

CASE REPORT

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Localised Ridge Augmentation Using Soft Tissue Onlay Graft : A Case Report

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Localised alveolar defects are frequently found in partially edentulous patients. This impairs the prosthetic restoration of damaged area causing esthetic, phonetic and oral hygiene complications. Esthetically correct treatment of an alveolar ridge defect is a frequent challenge to dentists. Long term growth and development of clinical research in soft tissue and hard tissues has provided a means of treating problems of inadequate alveolar ridges necessary for restorative procedures. Treatment modalities vary with the class of ridge deformities involving an interdisciplinary approach. Such defects can be overcome with different surgical techniques. The onlay graft technique is primarily designed to gain the ridge height. A case report has been presented here for a patient with alveolar ridge defect in the maxillary anterior region corrected with soft tissue ridge augmentation using onlay graft technique. This technique has favored gain in tissue volume without any postsurgical complications.

Keywords: Esthetics, Ridge defect, Onlay graft, Reconstruction



INTRODUCTION

Evolution of periodontal plastic surgical techniques allows the clinician to satisfy the growing expectation of today's appearance oriented patients. Newer techniques have evolved in periodontics and restorative dentistry to treat these defects to improve the esthetics, form and functions of the dentition¹. Esthetic reconstruction of large-volume ridge deformities where bone and soft tissue have been lost buccolingually as well as apicocoronally continues to offer a major challenge in therapy to periodontists and to those engaged in advanced reconstructive dentistry². No single procedure is well suited for solving all problems in reconstructive surgery³. Reconstructive procedures for the deformed ridge have evolved to include, guided bone regeneration, bonegrafts and soft tissue graft beneath the flap or tunnel in the damaged area and soft tissue onlay grafts. The periodontal plastic surgical procedures can effectively improve the ridge contour and there by the mucogingival esthetics and pontic ridge relationship. It is designed to establish the best hard and soft tissue base for prosthetic appliances⁴. Studer et al (1997) defined ridge defect as a volumetric deficit of limited extent in bone and soft tissue within the alveolar process.⁵

Complications

Esthetic complications involve appearance of unesthetic black interdental spaces, unnatural thick/long pontic fabricated to compromise the ridge defect and unesthetic gingival texture (scar tissue) or missing gingival breadth. Phonetic complications like "moist" speaking voice due to open interdental spaces is a common problem. Patient finds it difficult to maintain a good oral hygiene due to food impaction under the pontic and inaccessibility to perform proper oral hygiene measures in the area.

Classification of Ridge Defects

Preoperative classification of a ridge defect according to its expanse, its severity and its form is clinically relevant because such classifications permit establishment of preliminary prognosis for a planned augmentation. Localised ridge defects can be classified qualitatively, on the basis of their

three dimensional form and semiquantitatively, on the basis of their extent and severity.

*Seibert's Nomenclature*⁶

Class I- Horizontal or buccal tissue loss with normal bone height.

Class II- Vertical or apicocoronal tissue loss with normal ridge width.

Class III- Combined horizontal and vertical bone loss

*Allen's Nomenclature*⁷

Type A - Vertical or apicocoronal tissue loss with normal ridge width.

Type B - Horizontal or buccal tissue loss with normal bone height.

Type C - Combined horizontal and vertical bone loss.

Semiquantitative Classification

Allen et al classified ridge defects according to the degree of severity of alveolar deformities⁵. Mild < 3 mm, Moderate 3-6 mm, Severe > 6mm

Management Strategies

Non surgical methods of management can be done by the use of modified tooth-coloured pontics, pontics with gingival - shaded cervical portion, removable and flexible tooth "mask" and orthodontic extrusion.

Surgical management by soft tissue augmentation is done using roll flap technique and onlay transplant technique with their modifications.

Correction using guided bone regeneration can be done as a sole technique or in combination with bone graft or bone substitute material. Autogenous bone transplantation from mandibular symphysis or iliac crest and alloplastic materials like tricalcium phosphate, hydroxyapatite, calcium sulfate has also been used for guided bone regeneration.

Ridge expansion using split crest technique, osteotome technique and distraction osteogenesis are the other management options.

Soft tissue augmentation with autogenous grafts is a widely accepted procedure in dentistry. It is indicated in both partially and fully edentulous patients to augment areas with a lack of or a reduced width of keratinized tissue, as well as to increase soft tissue volume. Larger defects in which a volumetric problem must be solved are corrected through the subepithelial connective tissue technique. However each procedure presents certain limitations.³ This case report describes a technique where soft tissue onlay graft is used for esthetic repair of a ridge defect.

CASE REPORT

A male patient aged 22 years reported to the Department of Prosthodontics, Yenepoya Dental College with a chief complaint of missing front tooth. Patient revealed the history of extraction of left central incisor one year back due to mobility. A localized ridge defect in relation to 21 was detected which might affect the esthetic and functional outcome of the prostheses. Hence the patient was referred to the Department of Periodontics. On clinical examination of the maxillary alveolar ridge, a Seibert's Class II defect (1.5mm) was detected (loss of apicocoronal tissue height) with the need to improve the soft tissue contour in the maxillary anterior region. An aberrant maxillary labial frenum was also identified in relation to the defect. A localized ridge augmentation procedure was necessary to obtain esthetic prosthetic reconstruction. Hence it was decided to augment the ridge using onlay soft tissue transplant technique. A frenectomy procedure was also indicated so as to prevent frenal pull and tension on the surgical site. Informed consent was obtained from the patient before carrying out the surgical procedure.

Procedure

Prior to the surgical procedure, the patient was instructed to rinse for 30 seconds with 10 ml of 0.2% chlorhexidine gluconate solution. The area was anaesthetized using local anaesthetic solution 2% Xylocaine with



Figure 1 Preoperative Photograph



Figure 2 Aberrant Frenum engaged with Hemostat



Figure 3 Frenectomy Procedure

1: 1,00,000 adrenaline. Aberrant maxillary frenum was excised using a hemostat and Bard Parker blade No.15, by placing an oblique incision along the under surface of the hemostat. The triangular resected portion of the frenum was removed exposing the underlying brush like fibre attachment. A horizontal incision was placed to separate this fibrous attachment.

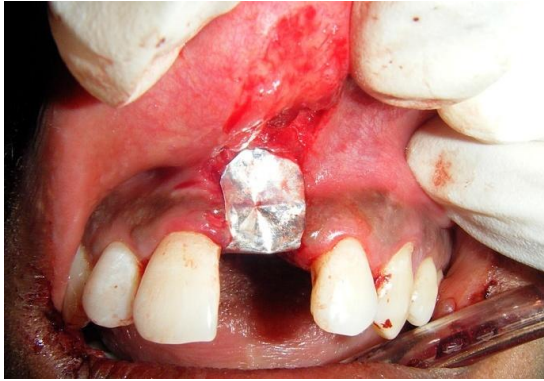


Figure 4 Preparation of Recipient site



Figure 5 Donor Site

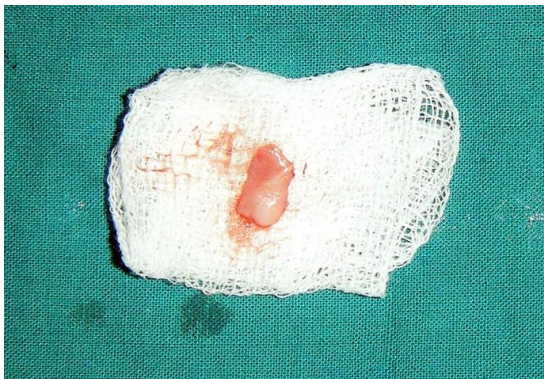


Figure 6 Free Gingival Graft

A template was used to prepare the recipient site over the ridge defect. The size of the template was selected slightly more than the defect size. Bard parker blade No 15 was used to remove the epithelium. The blade is moved with short, saw like strokes across the recipient site at a level approximately 1 mm below the outer surface of the epithelium. Care was taken to

remove the least amount of connective tissue. A connective tissue bed was created to receive the graft. The prepared recipient site was covered with sterile guaze moistened with saline.

The palate was selected as the donor site. The template was placed on the donor site. A shallow incision was placed using No 15 blade along the borders of the template. The edge of the graft was slowly elevated using tissue forceps and gently separated from the palate. The graft containing the epithelium and a thin layer of connective tissue was obtained from the donor site with a thickness of approximately 1.5mm to 2mm. The loose tissue tags from the under surface of the graft was removed. The donor site was then sutured to prevent excessive bleeding. The graft was then stabilized on the recipient site and adapted firmly. Care was taken to remove the clot and tissue fragments on the recipient site. The graft was sutured using black silk suture (5-0). Care was taken to avoid excessive tension on the graft. Periodontal dressing was placed on both the donor site and the recipient site.

After the surgery, analgesics and antibiotics were prescribed. Patient was instructed not to brush the teeth in the treated area and advised to rinse with 0.2% chlorhexidene mouthwash, 10ml twice daily for one minute for 10 days. The sutures were removed after 10 days. The patient presented a satisfactory soft tissue healing. The wound healing was uneventful and there were no post-surgical complications and the patient was satisfied with the results. The increase in the amount of tissue was adequate for the placement of fixed restoration. After 6 months, a gain of 1.5mm in the apicocoronal height was observed.

DISCUSSION

A deformed ridge may result from tooth extractions following advanced periodontal disease, periodontal and periapical abscess formation etc. With the advent of various grafting techniques, treatment of ridge deformities is more predictable⁸.

Autogenous soft tissue grafting procedures have been proposed to surgically correct localized alveolar defects, as preprosthetic site development, and as ridge



Figure 7 Graft Stabilized on the Recipient Site



Figure 8 Placement of Nonresorbable Sutures



Figure 9 Two Weeks Postoperative Photograph

preservation procedures^{1,6}. In this case report, an onlay transplant procedure was designed to augment ridge defect in the apico-coronal plane i.e. to gain ridge height.

Onlay grafts are epithelized free grafts which, following placement, receive their nutrition from the de-epithelized connective tissue of the recipient site. The amount of apico-coronal augmentation that can be obtained is

related to the initial thickness of the graft, the events of wound healing process, and the amount of graft tissue that survives. If necessary, the grafting procedure can be repeated at 2-month intervals to gradually increase the ridge height. Onlay grafts have diverse utility, i.e. not only to treat deficient ridges but also to correct additional mucogingival problems like inadequate width of attached gingiva and root coverage procedures during the same surgical intervention. It is a relatively simple procedure and does not require the use of expensive biomaterials as the graft can be procured from patients own oral cavity. However, they are not suited for use in areas where blood supply to the recipient site has been compromised by extensive scar formation from previous surgical procedures or trauma. Hence these thick grafts require an abundant blood supply and thus there are high chances of graft sloughage⁹ and color mismatch being the major drawback.

The autogenous soft tissue grafting may fail mainly due to the improper harvesting procedure, which leads to a prolonged healing time at the donor site and therefore to an increased patient's morbidity. Patients often complain about pain and numbness for several weeks after the surgery. On the other hand, anatomical and individual limitations also exist. Depending on the shape of the palatal vault, the patient's sex and age, the quantity and quality of tissue that can be retrieved varies. The location of the palatal vessels and nerves further limits the total amount that is available for grafting procedures³.

CONCLUSION

Repair of the deformed edentulous ridge preceding prosthetic rehabilitation can provide the restorative dentist with more ideal gingival contour and preclude the need for modifications or compromises in the final prosthesis. Successful tooth replacement depends on appropriate management of the soft and hard tissues on the edentulous ridge. Augmentation may be indicated, especially when FPD is planned. The onlay graft procedure is easy to perform and does not require expensive biomaterials like the bone graft or GTR membrane. The treated case has shown

improved ridge contours, and mucogingival esthetics.

CONFLICTS OF INTEREST

None declared

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