do not trigger an immune response. Autogenous grafts can be derived from iliac crest, rib, calvarian bone, chin, retromolar region and tibial bone. The symphysis/chin bone graft consists of cortical bone (66%), cancellous bone (36%) when compared to ramus of mandible which is mainly comprised of cortical bone.

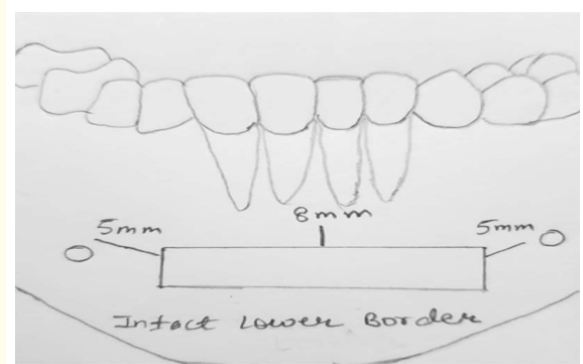
Bone from symphysis region is dense cortical D-1 (> 1250 HU) or 2 mm thick porous cortical D-2 (850-1250 HU) bone with coarse trabecular type density of bone for augmentation [15]. The maximum volume of bone block from mandibular symphysis is around (1- 1.5 cm) in height and around 4.0 cm in width centered at mid-line of mandible.

Misch in 1992 proposed a safe surgical technique to harvest a bone block graft from symphysis named "Rule of 5" which helps to prevent injury to neurovascular component of mandibular symphysis region. According to the theory- the bone cuts should be perpendicular to the cortex in a right angle to the vestibular plain of the symphysis. The superior cut should be 5 mm below root apices to prevent injury to tooth roots and MIC, the inferior cut should be 5 mm above the lower border and the vertical cuts should be atleast 5 mm away from the mental foramen. Depth of the cut should be at least through the outer cortex and to the opposite cortical plate to obtain monocortical graft [27] (Figure 11). Lingual cortex should not be perforated [14].

Also a modification was incorporated stating - depth of the bone graft should be 4 mm and the distance to the tooth apices should be kept at least 8 mm. The lower border should be kept intact with the 5 mm safety distance from the mental foramen [28]. (Figure 12).



**Figure 11:** Rule of 5.



**Figure 12:** Modification in rule of 5.

## Conclusion

In respect to the present studies and the literature we conclude that the symphysis is a good site for autogenous grafting as it is acortico- cancellous bone thereby providing less resorption and higher regeneration rate thus giving us less healing period as compared to other osseous grafts. The result however may depend on the case selection, the guidelines followed in harvesting, handling and repositioning of the graft.

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