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CASE REPORT

SOFT TISSUE RIDGE AUGMENTATION OF MAXILLARY ANTERIOR REGION USING COMBINATION OF ALLOGRAFT AND GTR MEMBRANE

*Saima Hussain, Anoop Bhushan, Vaibhav Joshi, Shobhit Arora and Nada Ali

C-8 Floor Lajpat Nagar 1

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ABSTRACT

The evolution of periodontal plastic surgical techniques allowed the clinician to meet growing expectations and demands of today's dental patient. Newer techniques are evolving in restorative dentistry and periodontics to treat these defects to improve the esthetics, form and functions of the dentition. Aims: to determine the stability of the horizontal augmentation of the anterior maxilla using particulate bovine allograft under a membrane. The hypothesis to be tested was that bovine particulate graft material is effective for augmenting the narrow ridge of the anterior maxilla and can maintain its augmentation dimension over time. Case description: A 18year old boy presented with periodontally compromised maxillary central incisors due to trauma with no Buccal cortical bone present which was treated by extraction of the incisors with augmentation of the alveolar bone using bone graft under a gtr membrane. Long term growth and development of clinical research in soft tissue and hard tissues has provided a means of treating problems of inadequate alveolar ridges necessary for restorative procedures. Multiple surgical procedures may be required to achieve predictable results. The technique described in this case report allows the gtr membrane over the graft to be folded before it is placed under the vestibular flap, favoring the gain in tissue volume with promising results without any postsurgical complication. Conclusion: soft tissue ridge augmentation resulted in 100% restoration of the ridge defect in anterior dentition. Clinical significance: As the thickness of connective tissue graft is limited in anterior palatal region, this technique is predictable for all types of ridge defects and can be used for routine patients.

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INTRODUCTION

Bone is a highly vascularized and innervated connective tissue, subjected to continuous remodeling and renovation; it possesses the intrinsic regeneration capacity as part of the repair process in response to injury, as well as during skeletal development or continuous remodeling throughout adult life. Some complex clinical conditions require bone regeneration in large quantity, like in case of large bone defects (due to trauma, infection, tumor resection, skeletal abnormalities) or atrophic non-unions and osteoporosis (Elizaveta Kon *et al.*, 2012). Localized alveolar defects are frequently found in partially edentulous patients that impair the prosthetic restoration of damaged ridge area causing esthetic, phonetic and oral hygiene complications. These defects are associated with deficit volume of bone and soft tissues within the alveolar process resulting

from traumatic tooth extractions, advanced periodontal disease, periapical pathologies, developmental defects, external trauma, tumours etc (Ramesh Chavan and Manohar Bhongade, 2011). Alveolar bone resorption after tooth extraction is an inherent condition of the healing process. It is accelerated at the first 6 months after extraction and followed by a gradual remodeling that includes changes in size and shape, about 40% height and 60% width loss. The height and width reduction of the alveolar ridge is progressive and irreversible and it can make implant placement difficult, especially in the anterior maxilla, where bone volume is important for functional and esthetic reasons. Early extraction socket healing is expected to decrease the alveolar ridge by 2 to 4 mm horizontally and 1 mm vertically. This change is time dependent; by the end of the first year postextraction, nearly 6 mm of Buccal bone loss can be expected (Patricia Garani Fernandes *et al.*, 2011). The general understanding is that bone graft placed in the extraction socket should offset the catabolic processes observed within the crestal buccal plate region.

*Corresponding author: Saima Hussain,
C-8 Floor Lajpat Nagar 1

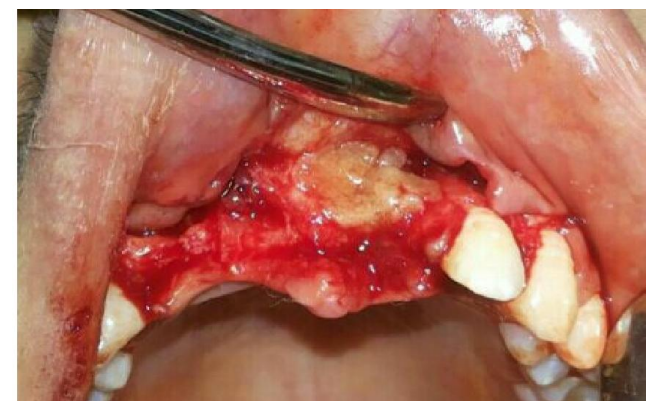
Therefore, several procedures, such as the use of bone auto grafts, bone substitute materials, and regenerative techniques, have been proposed to prevent and correct alveolar bone resorption. Guided bone regeneration (GBR) is based on the principle of selective cells using membranes to prevent epithelial cell migration and to guide osteogenic cell proliferation. Conventionally, non resorbable and resorbable membranes are used in GBR techniques (Patricia Garani Fernandes *et al.*, 2011). The choice between ridge augmentation or the use of a membrane in conjunction with bone grafts depends on the extent and shape of the bone defect (Gerry *et al.*, 1996). New techniques are constantly being developed to treat alveolar ridge defects. Gasparini (2004) proposed a surgical procedure to treat localized alveolar ridge defects in posterior segment by using "double-fold connective tissue pedicle graft".² The purpose of this case report was to clinically evaluate the effectiveness of an allograft (bioactive glass putty) covered by a GTR membrane to augment localized alveolar ridge defect in anterior dentition.

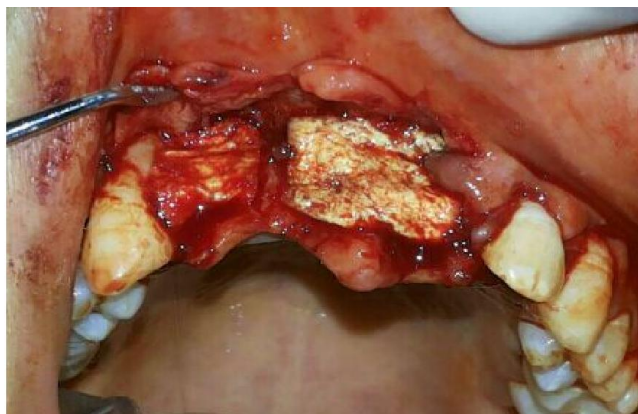
CASE REPORT

A 18 year old boy presented with localized alveolar ridge deformity in maxillary anterior region as a result of trauma 4 years due to which the patient lost his maxillary right and left central and right lateral incisors which were immediately reimplanted, however the lateral incisor was not stabilized and subsequently lost. Over a period of time resorption took place and the patient presented a case of supraerupted central incisors and an edentulous right lateral incisor region. Radiographic investigations (IOPA, CBCT) of the maxillary anterior region showed labial plate dehiscence and absence of the palatal compact bone in the maxillary incisor region. A localized ridge augmentation was necessary to obtain an esthetic prosthetic reconstruction and thus it was decided to augment the ridge using a novabone putty bone graft in combination with a GTR membrane.

Immediately prior to the surgical procedure the patient was instructed to rinse for 30 seconds with 0.2% chlorhexidine gluconate solution. The area subjected to surgery (right to left maxillary canine region) was anaesthetized using infraorbital nerve block. Two full thickness vertical incisions were made distal to the canines, followed by the crevicular and interdental incisions. The technique involved the reflection of a full thickness mucoperiosteal flap on the Buccal side and a partial thickness relieving incision was given on the palatal side for easy accessibility. On the Buccal side a sharp dissection was carried out to achieve proper coverage. The central incisors were extracted with help of a periosteal elevator and forceps causing minimum damage to the bone. A thorough curettage of the socket was achieved. On taking an intraoral periapical radiograph it was observed that full extraction of the teeth was achieved however a part of GP cone was present in the right central incisor socket. Complete removal of the infected fibrous tissue resulted in removal of the remaining GP cone part. Using a Bioactive glass putty gun the bone graft (Novabone putty) was injected and placed over the defect which was then covered by a GTR membrane covering the entire graft over the defect.

Using resorbable vicryl sutures the membrane was stabilized over the graft and a full coverage of the flap over the graft and membrane was achieved using horizontal mattress sutures in order to prevent any exfoliation of the graft or membrane. A periodontal dressing was given. The patient was kept under antibiotic and analgesic coverage for 5 days and 0.2% chlorhexidine gluconate mouthwash for two weeks.





RESULTS AND DISCUSSION



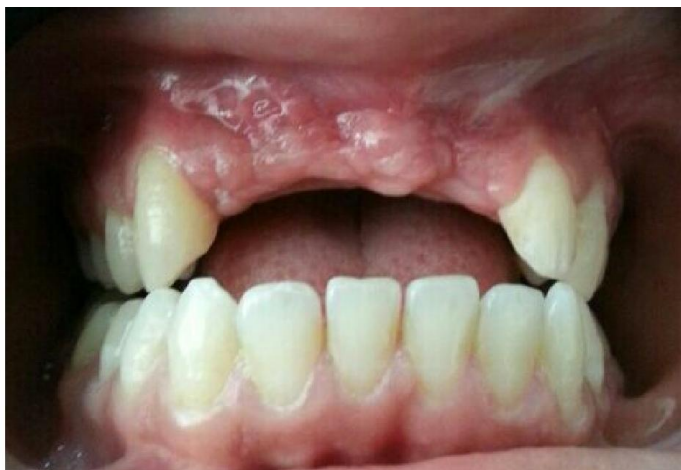
During the course of the study, wound healing was uneventful. There were no post operative complication and patient was satisfied with the results. The increase in the amount of tissue present was adequate to permit placing an esthetic fixed restoration. Six months postsurgically, there was 4mm gain in buccolingual width. Augmentation resulted in restoration of deficient ridge with satisfactory improvement in buccolingual width. The construction of fixed restoration was delayed for two months. The final esthetics after placement of fixed restoration was acceptable to the patient. Long term growth and development of clinical research in soft tissue and hard tissues has been provided a means of treating problems of inadequate alveolar ridges necessary for restorative procedures. Multiple surgical procedures may required to achieve predictable results (Ramesh Chavan and Manohar Bhongade, 2011).



In 1993 Misch and Dietsch suggested different graft materials and techniques for socket grafts based on the number of bony walls that remained after the tooth is removed. A 2- to 3-bony wall defect is treated very similarly to a 4-wall bony defect. However, since the defect size is larger, more bone graft is required, using a layered technique as first suggested by Misch. A barrier membrane is then placed over the site and acts as the third layer of the graft. Primary closure of the soft tissue is required in larger bony wall defects (Carl E Misch and Jennifer T Silc, 2008). The case presented refers to an alveolar ridge defect that involved an area of four teeth with satisfactory result. This procedure to increase the bone volume in maxillary alveolar defects is clinically worthwhile because of its simplicity and the good treatment result (Carl E Misch and Jennifer T Silc, 2008). The follow-up period is still rather short, but the preliminary results did not show any failures. Thus augmentation of local defects in the alveolar ridge with alternative bone filling materials such as freeze-dried, demineralized bone grafts or other bone grafts combined with GTR membrane may be considered. The important advantage of these materials is their unlimited availability and lack of donor site morbidity. Therefore combining Bioactive glass bone graft with GTR membrane presented a satisfactory ridge augmentation technique

Conclusion

In this case report ridge augmentation by using a combination of bone graft with GTR membrane showed satisfactory results in an esthetic region with a single surgical procedure that overcomes the limitation of soft tissue graft techniques.



Clinical studies using larger sample size with long term analysis are necessary to determine the success rate and predictability of this surgical technique.

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