



Esthetic Enhancement of a Fixed Prosthetics Using Connective Tissue and Alloplastic Bone Graft: A Case Report

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ABSTRACT

Aloe Augmentation of the partially edentulous ridge can significantly improve the final prosthodontic rehabilitation. For enhancing soft tissue contours in the anterior region, the subepithelial connective tissue graft is the treatment of choice. The combination of connective tissue grafts with alloplastic bone graft material can optimize the ridge augmentation and reduce post extraction defects. The aim of this clinical report is to describe the use of subepithelial connective tissue in conjunction with an alloplastic bone graft for augmentation of a maxillary anterior ridge prior to prosthetic rehabilitation.

Keywords: Alloplastic bone, alveolar ridge augmentation, connective tissue graft, esthetics, fixed partial denture.

INTRODUCTION

Critical esthetic problems arise when an anterior fixed prosthesis is fabricated over a deformed, collapsed edentulous ridge. When ridge deformation occurs, a standard pontic size and shape will not maintain a normal tooth to gingiva relationship with a resultant unattractive restoration.¹ The most common causes of alveolar ridge deformities include developmental defects, advanced periodontal disease, traumatic removal of teeth, and surgical injury.² Reconstructive periodontal procedures permit the restoration of the hard and soft tissues of the alveolar ridge to their former dimensions and gives the restorative dentist the opportunity to provide their patients with a functional and improved esthetic prosthesis.³

Reconstructive procedures for the deformed edentulous ridge have evolved from the use of free soft tissue autografts⁴ and "onlay" type grafts⁵, to subepithelial connective tissue grafts^{6,7} with and without supplemental bone replacement materials and implants.^{2,8-10}

Onlay grafts are thick free gingival grafts derived from partial or total thickness palatal grafts.⁵ The onlay graft procedure was designed to augment the difficulty in restoring apicocoronal ridge defects.⁵ The major disadvantage is they are generally pale in color and will present an esthetic challenge and also undergo moderate to severe postsurgical shrinkage.¹¹

Recently, the concept of Guided Bone Regeneration (GBR) has been developed to augment the volume of alveolar bone prior to placement of implant fixtures.¹²⁻¹⁴ Still, the most commonly used procedures are those which augment the soft tissues associated with ridge defects.^{3,5} The alloplastic material has been shown to be effective in preserving ridge height and width after tooth extraction and has demonstrated success when used for ridge augmentation.⁸

Following anterior tooth extraction without some type of ridge preservation, alveolar ridge resorption occurs at a rate of 40% to 60% during the first 2 to 3

years.¹⁶ The resultant ridge defect commonly presents a difficult prosthetic challenge. Seibert^{3,5} classified three types of ridge deformities. Class I is a buccolingual loss of tissue contour with a normal apicocoronal height. Class II is an apicocoronal loss of tissue with normal buccolingual contour.

This case report will describe the use of subepithelial connective tissue supplemented with an alloplastic bone graft to augment a moderate apicocoronal and buccolingual ridge defect. The combined use of these procedures enhanced the final prosthetic restoration, a fixed partial denture, significantly improving restoration esthetics.

Case Report

A male 32-year old businessman was referred to the Dept. of Periodontics, Chandra Dental College & Hospital, Barabanki, U.P., India, for evaluation of his maxillary anterior ridge prior to prosthetic rehabilitation. Six months previously the maxillary left lateral incisors was extracted due to trauma (Figure 1)



Fig 1: Preoperative View

The patient originally presented to the Department of Prosthodontics his anterior ridge demonstrated significant bone loss expressed clinically by loss of approximately 2 mm height and 4 mm width 10 weeks post extractions and prominent soft tissue loss labially (Figure 2).



Fig 2: Deficient Ridge Labial View

The patient was then referred to Periodontics for an anterior ridge augmentation prior to final prosthetic rehabilitation. A clinical examination of the maxillary alveolar ridge revealed a moderate Seibert Type C ridge defect (combined buccolingual and apicocoronal loss of tissue height) (Figure 3).



Fig 3: Maxillary Alveolar Ridge Occlusal View

Rehabilitation with a conventional fixed partial denture (FPD) of the left maxillary canine through left central incisor was planned. Option of Implant was given to the patient but he was reluctant for putting a foreign metallic object in his body. Surgical options were discussed with the patient, and it was decided to augment the ridge with a subepithelial connective tissue graft harvested from the palate combined with an alloplastic bone graft.

Following a pre-surgical rinse with chlorhexidine and administration of local anesthesia (2% lidocaine with 1:80,000 epinephrine), a labial full thickness flap was elevated and the ridge defect was exposed. The residual bone defect of the labial plate was well visualized (Figure 4a,b).

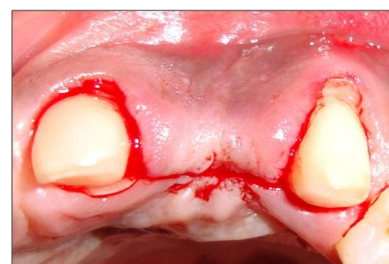


Fig 4a: Incisions



Fig 4b: Flap Elevation

Biograft HT was condensed in the apical aspect of the labial flap increasing the width in the buccolingual aspect (Figure 5).



Fig 5: Placement of Bone Graft

A subepithelial connective tissue graft was then harvested from the palate distal to the right canine and extending to the mesial of first molar. Care was taken to avoid the greater palatine nerve and artery (Figure 6a,b).



Fig 6a: Donor Site



Fig 6b: Connective Tissue graft Harvested

The graft was placed under the labial flap and over the bone graft to increase the width as well as the apicocoronal height of the ridge. The subepithelial connective graft was sutured with 4.0 plain gut sutures (Ethicon, Johnson & Johnson, Somerville, NJ). The labial flap was then sutured with 3.0 Vicryl (Ethicon, Johnson and Johnson, Somerville, NJ) (Figures 7 and 8).

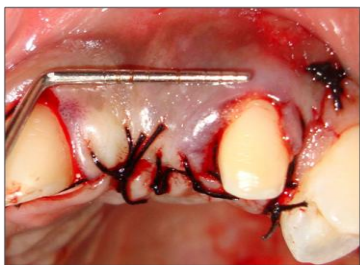


Fig 7: Suturing



Fig 8: Immediate post - operative

The interim prosthesis was modified to fit over the expanded ridge with minimal pressure (Figure 9).



Fig 9: Post - operative 1 month

Home instructions included daily chlorhexidine mouthrinsing as well as the administration of amoxicillin antibiotic 500mg 3 times daily for 5 days was prescribed for reduced chances of post operative infection.

Ibuprofen 1 to 2 tabs every 4-6 hours daily for 3 days was prescribed as analgesic. The sutures were removed 10 days after the periodontal surgery, and the patient presented with a good soft tissue healing.

Three months after the ridge augmentation, the final prosthesis was cemented (Figures 10).



Fig 10: Post - operative 3 months

Results

Although augmentation did not result in 100% restoration of this deficient ridge, a significant improvement was obtained. Approximately one half of the apicocoronal ridge loss (1 mm) was regained with an almost 90% gain (3 mm) in the buccolingual

dimension. The patient was satisfied with the esthetic result of the fixed partial denture.

Discussion

Connective tissue grafts for ridge augmentation preserve the coloration and characteristics of overlying mucosa⁷ resulting in a better esthetic blend in a potentially highly visible area. In contrast onlay grafts retain their palatal mucosal characteristics, which may compromise tissue esthetics.⁵ As a result, the natural coloration and texture that is maintained by connective tissue grafts may reduce the need for secondary procedures.¹¹ Ridges augmented with connective tissue have demonstrated stability ranging from 7 to 12 years.^{3,11} However, when faced with severe apicocoronal ridge defects, connective tissue alone may not be able to completely augment the ridge defect. Other materials such as Biograft HT[®] or other bone alloplasts may be indicated in these more challenging situations.

The major disadvantage of connective tissue grafts is they require a second surgical site. Although leaving palatal donor epithelium with a base of connective tissue will generally allow the site to heal by primary intention, thereby, minimizing post-surgical complications.^{11,14}

Biograft-HT[®] (IFGL Bioceramics Limited, Calcutta) is a biphasic calcium phosphate consisting of hydroxyapatite and beta-tricalcium phosphate in the weight % ratio of approximately 70:30 that is biocompatible, non-toxic, resorbable, non-inflammatory, and bioactive. It causes no immunological, foreign-body, or irritating response, and has excellent Osteoconductive ability.^{15,16}

Finally,GBR will predictably restore both width and height to a deformed ridge.⁷ GBR can be used alone or combined with bone graft materials such as demineralized freeze dried bone allograft (DFDBA) to prevent the collapse of the ridge following extraction.⁷ GBR is based on the principle that through selective exclusion of non-osteogenic tissues by a barrier membrane, the initial blood clot that fills the space under the membrane will be replaced with bone allowing the placement of implant fixtures.⁷

Summary

This case illustrates the treatment of a deformed maxillary anterior ridge with a subepithelial

connective tissue combined with an alloplastic bone graft. The apicocoronal and buccolingual augmentation of this ridge provided a functional and improved esthetic result.

The combined use of an alloplast bone graft provided additional augmentation not achievable with either procedure alone. Biograft HT[®] was technically easy to use and resulted in good clinical healing. Although an additional augmentation procedure would have improved the final prosthetic result, the patient was satisfied with his final restoration.

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