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CASE REPORT

Prosthetic Rehabilitation using Zygomaticomaxillary Buttress as a Graft for Placing Endosseous Implants

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ABSTRACT

Loss of teeth due to periodontitis or trauma leaves behind some degree of residual alveolar bone defect. The deficiency of bone is one of the most common problems encountered during placement of endosseous implants. In such situations, it is necessary to augment deficient ridge so as to provide an ideal bone for better prosthetic foundation. Among all possible options present for augmentation, the autogenous bone graft still remains the "gold standard." The aim of this article is to present a case treated successfully using zygomaticomaxillary buttress (ZMB) as a graft to augment deficient alveolar ridge and discuss the applications with support of literature in a 26-year-old male patient with a history of loss of teeth due to trauma in the region of anterior maxilla treated by placing endosseous implants along with bone graft for prosthetic rehabilitation.

Keywords: Alveolar ridge augmentation, Intraoral bone graft, Zygomaticomaxillary buttress.

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INTRODUCTION

Maxillary anterior segment is at a high risk for being traumatized in maxillofacial injuries, leading to functional and esthetic deficiencies and requiring augmentation for sound prosthetic rehabilitation.[1] Augmentation of maxillary alveolar bone defects for placement of implant poses a clinical challenge for the surgeons. Bone grafts are often necessary to reconstruct such defects to achieve a good esthetic result and long-term functional stability.[2] The purpose of this article is to describe a patient with loss of bone in the anterior maxilla due to a road traffic accident (RTA) who was successfully treated by harvesting bone graft using a trephine from the zygomaticomaxillary buttress (ZMB) region and immediate placement of an implant. The technique used, the limitations, and other bone grafting applications from ZMB region are discussed.

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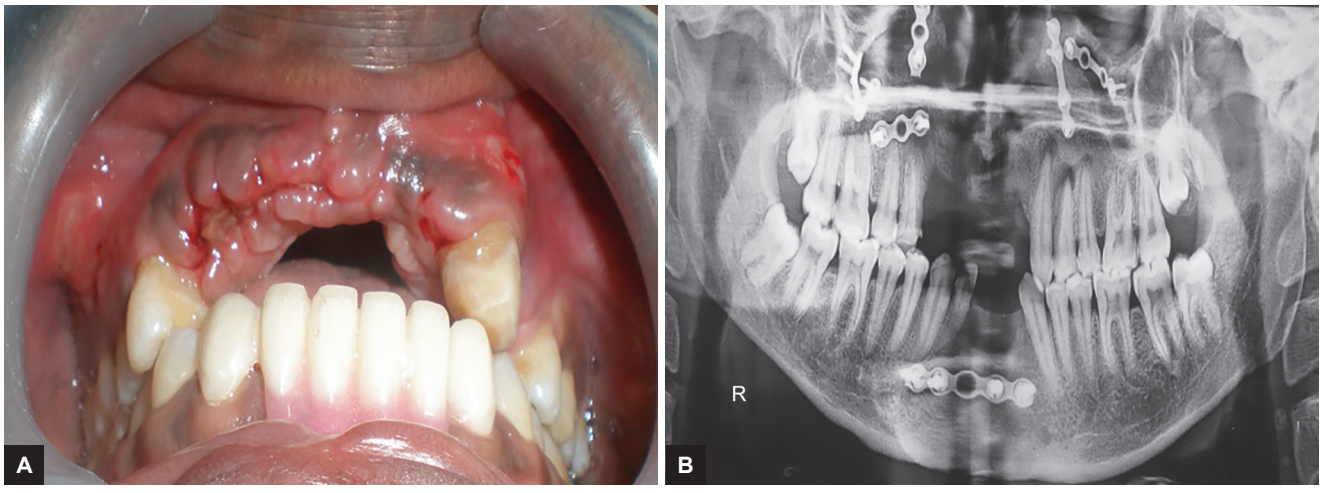
CASE REPORT

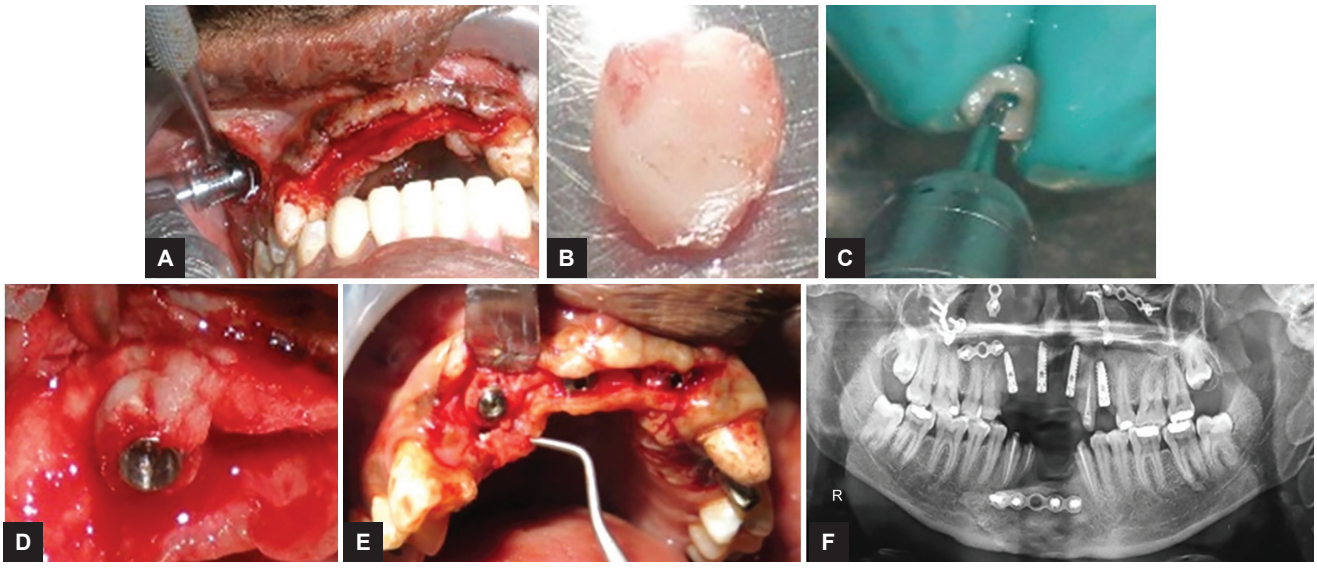
A 26-year-old male patient visited for rehabilitation of his lost maxillary anterior teeth due to MVA in 2010. He was treated for panfacial fractures by open reduction and internal fixation. Following clinical, radiological, and model assessments, the maxillary rehabilitation was planned using 4 implants supported by prosthetic bridge considering the patient's affordability and feasibility. Radiographic evaluation revealed a deficient bone on crest of about 6 mm in the region of 13 (Figs 1A and B). Zygomaticomaxillary buttress grafting was planned for augmentation considering the amount of bone required and proximity to the rehabilitation site under local anesthesia. The implant site was first prepared to receive a 3.75×16 mm implant (MIS seven, Confident Sales India Pvt. Ltd., Bengaluru, India), by using a crestal incision. The donor site was exposed through a subsulcular incision; 5 mm above the mucogingival junction, extending from 2nd premolar to the distal of 1st molar and mucoperiosteal flap was raised. A 5 mm trephine and a 3 mm chisel were used to harvest the graft from the buttress region. A hole for accommodating implant was drilled in the graft and the graft was held in place using Adson's toothed forceps, and the implant was carefully inserted into the previously prepared site. Collected graft particles from the drills were packed around the exposed areas (Figs 2A to F). Zygomaticomaxillary buttress graft and additional 3 implants were placed as planned earlier and primary closure was achieved using 4-0 vicryl sutures. Patient was followed up at 1 month, 6 months later, and 2 years.

RESULTS

No donor or recipient site morbidity was observed either clinically or radiographically. Immediate postoperative orthopantomogram revealed adequate alveolar



Figs 1A and B: Preoperative clinical and radiographic views of the defect in the region of 13



Figs 2A to F: Clinical and radiographic pictures showing ZMB grafting

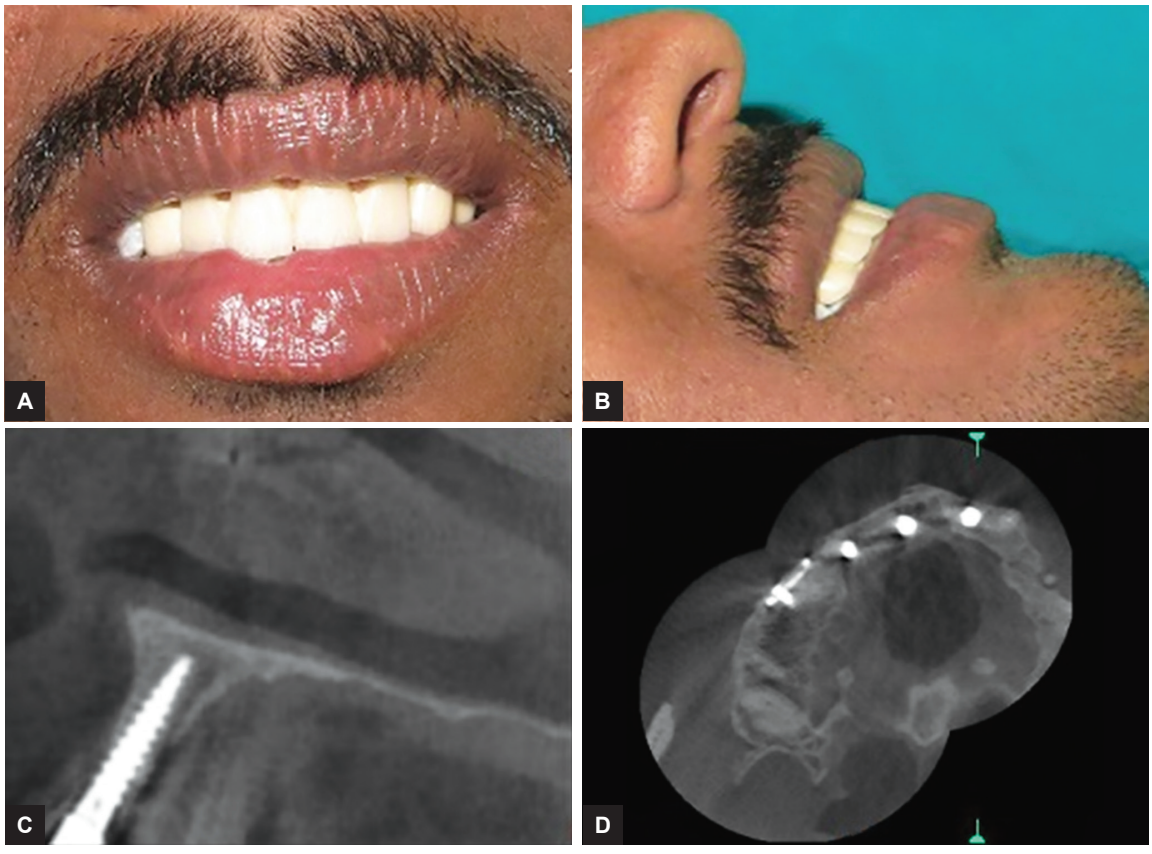
height around the grafted implant. Six months later, the implants were loaded with a six-unit bridge along with the support of contralateral canine. The patient was followed at regular intervals and clinical assessment was done to check pain if present, the condition of tissue covering, implant exposure, mobility of implant, signs of infection, and difficulty experienced by patient while chewing. On completion of 2 years, cone beam computed tomography was advised and studied for bone deposition around the implant along with clinical assessment to check for mobility and signs of bone resorption (based on increased pocket depth). Zygomaticomaxillary buttress graft provided a good quality and adequate quantity of bone for implant stability and satisfactory osseointegration with no donor site morbidity. Radiographically, the appearance of bone around the implant near the neck was studied and found satisfactory (Figs 3A to D).

DISCUSSION

Augmentation of alveolar bone defects prior to dental implant insertion has been discussed in detail in several clinical studies. Alveolar crest defects have been particularly scrutinized because they are the limiting factors in optimal implant positioning. Autogenous bone continues to be the "gold standard" for bone grafting to reconstruct such defects and intraoral sites are preferred for ease of access.[3-6] The graft may be harvested from many intraoral sites. In mandible, symphysis, ascending ramus, coronoid process, and horizontal ramus are preferred. The maxillary tuberosity, anterior nasal spine, hard palate, and zygomatic buttress have been considered ideal for the grafting maxillary alveolar defects.[7,8]

ADVANTAGES OF ZMB GRAFT[9]

- Autologous
- Accessibility to site and excellent visibility



Figs 3A to D: Two-year postoperative follow-up: (A and B) Clinical photographs with prosthesis, (C and D) cone beam computed tomography views showing bone around implant in 13 region

- No visible scar
- Same morphology
- Same architecture (convex cross-section)
- Bony structure in this area is especially strong
- No muscles have to be detached
- No neurovascular injury
- Can reconstruct the alveolar defects of a breadth of between 1 or 2 teeth
- In nontraumatized facial skeleton, a bone graft of 1.5 to 2 cm – not compromising the strength of the lateral midface frame
- Donor site morbidity is less
- Good quality bone of favorable form—successful osseointegration of dental implants
- The cost–benefit ratio is good, and the complication rate is very low
- As being membranous origin – less prone to resorption than grafts of endochondral bone origin
- There is no dehiscence of the soft tissue flaps.

LIMITATIONS OF ZMB GRAFT[10]

- Damage to maxillary sinus membrane
- Limited volume of graft
- Damage to tooth root
- Contraindicated in patients with sinus pathologies.

CONCLUSION

The advantages of the ZMB region as a donor site can now be comparatively stated. The donor site offers easy access with excellent visibility and yields good quality bone of correct morphology. This new method is an excellent alternative for the augmentation of maxillary alveolar defects prior to or during implant therapy. Adequate quality and quantity of bone to augment defect in 1 to 2 teeth can easily be obtained. In the case of an otherwise nontraumatized facial skeleton, a bone graft of 1.5 to 2 cm taken from the caudal zygomatic buttress zone will not compromise the strength of the lateral midface frame. Such sites are not constrained by concerns of deeper elements, such as tooth roots and neurovascular structures. However, damage to mucous membrane of the adjacent maxillary sinus and rarely to tooth root has to be approached with caution. Furthermore, morbidity is minimized if only a small thickness of bone is removed passively from the donor surface.

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