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Soft Tissue Ridge Augmentation – A Perio-Prosthodontic Interdisciplinary Approach

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ABSTRACT

Introduction: Aesthetics play a major role in a favorable outcome of any dental related treatment. It provides patient satisfaction, boosts dentist's confidence and achieves a long term favorable therapeutic prognosis. These results cannot be achieved single handedly but through a combination of interdisciplinary skills and approaches of various fields of dentistry. A tooth loss is often accompanied by a deformity of the alveolar ridge leading to a compromised esthetic and functional outcome. Therefore, various grafting procedures could be considered for the reformation and reconstruction of the deficient alveolar ridges. This case report discusses an approach for correction of a Siebert's class III alveolar ridge defect in the anterior mandibular region prior to the placement of fixed partial denture in order to establish better esthetic and functional outcome.

Case Report: A 42-year-old male patient reported to the Outpatient Department of Periodontology and Oral Implantology, at D.Y. Patil School of Dentistry, Navi Mumbai with a chief complaint of missing lower front teeth since 6 months. The edentulous space appeared asymptomatic and normal. The medical history obtained was non-contributory. The missing tooth was 41.

Conclusion: Localized alveolar ridge defects may create physiological and pathological problems. Correction of a localized ridge defect with soft tissue augmentation is a promising therapeutic measure in a fixed prosthodontic therapy. It not only improves the mucogingival aesthetics of the pontic region, especially in the anterior segments of maxilla/mandible but also prevents further phonetic & functional problems.

Key Words: Aesthetics, Reformation and reconstruction, Therapeutic prognosis, Dentistry, Alveolar ridges, Anterior mandibular region

INTRODUCTION

There has always been an increasing demand for optimum functional and esthetic prosthetic restorations. Teeth replacement in esthetically demanding areas such as anterior segments of maxilla and mandible require restorations and prostheses, not only with a correct form and color shade but also with a well-established natural appearance of the surrounding periodontal tissues. A variety of etiologic factors could be responsible for the dentoalveolar bony defects. These factors could be a pulpal or periapical pathology, an unfavorable tooth extraction causing trauma, advanced stages of periodontal disease with alveolar destruction, failed implants, odontogenic cysts and tumours or congenital anomalies, thereafter resulting in alveolar ridge defects with loss of attached mucosa thus presenting a major prosthetic challenge. If a prosthesis is placed on

a deficient alveolar ridge, it could pose various potential issues, compromising the aesthetic and functional results.² The aesthetic issues may involve open interdental spaces due to a deficient interdental papilla, loss of buccal contour, inadequate width of attached gingiva, unfavorable gingival texture whereas functional problems may involve compromised phonetics and food accumulation/food impaction under the prostheses. These issues could be difficult to tackle if they occur in the anterior segments of maxilla and mandible. Therefore, various soft and hard tissue augmentation procedures should be considered in order to correct the alveolar deformities. The correct augmentation procedure is determined depending on the type of the defect (soft tissue/hard tissue), extent of the defect, type of prosthesis to be placed and the specific procedures to be carried out for prosthetic rehabilitation.

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In the last decade many advancements and modifications in surgical procedures in the field of Periodontology have been utilized to achieve best treatment outcome results in order to restore form, function and aesthetics of the patient. Soft tissue ridge augmentation is a valuable periodontal plastic surgery procedure for correction of ridge defects for aesthetic purposes.^{1,5} Sub-Epithelial connective tissue graft, free gingival graft, roll pedicle graft, interpositional graft technique are the most used dental surgical approaches in this scenario.

Various Procedures are considered for rectifying a localized alveolar ridge deficiency. These procedures may include either surgical or non- surgical approaches.

I. Non-surgical Approach -

- (a) A tooth colored pontic for overcoming the alveolar ridge defect
 - Palatally inclined pontic design.
 - Long design of the pontic.
- (b) Replication of the soft tissue deficit in order to cover the ridge defect
 - Use of Pink ceramic restorative material in the cervical portion of the pontic.
 - Use of Pink silicone material for removable tooth prostheses.

II. Surgical Approach -

- a. Soft tissue procedures -
 - Full thickness free gingival grafts.
 - Subepithelial connective tissue graft
 - Lateral Pedicle graft
 - AlloDerm.
- b. Osseous/Alveolar ridge augmentation procedures -
 - Higher vertical dimension gain with interpositional Bone Grafting procedures
 - Membrane supported Guided bone regeneration.
 - A membrane and bone grafts' classical combination.
 - Techniques for Ridge expansion.
 - Osteogenesis procedures

The following case report describes a soft-tissue ridge augmentation procedure for correction of Siebert's class III mandibular anterior ridge defect by using a connective tissue graft derived from the hard palate region, followed by prosthetic rehabilitation, to achieve maximum esthetic and functional therapeutic outcome.

CASE REPORT

A 42-year-old male patient reported to the Outpatient Department of Periodontology and Oral Implantology, at D.Y. Patil School of Dentistry, Navi Mumbai with a chief complaint of missing lower front teeth since 6 months. The

edentulous space appeared asymptomatic and normal. The medical history obtained was non-contributory. The missing tooth was 41. The edentulous space examination about 41 revealed Siebert's class III alveolar ridge defect (Figure A). A soft tissue ridge augmentation approach using a sub epithelial connective tissue graft was considered for this case prior to the placement of fixed partial denture. (Figure B)^{3,6,7,8}



Figure A: Figure showing Siebert's class III ridge defect.

Surgical Procedure

A meticulous scaling and root planning procedure was carried out in order to avoid plaque accumulation and unnecessary inflammation. Extra-oral antisepsis was performed with 10% povidone iodine solution right before the surgical procedure. Local anesthesia (2% Lignocaine hydrochloride with adrenaline 1:80000) was administered to both donor and recipient sites. A crestal incision was made in the edentulous space. Two vertical incisions were given on either side of the edentulous space, at the line angles of the neighboring teeth. The vertical incisions were extended beyond the mucogingival junction continuing into the alveolar mucosa. Then, till the mucogingival junction, a full-thickness flap was raised. Following it, a partial thickness flap was raised beyond the mucogingival junction. The flap was sufficiently relieved in order to reduce the strain on the tissues and to advance it coronally to contain the sub-epithelial connective tissue graft. The alveolar ridge showed an adequate vertical and horizontal dimension. Following this, a sterilized aluminum foil template was made to imitate the appropriate size of the graft required at the recipient site in order to cover the defect. The amount of donor tissue required was accurately determined using a periodontal probe. The connective tissue graft of adequate size was harvested from the palatal region and was then placed over the recipient site and was stabilized using 3-0 silk sutures (Figure C). A surgical stent was given to protect the donor site.

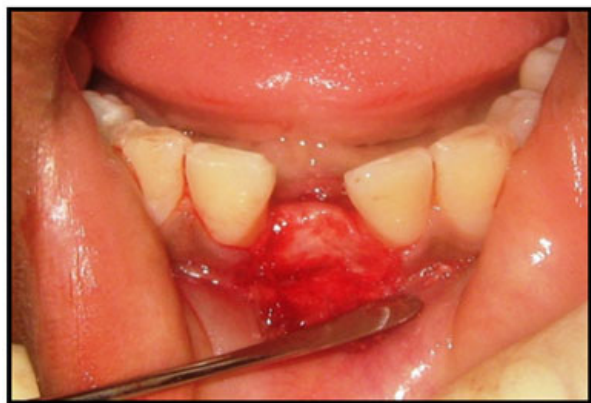


Figure B: Sub-epithelial connective tissue grafting at the recipient site.



Figure C: Sutures placed after placing the graft tissue.

Post-operative instructions were explained to the patient. The patient was put on antibiotics therapy (Amoxicillin 500 mg) for 5 days and analgesic (Enzoflam) for 5 days post-operatively. Mouth rinse 0.2% chlorhexidine gluconate 10ml was prescribed two times a day for 21 days. Patient was recalled 14 days after the surgery for suture removal where healing was found to be satisfactory (Figure D).



Figure D: Post-operative - 14 days.



Figure E: Restorative phase: After adequate soft tissue healing of the defect, three units of metal-ceramic FPD was placed using 31 and 42 as the abutment teeth to replace the missing 41 leading to improved esthetics of the patient.



Figure F: Patient rehabilitated with metal ceramic FPD.

DISCUSSION

Edentulous areas which are about to receive a fixed prosthesis should always be carefully examined while the treatment planning phase.⁹ An ideal shaped alveolar ridge should have a smooth, regular surface of keratinized mucosa. Its height and width should allow the placement of a pontic that can emerge from the ridge and mimic the appearance of neighboring teeth. However, a high incidence (91%) of residual ridge deformity has been reported following an anterior tooth loss.

The ridge defects pose as a functional and aesthetic challenge in maintaining a normal anatomy of the periodontal tissues following rehabilitation. An unesthetic or unattractive prosthesis can result from an unbalanced tooth to gingival tissue relationship.¹⁰ The localized alveolar ridge defects may be corrected by two different approaches: hard tissue ridge augmentation and soft tissue augmentation procedures. However, when planning fixed partial denture as definitive prosthesis, soft tissue augmentation procedures alone provides a satisfactory aesthetic outcome in majority of cases. Soft tissue connective tissue grafts were useful in augmenting alveolar ridge defects, especially in the apico-coronal

plane. These grafts are mostly indicated in Seibert's class I and III defects whereas in areas with compromised vascular supply, they are contraindicated.

In the present case, soft tissue ridge augmentation using a sub-epithelial connective tissue graft from the palatal region followed by placement of fixed partial denture was advocated in mandibular anterior region with Siebert's class III defect to attain maximum esthetics and functions. The first clinical report on using a soft tissue graft to correct an anterior vertical ridge defect was published by Meltzer in 1979. In 1983, Siebert developed a free gingival only graft using the palate as a donor area.¹¹ Connective tissue grafts can be used not only to treat ridge defects but also to correct various mucogingival problems. It is a relatively simple procedure and can be obtained from patients own oral cavity.

Conventional tooth supported FPD may be an ideal treatment option where implants are contraindicated or patients refuse the implant therapy due to its surgery, expense and long time consumption to complete the treatment. However, natural abutment teeth with sufficient bone support are required for these types of prostheses. Moreover it reduces treatment time and cost.

CONCLUSION

Localized alveolar ridge defects may create physiological and pathological problems. Repair of the deformed edentulous ridge preceding prosthetic rehabilitation can provide the restorative dentist with a more ideal gingival contour. Careful examination and correct diagnosis along with a periodontic surgical-prosthetic treatment planning before surgery should be performed in order to attain optimal esthetic results. Correction of a localized ridge defect with soft tissue augmentation is a promising therapeutic measure in a fixed prosthodontic therapy. It not only improves the mucogingival aesthetics of the pontic region, especially in the anterior segments of maxilla/mandible but also prevents further phonetic & functional problems.

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