

**CRAFT WITH GRAFT – USE OF FREE GINGIVAL GRAFT FOR GINGIVAL
TISSUE AUGMENTATION – A REPORT OF TWO CASES**

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Abstract

Mucogingival surgery is defined as periodontal surgical procedures designed to correct defects in the morphology, position, enhance the dental gingival junction, since defects in the morphology of the gingival and alveolar mucosa can accelerate the course of periodontal disease, or interfere with the successful outcome of periodontal treatment. Gingival recession and loss of attached gingiva is frequently complicated by the presence of a shallow vestibular fornix. The autogenous Free Gingival Graft (FGG) has been considered the most predictable and popular procedure for increasing the width of keratinized tissue around a tooth associated with any mucogingival defect. The present case report of two cases describes a technique where the vestibular deepening was carried out with the periosteal fenestration technique and the apical augmentation of the gingival recession by increasing the width of the keratinized tissue is done using free gingival graft from the palate.

Keywords: Mucogingival Surgery, Free Gingival Graft, Vestibular Deepening, Attached Gingiva

Introduction:

Periodontal plastic surgery is defined as a "surgical procedure performed to correct or eliminate anatomic, developmental, or traumatic deformities of gingival or alveolar mucosa."¹ The presence of "adequate" zone of gingiva was considered critical for the maintenance of marginal tissue health and for the prevention of continuous loss of connective tissue attachment.² The prevailing concept is thus that a narrow zone of gingiva was insufficient (a) to protect the periodontium from injury caused by friction forces encountered

during mastication and (b) to dissipate the pull on the gingival margin created by the muscles of the adjacent alveolar mucosa.³ Though a number of studies suggest that a minimum of 2 mm width of keratinized gingiva, corresponding to 1 mm of attached gingiva is necessary for maintaining a good periodontal health, others claim that 1 mm or less of keratinized tissue is sufficient to guarantee a healthy periodontium in the presence of good oral hygiene.⁴

Coronal frenal attachments are commonly associated with decreased vestibular depth. Extreme cases may present with lip or cheek mucosa attached directly to the gingival margin, which may make it movable and difficult for plaque control to be performed and predispose such an area to gingival recession.⁵ Gingival recession and loss of attached gingiva is frequently complicated by the presence of a shallow vestibular fornix and aberrant tissue bands attached to the gingival margin or the soft tissue wall of the pocket.⁶

Important functional points in the treatment of mucogingival problems are to halt the recession process and to facilitate plaque control in the affected area.⁶ Mucogingival therapy must be directed toward repositioning the tissue bands and deepening the vestibular fornix in order to allow for a take of the graft and also to create an environment in which it can be maintained.⁵ Since the establishment of the adequate width of attached gingiva is one of the important goals of periodontal surgery, several techniques have been developed to widen the zone of keratinized gingiva and obtain the predictable outcome in improving the periodontal health.

First described by Bjorn (1963) free gingival grafts have been widely used in the treatment of certain mucogingival problems like lack of attached gingiva and gingival recession. The autogenous FGG has been considered the most predictable and popular procedure for increasing the width of keratinized tissue around a tooth associated with any mucogingival defect.^{2,7,8}

The present case report of two cases describes a technique where the vestibular deepening was carried out with the periosteal fenestration technique and the apical augmentation of the gingival recession by increasing the width of the keratinized tissue is done using free gingival graft from the palate.

Case report:

Case 1: A 23 year-old male patient reported to the Department of Periodontics with the chief complaint of receding gums. On examination, it was found that vestibular depth was inadequate in relation to 31,32,33,34 with Miller's Grade I gingival recession in 31, 41.

(FIGURE 1) 31 was slightly labially placed and patient gave the history of toothbrush trauma. The width of attached gingiva was also inadequate in the region. There was no mobility associated with the tooth.

Case 2: A 36-year-old male patient reported with the chief complaint of sensitivity due to receding gums. On examination, vestibular depth and width of attached gingiva were inadequate in relation to 31,32,41,42. Grade I recession of 3mm evident in relation to 31,41 and 2mm evident in relation to 42,32 (FIGURE A). There was no mobility associated with the tooth.

For both the cases, to increase the width of attached gingiva, to deepen the vestibule, and to manage the gingival recession by apical augmentation, the periodontal plastic surgery was planned by periosteal fenestration technique and free gingival grafts. A general assessment of the patient was made through the history, clinical examination and routine laboratory investigations. Before surgery, the patients received phase-I therapy, which included oral hygiene instructions and scaling and root planning with ultrasonic and hand instruments. Two weeks after phase I therapy, the patients were planned for surgical procedures. On the day of surgery, local anesthesia was first administered bilaterally by using a mental nerve block.

Vestibular Deepening By Periosteal Fenestration Technique:

A horizontal incision was made using a no. 15 surgical blade at the mucogingival junction retaining all of the attached gingiva. (FIGURE 2) A split thickness flap was reflected sharply, dissecting muscle fibers and tissue from the periosteum. A strip of periosteum was then removed at the level of the mucogingival junction, causing a periosteal fenestration exposing the bone and the recipient bed is made ready for the graft placement. (FIGURE 3) (FIGURE B)

Preparation of Donor Tissue – Free Gingival Graft:

The amount of donor tissue needed was accurately determined by using a foil template. (FIGURE 4) (FIGURE C) The right side of palate between first and second premolar which had greater thickness was selected to harvest the donor tissue. The initial incision was outlined by the placement of tinfoil template with a number 15 scalpel blade. A bevel access incision was made to get an even thickness of the graft. The incision was made along the occlusal aspect of the palate with number 15 scalpel blade held parallel to the tissue, continued apically, lifting and separating the graft (FIGURE 5)(FIGURE D) After the

donor tissue had been released, the pressure was applied with damp gauze at the donor site (FIGURE 6)(FIGURE E). The adipose and glandular tissues on the graft were removed using a scraping motion with a no. 15 scalpel blade. (FIGURE 7) (FIGURE F)

The free gingival graft was then placed on the recipient bed (FIGURE 10)(FIGURE H) and sutured by means of interrupted sutures (3-0 Vicryl resorbable) at the coronal and apical borders.(FIGURE 11)(FIGURE I) Periodontal dressing was applied over the operated area and an acrylic palatal stent was placed to cover the wound. (FIGURE 8, 9 AND 12) (FIGURE G AND J) Antibiotic therapy (amoxicillin 500 mg, Thrice daily and analgesic (Aceclofenac (325mg) and Paracetamol (100 mg) twice daily) was prescribed for 5 days. The patients were advised to refrain from retracting the lips and cheeks and Tooth brushing was discontinued for the first 2 weeks at the surgical site and 0.2% chlorhexidine mouth rinse was instructed till 4 weeks after surgery. Periodontal dressings were removed 10 days after the surgical procedure and the patients were asked to maintain meticulous oral hygiene. Healing had proceeded uneventfully, with secondary wound closure. In 2 weeks, healing was nearly complete, with minimal post-operative discomfort to the patients. (FIGURE13) (FIGURE K). At 2 months post-operative, there was an increased width of keratinized tissue with minimal probing depths, no inflammation, and a favorable esthetic result. (FIGURE 14) (FIGURE L)

CASE1:



FIGURE 1: Pre-Operative



FIGURE 2: Incision placed at



FIGURE 3: Periosteal fenestration done

DONOR TISSUE PREPARATION- FREE GINGIVAL GRAFT:



FIGURE 4: Tin foil template



FIGURE 5: outline marked for FGG



FIGURE 6: donor site after graft harvesting



FIGURE 7: Free Gingival Graft



FIGURE 8: Periodontal Dressing



FIGURE 9: Clear Acrylic Stent

RECIPIENT SITE:



FIGURE 10: Graft placed in recipient bed



FIGURE 11: Sutures Placed



FIGURE 12: Periodontal Dressing



FIGURE 13: Two Weeks Post-Operative – Donor and Recipient site



FIGURE 14: Two Months Post-Operative – Donor and Recipient site

CASE 2:



FIGURE A: Pre-Operative



FIGURE B: Periosteal fenestration done

DONOR TISSUE PREPARATION- FREE GINGIVAL GRAFT



FIGURE C: Tin foil template



FIGURE D: outline marked for FGG



FIGURE E: donor site after graft harvesting



FIGURE F: Free Gingival Graft



FIGURE G : Periodontal Dressing and Clear Acrylic Stent placement

RECIPIENT SITE:



FIGURE H: Graft placed in recipient bed



FIGURE I: Sutures Placed



FIGURE J: Periodontal Dressing



FIGURE K: Two Weeks Post-Operative



FIGURE L: Two Months Post-Operative

Discussion:

For decades, one of the main goals of mucogingival surgical procedures was to widen the zone of attached gingiva in areas where it is deficient to improve the periodontal health.⁴ The other therapeutic goals of mucogingival surgery are esthetics, treatment of hypersensitivity and prevention of root surface caries. It was believed that an "inadequate"

zone of gingiva would (a) facilitate subgingival plaque formation because of the improper pocket closure resulting from the movability of the marginal tissue and (b) favor attachment loss and soft-tissue recession because of less tissue resistance to apical spread of plaque-associated gingival lesion.⁹ The study by Lang and Loe regarding the significance of gingiva for periodontal health concluded that “two mm of keratinized gingiva is adequate to maintain gingival health” and this expression has been widely quoted as definition as to what constitutes an adequate width of gingiva for the maintenance of periodontal health.¹⁰

The importance of attached gingiva has also been acknowledged by Goldman and Cohen in 1979 who gave a “tissue barrier” concept and postulated that a dense collagenous band of connective tissue retards and obstructs the spread of inflammation better than does the loose fiber arrangement of the alveolar mucosa. They recommended increasing the zone of keratinized attached tissue to achieve an adequate tissue barrier (thick tissue), thus limiting recession as a result of inflammation. A thick keratinized attached gingiva is capable to withstand the stresses of mastication, tooth brushing, trauma from foreign objects, tooth preparation associated with a crown and bridge, subgingival restorations, orthodontics, inflammation and frenulum pull, as well as prevent the apical spread of plaque-associated gingival lesions. This can be achieved by mucogingival surgical techniques, which are designed to provide a functionally and esthetically adequate zone of keratinized attached gingiva.¹¹

It was also considered that a narrow gingiva in combination with a shallow vestibular fornix might (a) favor the accumulation of food particles during mastication, and (b) impede proper oral hygiene measurement.⁹ Hence vestibular deepening should be considered where patients experience discomfort during brushing and chewing.¹² The periosteal fenestration technique as described by Corn is particularly applicable where vestibular deepening involves separation of the mentalis muscle. The exposure of a thin area of bone appears to tack down the tissue and there is less shallowing out of the trough after healing.¹³ In both the cases, since inadequate vestibular depth was evident, vestibular deepening was carried out using periosteal fenestration technique.

Though the technique of FGG is in the practice since its introduction in 1963, it is still considered as gold standard and the most predictable gingival augmentation procedure. The term “Free gingival graft” seems to be misleading because “free gingiva” is the unattached gingiva surrounding the teeth and this tissue is not used in the grafting procedure.

In addition, the palatal tissue used for grafting is not actually gingiva but technically masticatory mucosa.¹⁴

The clinical performance of autogenous FGG is always considered superior to other contemporary gingival augmentation procedures in terms of its effectiveness, reliability, and a high degree of predictability.¹⁴

Several other techniques such as acellular dermal matrix (ADM) allograft, modified apically repositioned flap, tissue engineered human gingival fibroblast-derived dermal substitute, DynaMatrix extracellular membrane, tissue-engineered bilayered cell therapy, and mucograft collagen matrix, have been tried in periodontal plastic surgery with varying rates of success.⁴

It was speculated that where the combined problems present, a free gingival graft would have an adequate blood supply for a successful take when employed with periosteal fenestration along with a vestibular extension.⁶ If the connective tissue coronal to the fenestration could survive, it should also be able to support the donor tissue placed in intimate contact with it. Even if the fenestration were to sever some of the arterioles passing along the labial surface, other vessels in the area should be sufficient to supply the periosteal bed of tissue remaining and thus support the graft. The source of this additional blood supply would be coming from the anastomosis of vessels coursing up the lingual to the interdental papilla, the vessels emerging from the alveolar crest, the periodontal ligament and, to a lesser degree, those penetrating the labial plate of alveolar bone.⁶

The use of a free gingival graft in combination with a periosteal fenestration has advantages over the sliding flap, fenestration procedure alone, or free gingival graft alone.

The advantages are:

1. There is no possibility of exposing a dehiscence or creating bone loss on adjacent teeth, as might occur when the sliding flap is used and bone is exposed at the donor site.
2. Mature gingival tissue can be placed over root surfaces with possible reattachment which cannot be accomplished with fenestration alone.
3. There is probably less chance of a pull out of the tissue or decrease in the width of the attached gingiva or shallowing out of vestibular depth when fenestration is used along with the free graft.⁶ Thus in both the cases free gingival graft was used after periosteal fenestration technique for apically augmenting the gingiva which resulted in the increased amount of

attached gingiva. The main purpose of the free gingival graft was apical augmentation rather than root coverage.

Despite its clinical superiority and more predictability, certain disadvantages associated with FGG continue to spur interest for the less invasive alternatives.⁴ Disadvantages such as procurement of FGG procedure requires an additional donor surgical site, availability of limited amount of donor tissue, leaves a wound of considerable size in the palatal donor area to heal by secondary intention causing postoperative pain and other complications. Similarly, at the recipient site, FGG may be associated with esthetic problems due to discrepancies of color and texture between the healed graft and surrounding mucosa as well as a bulky appearance.¹⁵

In the present study also, the esthetic results varied greatly in both the cases; the FGG tended to create a more “patch-like” appearance. This phenomenon of “patch-like” appearance can readily be explained by the fact that by retaining viable cellular components, the FGG remains vital at an ectopic site and stubbornly expresses the characteristics of palatal mucosa.⁴

Even though free gingival graft has certain disadvantages, By using this technique, attached gingiva can be increased in a very predictable way. Furthermore, the results obtained using this procedure has been reported to be stable.¹⁶

Conclusion:

Free gingival graft may still be the best treatment option for gingival recession when an increase in the apicocoronal dimension of the keratinized gingival tissues is a desirable treatment outcome such as cases with shallow vestibular depth and cases with inadequate gingival tissue where restorations with subgingival margins are to be placed. Close attention to proper case diagnosis and to the steps involved in the surgical procedure are crucial in maximizing the predictability of the free gingival graft in correcting mucogingival problems and achieving root coverage.

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