

Techniques of Soft Tissue Ridge Augmentation – An Overview



Dental Sciences

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ABSTRACT

Defective residual alveolar ridge is commonly encountered problem in dental practice which occurs following traumatic tooth extraction, long standing edentulous space and also as a result of periodontal disease. Failure to manage the alveolar ridge defects and treating the patient with prosthetic replacement leads to compromised results with unaesthetic long pontics. This undesired result can be managed by a procedure called ridge augmentation before doing prosthesis. This present review is focused on various grafting methods and different techniques for soft tissue augmentation.

INTRODUCTION

Residual ridge resorption is an inevitable process which follows the tooth loss and if excessive lead to compromised prosthetic procedures like inability to place implants and unaesthetic pontics. This can be treated by a procedure called ridge augmentation which is done to increase volume, width and height of residual ridge to receive and retain dental prosthesis.

We can broadly classify ridge augmentation procedures in to hard tissue augmentation and soft tissue augmentation procedures. Hard tissue augmentation procedures are those which are done to increase the bone and its supporting structure before placing the implant whereas soft tissue augmentation is mainly aimed to enhance the soft tissues alone particularly before placing fixed partial denture to avoid unaesthetic pontics.

RESIDUAL RIDGE DEFECTS

The most commonly used classification are

SIEBERT – 1983

Class I	Bucco-lingual loss of tissue with normal apico-coronal ridge height.
Class II	Apico-coronal loss of tissue with normal bucco-lingual ridge width
Class III	Combination type defects with both height and width loss

ALLEN IN 1985

Class A	Apico-coronal loss of tissue
Class B	Bucco - lingual loss of tissue
Class C	Combination of apico-coronal and bucco - lingual loss of tissue

TECHNIQUES OF SOFT TISSUE AUGMENTATION

The different techniques involved in soft tissue augmentation procedure involve use of either autogenous grafts harvested from patients or any commercially available materials to be used with any one of the following procedures. The type of procedure is determined by the clinician based on the type of ridge defect. The various procedures are

1. Pouch graft procedure
2. Roll flap technique

3. Modified roll flap technique
4. Onlay epithelized grafts
5. Interpositional graft technique
6. Combined onlay interpositional graft

1. POUCH OR ENVELOPE FLAP PROCEDURE

Siebert in 1993 introduced this procedure which involves connective tissue graft along creation of sub epithelial pouch in the ridge defect area by making a partial thickness horizontal incision in the crest of ridge. The incision is extended apically and laterally over the deformity and connective tissue graft is inserted in to the pouch and sutured using 4-0 / 5-0 silk sutures. The connective tissue used for this purpose mostly harvested from maxillary tuberosity to obtain stable graft along with ridge enhancement. This procedure can also be accompanied with use of bone grafts to obtain better results.

2. ROLL FLAP TECHNIQUE

Roll flap technique was originally advocated by Abrams 1980. This technique involves the stripping of epithelium from connective tissue of pedicle flap which is obtained from the palate. A full thickness vertical incision is made initially in defect area joining the partial thickness horizontal incision which is made over the crest of residual ridge and flap is raised. The pedicle connective tissue is now rolled under buccal mucosa in order to correct bucco lingual ridge defects.

3. MODIFIED ROLL FLAP TECHNIQUE

Scharf in 1992 introduced this technique which involves use of de epithelized connective tissue pedice flap which can be used in small or moderate class I defects. In this technique a full thickness vertical incision is made from mesial aspect of deformed ridge towards the palatal aspect. This incision should meet a partial thickness horizontal incision made on the crest of edentulous ridge. The reflection of palatal connective tissue graft initiated at apical end and moved coronally to the crest of ridge. Graft is folded in to two pieces and rolled in to the pouch and then stabilized with resorbable sutures.

4. ONLAY EPITHELIZED GRAFT

Onlay grafts are epithelialized free gingival graft which is placed over connective tissue of de-epithelialized recipient site.(Siebert 1983). They can be used in large siebert class II & III defects. This technique involves gain in ridge height which can be attained gradually by repeating the procedure in two to three months.

As a result onlay graft maintains their intact epithelium over the connective tissue. The graft is secured with its connective tissue base in contact with de-epithelialized recipient site. Significant ridge correction can be achieved by this technique, but due to color difference between palatal and gingival tissue, it may create unpleasant esthetic results and hence not advocated in aesthetic areas. The other disadvantages include post-operative necrosis in case of inadequate blood supply and unpredictable shrinkage of grafts

5. INTERPOSITIONAL GRAFTS

Interpositional graft is used to correct class I and Class II ridge defects. The recipient site is prepared in a similar way to pouch procedure by making a partial thickness horizontal incision and extending it horizontally and apically and then inserting a thick, wedge shaped connective tissue graft. The graft is finally sutured leaving a epithelial surface at the level of surrounding tissue.

6. COMBINED ONLAY INTERPOSITIONAL GRAFT

Sibert and Louis in 1996 developed this procedure mainly to treat sibert class III ridge defects. This is a combination of two procedures onlay epithelialized grafts and interpositional sub epithelial connective tissue grafts

PROCEDURE

With the 15c scalped blade epithelium over the coronal aspect of the residual ridge is removed. Vertical grooves are advocated to increase vascularization. A pouch is created with the use of vertical clearing incision. The inter positional graft is a wedge shape thick graft placed between the free edge of pouch and exposed portion of the ridge. The graft is left exposed and vertical incision is also employed. The graft is first stabilized in pouch and then the pouch is sutured to the epithelial portion of the graft. The submerged connective tissue section of the interpositional graft aids in the revascularization of the onlay section of the graft, thereby gaining a greater percentage of success of the overall graft

IN VIVO STUDIES

With the limited literature available for different techniques the long term predictability were assessed based up on various factors present in the patient and patient compliance. The following are various studies in which different techniques of soft tissue augmentation is applied and its outcome is reviewed.

AUTHOR	TYPE OF PROCEDURE	RESULTS
Han et al 1995	Free gingival graft strips covered with tinfoil & dressing	Increase in keratinized gingiva
Block 1999	Palatal roll flap to cover exposed metal after implant	Enhanced aesthetics with patient smile
Price and Price 2000	Connective tissue graft in first surgery followed by coronally advanced flap after 17 days	Treated for siebert class III ridge defect
Mathews 2002	Pediculated connective tissue graft	Visible black triangle reduced.
Shibli et al 2004	Connective tissue graft with coronally advanced flap.	Sufficient gain in height and width
Shibli and d'Avila 2005	Sub epithelial connective tissue graft and coronally advanced flap in both cases	Facial margin apical to adjacent tooth
Yan et al 2006	Free gingival graft with anti-biotics	Increase in keratinized gingiva
David L. Hoexter 2009	Sub epithelial connective tissue graft – Pouch method	Favorable outcome

Arvind Shetty, Rasika Jagtap 2009	Sub epithelial connective tissue graft – Envelope method	Significant increase in ridge
Kavitha Jayavel, Mythili, Senthil 2010	Acellular dermal matrix with coronally advanced flap	3mm gain in thickness and 2mm gain in height
Ramesh chavan Manohar 2010	Double fold connective tissue pedicle graft	Satisfactory gain in both buccal lingual and apico coronal direction
Parimala Prithviraj 2011	Connective tissue graft with envelope flap for siebert class III ridge defect.	Sufficient gain with no relapse of defect
Basegmez 2012	Free gingival graft with onlay method	Increase in keratinized gingiva
Po-Yu La Shing-Wai Yip, 2012	Sub epithelial connective tissue graft with envelope flap procedure in two stages.	Follow-up examinations for ten months confirmed a stable outcome
Ashish Agarwal Hirak S. Mini S. Semi 2012	Sub epithelial connective tissue graft by pouch method along with bone graft (DFDBA)	Adequate volume obtained to achieve normal soft tissue architecture

CONCLUSION

In this present review various techniques of soft tissue augmentation along with their corresponding studies is reviewed. Although there are various techniques available for use of soft tissue augmentation the best possible technique for particular individual should be decided by the clinician based on various factors present in the patient. Sufficient knowledge on different techniques and various grafting methods is essential for proper case selection and successful treatment outcome.

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