Clinical Report

An organized approach to improve esthetics in a mutilated maxillary anterior segment by localized alveolar ridge augmentation, cast post, and metal-ceramic fixed partial denture

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ABSTRACT

This clinical report describes the use of alveolar ridge augmentation procedure using connective tissue graft, cast post, and metal-ceramic fixed partial denture for a patient with ridge defect to enhance the esthetic result for a metal-ceramic fixed partial denture (FPD). This ridge augmentation procedure significantly increased the functional and esthetic outcome of the final FPD by restoring the alveolar ridge defect to its original dimension.

KEY WORDS: Alveolar ridge augmentation, cast post, connective tissue graft, localized alveolar ridge defect

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INTRODUCTION

The success of a fixed partial denture (FPD) should be measured by the satisfactory restoration of function and esthetics. The replacement of teeth in esthetically demanding areas requires a prosthesis of correct form and shade, along with establishment of a natural appearance of the periodontal tissue surrounding the restorations.

The structural loss with permanent deformity of the residual alveolar ridge can occur as the result of trauma, 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.[1] Such defects can be overcome by integrating various periodontal surgical/reconstructive techniques with prosthetic and restorative dentistry.

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

CASE REPORT

A 20-year old male patient reported to the Department of Prosthodontics, with missing left maxillary central incisor and fractured right maxillary central incisor teeth. His medical history did not reveal any systemic disease. The dental history revealed that his left maxillary incisor was extracted following a road traffic accident eight months back. The right maxillary central incisor was fractured at cervical level and it has undergone endodontic treatment. The patient also complaint of his labially proclined left maxillary lateral incisor affecting his appearance.

The clinical and radiographic examinations revealed a Seibert's Class-I alveolar ridge defect (horizontal defect) in the edentulous region. The fractured right maxillary central incisor revealed acceptable root canal

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filling with no peri-apical pathosis. The left lateral incisor was labially proclined and rotated distolabially [Figure 1].

Various treatment options like orthodontic treatment, removable prosthesis, implants, and conventional fixed prosthodontic procedure with ridge augmentation were discussed and explained to the patient, who selected augmentation of the defect area in the maxillary alveolar ridge followed by conventional FPD to improve the esthetics.

The definitive treatment plan includes (in order): (1) sub-epithelial connective tissue graft ridge augmentation, (2) cast post and core on fractured right maxillary central incisor, (3) intentional root canal treatment (RCT) to correct severely proclined left maxillary lateral incisor during crown preparation for FPD, and (4) metal ceramic FPD to replace missing teeth.

Surgical procedure

The ridge augmentation was performed in the Department of Prosthodontics. A prophylactic antibiotic medication was started (Amoxicillin 500 mg every 8 hours) 1 day prior to surgery and continued for 4 days after surgery. A crestal incision was made under local anesthesia with a No. 15 scalpel blade [Figure 2], extending from mesial aspect of right central incisor to mesial aspect of left lateral incisor over the deformity. No vertical releasing incision was made to make the surgical procedure more conservative. Using a blunt dissection the flap was separated from the alveolar bone to create pouch.

The donor site for the connective tissue graft was patient's left lateral half of the hard palate in the premolar region. With a No. 15 blade, a trap-door incision was made [Figure 3] and the partial thickness flap was reflected. The connective tissue graft was obtained by carefully incising the tissue from the donor site using No. 15 blade and tissue forceps [Figure 4]. The connective tissue graft was transferred to the recipient site, and inserted in to the pouch and sutured; using 4-0 silk sutures [Figure 5].

The pressure pack was given in the palatal region with the help of an acrylic resin plate retained with 0.8 mm stainless steel wire clasps on premolars and molars bilaterally. The patient was discharged. The patient was reexamined after 24 hours that revealed no post surgical complications. The pressure pack and the sutures removed after one week. After one month, both recipient and donor sites were well healed with firm and resilient mucosal coverage. The labial contour of the alveolar ridge was improved substantially.

Fixed partial denture treatment

After one month, clinical examination was performed to examine the improvement after augmentation. The labio-palatal contours of the alveolar ridge were now acceptable to place an esthetic FPD [Figure 6].

The intentional RCT with respect to left maxillary lateral incisor was carried out from labial approach, keeping in mind the correction of its labial proclination during crown preparation for FPD. The conventional lingual approach for RCT was not used as it would have weakened the lingual wall of the tooth that was more important for its resistance form. The cast post was fabricated with respect to right maxillary central incisor in conventional manner. In the resin pattern of post and core, lingual tilt was given to the core portion to reduce overall proclination of the maxillary anterior segment. The post was cemented using Glass inomer cement.

The abutment teeth were prepared with subgingival finish lines. Greater amount of crown structure was removed from labial surface especially with respect to proclined keeping the lingual wall intact left maxillary lateral incisor. Entire labial wall of the tooth was reduced to correct the proclination [Figure 6]. The impression was made and the master cast was poured in improved stone Three unit metal-ceramic FPD using left maxillary lateral incisor and right central incisor as the abutment teeth to replace missing left maxillary central incisors were fabricated in the laboratory. Fitness of the restorations were confirmed and occlusal adjustments were performed in the patient's mouth prior to cementation. After porcelain glazing, the prosthesis was cemented using resin cement. The improved facial profile and esthetics was achieved [Figure 7a, 7b].

The patient was scheduled for recall appointments at 2 weeks post-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. A clinical report was presented which 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 non-surgical and surgical treatment

Figure 1: Pre-operative photograph showing fractured right central incisor and labially proclined left lateral incisor

Figure 2: Crestal incision extending from mesial aspect of right central incisor to mesial aspect of left lateral incisor over the deformity

Figure 3: The donor site for the connective tissue graft

Figure 4: The connective tissue graft obtained from the donor site

Figure 5: The connective tissue graft transferred to the recipient site, and inserted in to the pouch and sutured; using 4-0 silk sutures

Figure 6: Post operative photograph showing substantial increase in ridge height and width, subsequently abutment teeth were prepared to receive metal ceramic FPD

Figure 7a: Showing substantial improvement in the facial profile and esthetics when compared to cast made before surgery and 2-months after surgery

Figure 7b: Patient rehabilitated with metal ceramic FPD showing improved facial profile and esthetics

options for the correction of localized alveolar ridge defects. The non-surgical prosthetic methods includes: (A) tooth colored pontics with "long" pontic design, (B) pink ceramic material in the cervical portion of the pontics. The surgical methods includes: (A) soft tissue autogenous ridge augmentation, (B) augmentation using alloplastic materials, (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 metal ceramic FPD. The labial proclination of maxillary anterior segment was also corrected substantially by an organized approach to prepare the abutment teeth extensively from the labial aspect. Lingually tilted cast post and core on right maxillary central incisor and severely reduced root canal treated left maxillary lateral incisor has avoided the need for orthodontic correction of labial proclination. 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 patient's comfort, function, and most importantly esthetics.

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