

CASE REPORT

Ridge Augmentation Technique Using Connective Tissue Graft for the Correction Of Class III Ridge Defects for Esthetic Fixed Partial Denture Construction – A Case Report

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ABSTRACT: The structural loss of the residual alveolar ridge can occur as a result of congenital defects, periodontal disease, tooth extraction or surgical procedures. During healing, the overlying soft tissue collapses into the bone defects, creating contours that make it difficult or impossible to make esthetic functional prostheses. The height and width of residual ridge allow placement of pontic that appears to emerge from the ridge and mimics the appearance of the neighboring teeth. Such residual ridge contour may lead to unesthetic open gingival surfaces ("black triangle"), food impaction and percolation of saliva during speech. There are high incidences of residual ridge deformity following anterior tooth loss; a majority of these are class 3 defects. This clinical report describes, the soft-tissue ridge augmentation to correct alveolar ridge defect combined with fixed prosthodontics to achieve maximum esthetics and health.

Key words: connective tissue graft, fixed partial denture, perio esthetics

Most esthetic failures in fixed partial denture occur due to focusing only on the micro esthetics than on the macro esthetics. The success of any fixed partial denture does not lie on just the tooth replacement but the harmonious relationship of the tooth to the adjacent structure. The most important of them is the relationship of the gingiva to the teeth. The ideal ridge contour and topography helps to produce proper emergence profile. An ideal ridge is the one that has a smooth, regular surface of attached gingiva, which facilitates maintenance of a plaque-free environment. Its height and width should allow placement of a pontic that appears to emerge from the ridge and mimics the appearance of the neighboring teeth.

The soft tissue morphology, however, is dependent upon a stable, adequate volume of underlying bone capable of serving as a viable, biologic foundation for overlying soft tissues. Without the harmony afforded by a proper balance of underlying bone and overlying soft tissue, esthetic restorations are not possible, especially in the anterior maxilla. The alveolar bone loss disturbs that critical balance, resulting in marginal tissue distortion, recession. It also results in loss of esthetically crucial interdental papillae, creating open gingival embrasures leading to 'black triangles'. Food impaction and percolation of saliva during speech are the sequel to such changes.

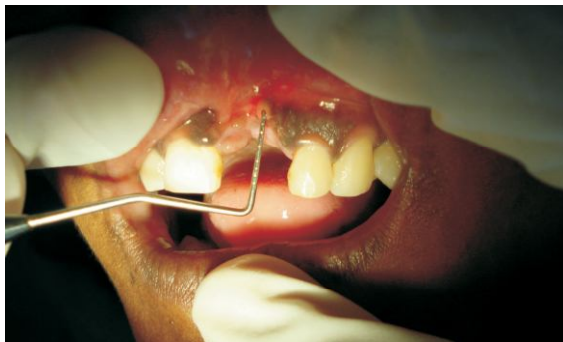


Figure : 1 and 2: Siebert's Class-3 ridge defect in the edentulous region

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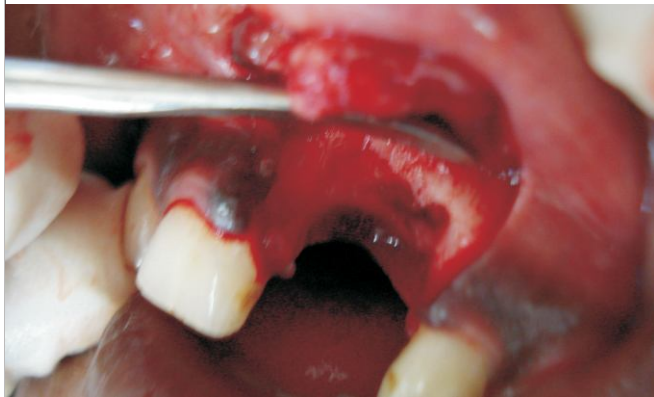


Fig 3: Raised full thickness mucoperiosteal flap



Fig 4: Donor area (palatal tissue) prepared for grafting

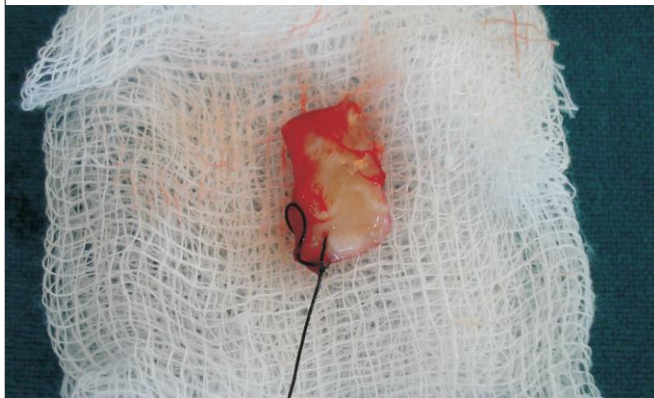


Fig 5: Harvested connective tissue graft



Fig 6: Provisional removable prosthesis placed over the Coe pack after surgery



Fig 7: Post operative surgical site with increase in width of attached gingiva



Fig 8: Metal ceramic fixed prosthesis

Congenital defects, periodontal disease, tooth extraction or surgical procedures, and periapical infection are the major etiological factors for loss of bone leading to poor ridge contour and topography. Unfortunately the recognition of the problem always occurs only after the tooth preparation is done and the master cast is prepared.

The correct identification of the problem during intra oral examination and a thorough pre-prosthetic treatment planning at this stage can avert the potential esthetic failure. Studies have concluded that predictable 3 mm to 4 mm of bucco-lingual and apico-coronal resorption at the ridge within 6 months after removal of maxillary anterior teeth, if left untreated leads to 50% bucco-lingual bone loss^[1-3]. Seibert^[4] has classified the ridge deformities into three types to facilitate treatment planning.

1. Class I defects- Facio-lingual loss of tissue width with normal ridge height
2. Class II defects- Loss of ridge height with normal ridge width
3. Class III defects- a combination of loss in both dimensions (a combination of bucco-lingual and apico-coronal loss)

Class-I defect are the most infrequent type and can be managed without surgical augmentation. Surgery will be required only for selected cases. The rolls technique or the pouch technique can be used to manage class-I surgical defect. Class-II and class-III defects are the most difficult to restore esthetically.

There is a high incidence (91%) of residual ridge deformity following anterior tooth loss, the majority of them being Class-III defects^[5]. The non-surgical options for Class-III defect is placement of long pontic and pink gingival ceramic to cover the defect in medically compromising patients who cannot afford surgery. The surgical technique advocated for Class-III ridge defect is inter-positional graft and onlay graft, either as full thickness or partial thickness.

CASE REPORT

A 35-year old female patient with severe maxillary ridge atrophy in the maxillary left central incisor area (21 region) reported with a poorly constructed acrylic removable partial denture.

The dental history revealed, left maxillary central incisor

extracted following a road traffic accident one year back. A thorough clinical and radiographic examination revealed a Siebert's Class 3 ridge defect in the edentulous region (Fig-1 & 2).

A diagnostic cast was articulated and diagnostic wax pattern fabricated. It revealed that a heavy compromise in the shape of the pontic was needed due to the residual ridge defect. A treatment was planned for connective tissue autogenous graft ridge augmentation procedure for the correction of ridge defect followed by porcelain-fused-metal (PFM)-fixed partial denture, to accomplish maximum esthetics and health. Informed consent was obtained from the patient.

A horizontal para-crestal incision was placed slightly palatal and two vertical releasing incisions were placed on either side of the defect and a full thickness muco-periosteal flap was raised (Fig-3). The proposed donor area (palatal tissue) was prepared and marked for the dimensions required (Fig-4). The incisions were made on the marked region and the graft was harvested (Fig-5). The epithelium was peeled off from the graft. The obtained graft was trimmed to the appropriate size and positioned over the defect area. The connective tissue is given striation cuts to encourage easy re-vascularization, then the flap was sutured back into position with interrupted silk sutures. Coe-pack dressing was given on the donor site and the removable prosthesis was placed over the pack (Fig-6).

Home care instructions were given and the patient was recalled after 1 week. On post-operative examination the wound healing was satisfactory. The sutures were removed and saline irrigation was done. Since the marginal gingiva showed enlargement in 11, gingivectomy was done in 11 under local anesthesia. Patient was reviewed after a week. The wound healing was satisfactory. The patient recalled after two months for fabrication of permanent prosthesis (Fig- 7).

Three-unit PFM-fixed partial denture was fabricated using the right central incisor and left lateral incisor as abutment to replace left central incisor with natural-looking esthetic modified ridge lap pontic. The fit of the restoration was confirmed and occlusal adjustments were performed prior to cementation. The prosthesis was cemented using glass ionomer cement. Improvement in both function and esthetics is dramatically evident in the final definitive prosthesis

cemented (Fig- 8).

DISCUSSION

Positive bone architecture is required to maintain an intact inter dental papilla which in turn is required for naturally pleasing emergence profile in conventional or implant supported fixed partial denture. Loss of alveolar bone produces soft tissue defects that require surgical intervention to reproduce the normal emergence profile.

Class-I and Class-II defect has better prognosis than Class-III defects. The success of the class III defects depends on many factors like the size of the defect, the graft material used to fill the defect and the surgical technique followed. In very large defect if surgical correction is not complete it will lead to excessively large ridge-lap pontics that fail to promote normal function, esthetics and cleansability^[6]. This can be corrected by use of pink ceramic to produce a pleasing gingival esthetic. The graft material that can be used to augment the ridge are hard tissue or soft tissue grafts, but hard tissue graft is indicated only when the edentulous site is to receive an implant. The two types of soft tissue graft that can be used are sub-epithelial connective tissue graft and full thickness graft. When comparing the autogenous gingival grafts used to restore the soft tissue defects the sub-epithelial graft produced greater volume gain than the with full thickness graft^[7].

In this case, the loss of bone was both horizontal and vertical, so a sub-epithelial connective tissue graft was used to restore the soft tissue architecture. Examination of the patient after 6 months showed clinical success of the procedure performed, restoring aesthetics, function and health of the patient.

CONCLUSION

Restoration of anterior esthetics improves the confidence of the patient. When loss of bone along with the associated loss of tooth is present, it is mandatory to restore the soft tissue morphology before replacement of the teeth to get proper emergence profile. In the present case report, Class-III Seiberts defect is restored with sub-epithelial connective tissue graft taken from the patients palate. The missing tooth was later replaced with

a metal ceramic fixed partial denture to produce pleasing anterior esthetics. The success of any prosthetic restoration depends on the proper pre treatment mouth preparation and execution of treatment plan.

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