

## Case Report

# An alveolar ridge augmentation using connective tissue graft to improve esthetics in anterior fixed partial denture

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The term localized alveolar ridge defect refers to a volumetric deficit of the limited extent of bone and soft tissue within the alveolar process. Esthetically correct treatment of a localized alveolar ridge defect is a common prosthetic challenge. A clinical report was presented that combined the fixed prosthodontics with the soft tissue ridge augmentation for a patient with ridge defect to attain maximum esthetics and functions.

**Key words:** Localized alveolar ridge defect, alveolar ridge augmentation, connective tissue graft

The structural loss with the permanent deformity of the residual alveolar ridge can occur as the result of congenital defects, periodontal disease, tooth extraction or surgical procedures. During healing, the overlying soft tissue collapse into the bone defects, creating contours that make it difficult or impossible to make esthetic functional prostheses.<sup>[1]</sup>

The esthetically correct treatment of a localized alveolar ridge defect is a common prosthetic challenge. The term localized alveolar ridge defect refers to the volumetric deficit of the limited extent of bone and soft tissue within the alveolar process.<sup>[2]</sup> Such defects can be overcome by integrating various periodontal surgical/reconstructive techniques with prosthetic dentistry.

If fixed prosthodontic treatment is carried out for a surgically uncorrected localized ridge defect, it may cause several potential problems such as the following. (1) Esthetic problems - loss of papillae, formation of "black" open interdental spaces, loss of buccal/facial contour, an esthetic pontic that is difficult to design and unesthetic gingival texture (scar tissue). (2) Functional problems - phonetics (open interdental spaces) and danger of food impaction under the pontic.<sup>[2]</sup>

Seibert (1983) classified the various types of ridge losses into three classes: Class I - buccolingual loss of tissue with normal ridge height in apicocoronal dimension, Class II - apicocoronal loss of tissue with normal ridge width in buccolingual dimension and Class III - combination of I and II resulting in loss of both the normal height and width.<sup>[3]</sup>

This clinical report describes the use of a maxillary alveolar ridge augmentation technique by using palatal connective tissue graft with metal ceramic restorations to achieve the maximum esthetic outcome.

## CASE REPORT

A 36-year-old male patient reported to the Department of Prosthodontics, Govt. Dental College, Bangalore, with missing right maxillary central and lateral incisors teeth. His medical history did not reveal any systemic disease. The dental history revealed that his right maxillary incisors were extracted following a road traffic accident 8 months back.

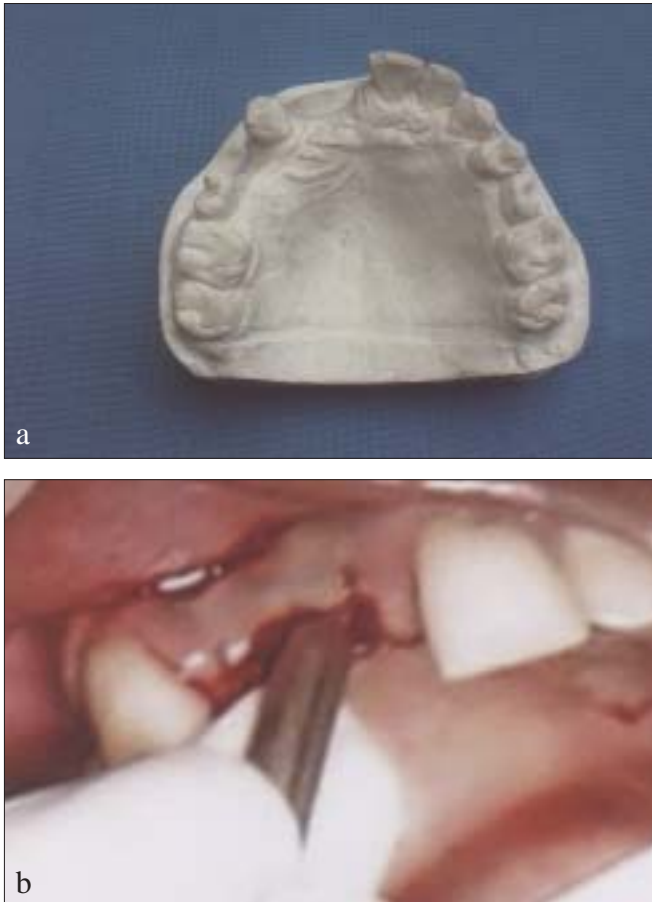
The clinical and radiographic examinations revealed a Seibert's Class-III alveolar ridge defect [Figure 1a and b] in the edentulous region. A fixed partial denture (FPD) restoration will result in elongated pontics and further their apical end will be depressed. This type of restoration would not provide optimal esthetics.

Various restorative options such as removable prosthesis, implants and conventional fixed partial denture with ridge augmentation were discussed and explained to the patient, who selected bone augmentation of the defective area in the maxillary alveolar ridge followed by conventional FPD to improve the esthetics.

The definitive treatment plan includes the following: a subepithelial connective tissue graft ridge augmentation followed by a metal ceramic FPD to replace the missing teeth.

## Surgical procedure

The ridge augmentation was performed in the Department of Prosthodontics. A prophylactic antibiotic medication was started (500 mg of amoxicillin every 8 h) 1 day prior to surgery and continued for 4 days after the surgery. A crestal incision was made under local anesthesia with a No. 15 scalpel blade [Figure 1b], extending from the mesial aspect of left central

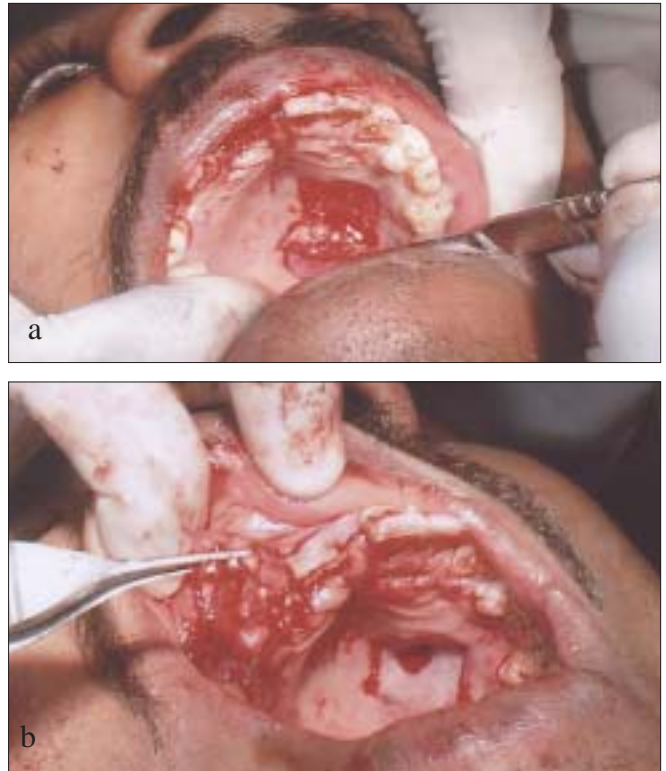


**Figure 1:** Preoperative photograph. (a) Diagnostic model showing Seibert's Class-III alveolar ridge defect, (b) Crestal incision made with No. 15 blade

incisor to the mesial aspect of left canine over the deformity. No vertical releasing incision was made to make the surgical procedure more conservative. By using a blunt dissection, the flap was separated from the alveolar bone to create the pouch.

The donor site in the patient for the connective tissue graft was the left lateral half of the hard palate in the second premolar and the first molar region. The approximate size of the graft required to correct the defect was marked on the donor site using a surgical marking pencil. With a No. 15 blade, a trap-door incision was made [Figure 2a] and the partial thickness flap comprising the epithelium and a thin layer of connective tissue was reflected. The connective tissue graft was obtained by carefully incising the tissue from the donor site using the No. 15 blade and tissue forceps [Figure 2b]. The connective tissue graft was transferred to the recipient site and inserted into the pouch and sutured using 4-0 silk sutures.

The zinc oxide eugenol pressure pack was provided to the palatal region with the help of an acrylic resin plate retained with 0.8 mm stainless steel wire clasps on the premolars and molars bilaterally. The pressure



**Figure 2:** (a) After a trap-door incision, the partial thickness flap was reflected in the palatal region, (b) Connective tissue graft taken from the donor site and transferred to the recipient site

pack was given to protect the donor site and to aid in healing. The patient was discharged.

The patient was reexamined after 24 h and no post surgical complications were revealed. His pressure pack was removed after one week [Figure 3] and also the sutures were removed. Subsequently, the patient was called after an interval of one month for the next 2 months. After 2 months, both the recipient [Figure 4a] and donor sites [Figure 4b] were well healed with firm and resilient mucosal coverage. The labial contour of the alveolar ridge improved substantially with a noticeable improvement in the height [Figure 4c].

### Fixed partial denture placement

After 2 months, clinical examination was performed to examine the amount of improvement after augmentation. The labio-palatal contours and height of the alveolar ridge were now acceptable to place an esthetic FPD.

The abutment teeth were prepared with the subgingival finish lines. The impression was made and the master cast was poured in an improved stone. Four units of metal-ceramic FPDs were fabricated in the laboratory using the left maxillary central incisor and right canine as the abutment teeth to replace the missing right maxillary central and lateral incisors. The fit of the restorations were confirmed and occlusal adjustments



**Figure 3:** 1 week after surgery

were performed prior to cementation. After porcelain glazing, the prosthesis was cemented using a resin cement [Figure 5].

The patient was scheduled for recall appointments after 2 weeks from cementation and then on a 3-month recall period. After 6 months of clinical service, there was no relapse of the augmented area compared with the alveolar ridge height and width at the cementation appointment. The esthetics and function of the restoration was satisfactory.

## DISCUSSION

Autogenous soft tissue augmentation techniques are options for restoring the esthetics and function in patients with alveolar bone defects. The replacement of teeth in esthetically demanding areas requires prosthesis of correct form and shade along with the establishment of the natural appearance of the periodontal tissue surrounding the restorations.<sup>[4]</sup>

A clinical report was presented that combined fixed prosthodontics with the soft tissue ridge augmentation for a patient with localized alveolar ridge defect to attain maximum esthetics and functions.

There are various nonsurgical and surgical treatment options for the correction of localized alveolar ridge defects. The nonsurgical prosthetic methods include the following: (A) tooth colored pontics with palatally inclined design and/or "long" pontic design, (B) pink ceramic material in the cervical portion of the pontics. The surgical methods include the following: (A) soft tissue autogenous ridge augmentation, (B) augmentation using various alloplastic materials such as tricalcium phosphate, hydroxyapatite, calcium sulphate and glass ionomer cement, (C) autogenous bone graft and (D) guided bone regeneration.

In this case, an autogenous connective tissue graft was taken from the palatal region to augment the localized ridge defect followed by rehabilitation with a



**Figure 4:** (a) 2 months after surgery shows substantial increase in ridge height and width, (b) 2 months after surgery shows well healed donor site, (c) the defective region shows substantial improvement when the cast made before surgery is compared with that made 2 months after the surgery



**Figure 5:** Patient rehabilitated with metal ceramic FPD

metal ceramic FPD. After augmentation and placement of the prosthesis, the patient was examined on a 6-month recall period, which showed signs of clinical success in restoring the comfort, function and most importantly esthetics of the patient.

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