

Localized Ridge Augmentation Using Demineralized Freeze-Dried Bone Allograft and Platelet Rich Fibrin - A Case Report

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Abstract

Localised alveolar ridge defect denotes to volumetric inadequacy of the limited extent of bone and soft tissue within the alveolar process. Such type of ridge deficiencies can be corrected by surgical ridge augmentation which can be achieved by the addition of either soft or hard tissues. The contour of a partially edentulous ridge should be carefully estimated before a fixed partial denture is undertaken. The ideal ridge height and width permits the placement of a natural appearing pontic which helps to maintain a plaque-free environment. This article describes a procedure of surgical ridge augmentation of a localised alveolar ridge defect in the maxilla, followed by fixed partial denture, enhancing the aesthetics, function and health.

Keywords: Ridge Augmentation, PRF, Bone Graft, Alveolar Ridge Defects

Introduction

The prosthetic substitute of the missing tooth should be in harmony with the adjoining natural dentition to achieve aesthetic demand of the patient, especially in the anterior region. However, alveolar bone resorption succeeding tooth loss results in alveolar ridge defect and impedes the goal¹. The high incidence of residual ridge defect has been found following anterior tooth loss; majority of which is Class III defect^{2,3}. Localized bone augmentation procedures allow clinicians to reconstruct horizontal alveolar ridge deficiencies and replace missing teeth. Therefore before initiating the fabrication of a fixed partial denture, the contour of the partially edentulous ridge should be assessed. Siebert in 1983 divided ridge defects into 3 classes:

Class 1: loss of bucco-lingual width but normal apico-coronal height

Class 2: loss of apico-coronal height but normal bucco-lingual width

Class 3: a combination of loss of both height & width of the ridge.

The ideal ridge height and width allows placement of a natural appearing pontic, thereby permitting the maintenance of a plaque free environment. Ridge defects can be corrected by surgical ridge augmentation³. The selection of the surgical treatment also depends on the type of prosthetic treatment. Ridge augmentation procedures can be carried out by both surgical-prosthetic treatment planing with opinion of surgeon and restorative dentist to achieve an ideal aesthetic result⁴.

Case Report

An elderly female patient 52 years old, visited the Periodontology department, Faculty of dental sciences, RUAS Bangalore, Karnataka for the correction of ridge defects in the upper anterior region. Patient gave a history of traumatic extraction with respect to 13 due to endodontic failure 30 days back. On oral examination, loss of labio-palatal width and ridge height was observed. Therefore, the patient was diagnosed under Seibert's Class III alveolar ridge defect.(fig.1).Clinical and radiographic examination revealed severe vertical ridge

resorption with respect to maxillary anterior region and highest resorption was seen in left lateral incisor region, leading to reversal of architecture. The patient was in good health with non-contributory medical history, good oral hygiene and a desire to restore the area with a permanent fixed prosthesis. The treatment was planned which comprised of ridge defect with platelet rich fibrin (PRF) and bone grafts. An informed consent was obtained from patient.



Fig.1 Clinical image of alveolar ridge defect involving loss of both ridge width and height in relation to maxillary canine region

After attaining adequate local anesthesia, crestal incision incisions were placed on the distal line angle of 11 and mesial line angle of 14. A full thickness flap was raised with periosteal elevator until the muco-gingival junction.(fig.2,3) degranulation of the defect was performed. Bone graft along with PRF was placed into the defect.(fig 4.) simple interrupted sutures were placed to approximate the flaps.(fig. 5,6) and covered with coe - pack , patient was recalled for suture removal after 7 days. Oral hygiene and postsurgical instructions were reinforced. The patient was prescribed antibiotic, amoxicillin 500 mg three times daily for seven days and

anti-inflammatory agent ibuprofen 400 mg two times daily, for a period of five days. The use of 0.12% chlorhexidine mouth rinses twice a day was instituted for two weeks. Suture removal was done after 10 days. Significant improvement in ridge thickness and height was achieved at 2 months.(fig.8). After 6 weeks assessment of the ridge contour and dimension was done and the patient was referred to Department of Prosthodontics for the prosthesis. All feasible prosthetic possibilities were discussed with the patient, due to economic limitations, patient was not able to afford implant supported prosthesis, instead the patient selected fixed prosthesis. A Porcelain-fused-to-metal with maxillary right central incisor and maxillary right first premolar was delivered to the patient (fig.9).

Discussion

Abrams *et al.*⁵ showed 91% prevalence of the anterior ridge deformity in the mandibular and maxillary arches of partially edentulous patients. A prevalence of about 55.8% Class III defects, 32.8% of Class I defect and 2.9 % Class II defects has been observed. When an adequate width or height of the alveolar ridge is not present ridge augmentation procedures prior to conventional fixed prosthodontics or implant therapy are indicated ⁶. The loss of the alveolar ridge can occur as a consequence of periodontal disease, congenital defects, extractions or surgical procedures⁷.The overlying soft tissue collapse into the bone defects during healing, making contours that make it challenging for esthetic functional prosthesis⁷.Seibert's Class III defect was noticed in this case as a result of extraction of maxillary canine due to endodontic failure resulting in loss of both tissue height and width.



Fig.2



Fig.3



Fig. 4



Fig. 5



Fig. 6



Fig. 7



Fig. 8



Fig. 9

Fig. 1 to 9 Growth factors in periodontal regeneration

The use of growth factors in periodontal regeneration has shown promising results recently.

In the treatment of periodontal intrabony defects, a combination of PRF with DFDBA showed improved clinical results as compared to DFDBA alone⁸. This result may be attributed to beneficial effects of PRF.

PRF has many advantages over platelet rich plasma (PRP). Its been shown from the literature that PRF increases the rate of clinical graft consolidation and the addition of PRF with grafts produce more mature and dense bone than grafts without PRF⁹. PRF in the form of a Platelet gel and can be used in combination with bone grafts, which offers several benefits including, bone growth and maturation, promoting wound healing, graft stabilization, wound sealing and hemostasis and improving the handling properties of graft materials¹⁰.

In patients with ridge deformities there are numerous additional prosthetic and surgical options for enhancing esthetics. Such type of

ridge defects can be corrected by surgical procedures by means of soft-tissue autogenous graft, autogenous bone graft, alloplastic materials and guided tissue regeneration. In this case, we used a blend of bone grafts and platelet rich fibrin for the intention of hard and soft-tissue augmentation.

Conclusion

This case report implies that soft tissue augmentation with demineralized freeze-dried bone allograft and platelet rich fibrin in combination with a Porcelain fused metal crown a possible attractive management regime that provides an aesthetically acceptable contour to the alveolar ridge.

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