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Soft Tissue Augmentation using modified Apically Repositioned Flap (MARF) – A Case Report

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ABSTRACT

This case report describes a technique for increasing the width of the attached gingiva which is a modification of the apically repositioned flap technique. Patient reported with chief complaint of hypersensitivity in the lower anterior teeth. On examination, the case was diagnosed to be a case of class III miller's classification, with an inadequate zone of AG .Treatment with MARF resulted in a significant increase (i.e 2 mm) in attached gingiva. There was no significant change in probing pocket depth. The advantages of this technique include: Minimal surgical trauma; it does not require a second surgical site; it is less time-consuming; and it results in a perfect gingival color match.

KEYWORDS: gingival recession, Apically displaced flap, keratinized gingiva , attached gingiva , Root coverage.

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INTRODUCTION

Orban[1] first described the term attached gingiva as that part of the gingiva that is firmly attached to the underlying tooth and bone and is stippled on the surface. The width of the attached gingiva (AG) is the distance between the mucogingival junction (MGJ) and the projection on the external surface of the bottom of the gingival sulcus or the periodontal pocket[2]. The presence of an adequate zone of AG was considered critical for the maintenance of marginal tissue health.[3]. Lang and Loe in 1972 [4] stated that the presence of adequate attached gingiva is necessary to maintain gingival health.

A multiplicity of operations have been devised, modified and remodified to correct problems associated with lack of AG. One of the first surgical techniques designed to correct such problems was an apically repositioned flap[5] that allowed surgeons to increase or preserve the area of AG by moving the tissue apically and exposing a variable band of crestal bone.

But this technique has limitations[6], apically repositioned flap technique leave 3–5 mm of denuded bone in the coronal portion which has a risk of bone resorption, marginal recession and regional accelerated phenomenon. To overcome these disadvantages, Carnio and Miller [7]in 1999 described the modified apically repositioned flap (MARF) technique for increasing the width of AG for single tooth and perceived advantages includes minimal trauma, ease of execution, predictable color match, requires less chair time. Carnio and Camargo in 2006 have proposed MARF technique for multiple teeth[8].

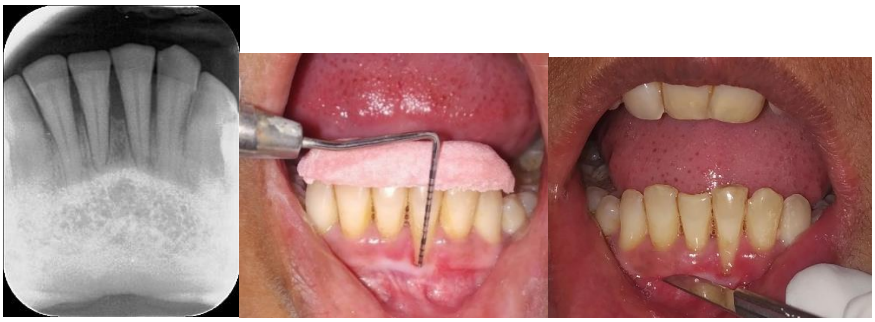
This case report describes the cases in which augmentation of attached gingiva was done by MARF technique.

CASE REPORT

A 32 years old female patient with an inadequate zone of AG reported to the outpatient department of periodontics and implantology. Informed consent was obtained from the patient.

At baseline, the clinical parameters such as the probing depth (PD), the width of keratinized tissue (KT), and the width of the AG were recorded (Fig –b). Method employed for locating the mucogingival junction is the visual method. The apicocoronal distance from MGJ to the gingival margin is the width of KT. Pocket Depth was measured using the University of North Carolina‑15 periodontal probe from the gingival margin to base of the sulcus. IOPA of this region (Fig –a) suggests, interdental bone loss, hence the case was diagnosed to be a case of class III Miller's classification. Prognosis was fair and increase in the width of attached gingiva was expected by this procedure. Treatment was

planned. Etiotrophic phase included scaling, root planning, and oral hygiene instructions were given. Patient was recalled after 2 weeks of Phase I therapy and then surgical phase ie. MARF procedure was carried out.



a) IOPA b) pre- operative c) horizontal incision

d) Vertical incision e) split thickness flap f) simple interrupted suture

g) Coe – pack placed h)suture removal- after 14 days of surgery

i)1month after surgery j) post – operative (after 3 months)

Fig 1 - a) IOPA , b) pre- operative, c) horizontal incision d) Vertical incision e) split thickness flap ,f) simple interrupted suture, g) Coe – pack placed ,h) suture removal- after 14 days of surgery , i) 1month after surgery, j) post – operative (after 3 months)

MODIFIED APICALLY DISPLACED FLAP

The surgical procedure was performed according to the protocol given by Carnio and Miller [7]in 1999.Local anesthesia using 2% lignocaine hydrochloride with 1:2,00,000 epinephrine was administered. A horizontal incision in the AG was made with no. 15 Bard-Parker blade, 0.5 mm coronal to MGJ. (Fig – c) Horizontal incision was made parallel to MGJ, at an angle of 30 to 45 degrees, formed by the blade and the portion of the gingival surface coronal to the blade. Therefore, the blade makes contact with periosteum at a point slightly apical to the alveolar crest.

The gingiva present coronal to the initial incision remains intact around the teeth. The mesiodistal extension of the initial horizontal incision should be extended by at least one half tooth mesially and distally of the areas in which gingival augmentation is desired. Two vertical incisions were placed on the mesial and distal ends connecting the horizontal incision. These incisions extended beyond the mucogingival junction. (Fig – d) A split-thickness flap is elevated, and the dissection is extended in the apical direction as far as deemed necessary (Fig – e). The flap is then secured to the periosteum with simple interrupted sutures using 3-0 mersilk (Fig – f). For preventing dead space between the flap and periosteal bed, a gentle finger pressure was applied and the periodontal pack was placed (Fig – g)

Postoperative care

Postoperative instructions and medications was given Amoxicillin (500 mg thrice daily for 5 days) and aceclofenac (100 mg thrice daily for 3 days) were given. Patient was instructed to avoid brushing, flossing, manipulating the surgical site with tongue, lips, and fingers for 6 weeks and use 0.12% chlorhexidine mouth rinse twice daily for 3 weeks. Suture removal was done after 2 weeks (Fig – h). All the clinical parameters were recorded at 3 months. (Fig – j)

OUTCOME

Pre- and post-operative (3 months) clinical measurements are compared. Preoperatively, there was inadequate width of attached gingiva <1mm but after MARF procedure, there is gain of 2mm of attached gingiva . Sulcus depth did not change. Patient is on regular follow ups.

Table 1- Clinical parameters at baseline and at 3 months

Comparison of preoperative and postoperative measurements		
Clinical parameters	**Preoperative (baseline)**	**Postoperative (at 3 months)**
Recession	6mm	5mm
Attached gingiva	< 1mm	3mm
Sulcus depth	1mm	1mm

DISCUSSION

AG is composed of keratinized epithelium and dense connective tissue and helps to stabilize the gingival margin position. AG is bound to underlying periosteum and protects the periodontium. Deficient AG with poor plaque control may lead to gingival recession.[9]Data suggests that 2 mm of the gingiva is an adequate width for maintaining gingival health[10].Lang and Loe[4] in 1972 reported that areas with 1 mm or <1 mm AG often presented with clinical signs of inflammation. According to Maynard[11]*et al*. in 1979, physiological dimensions of about 5 mm of KT with 3 mm of attached gingiva are needed for maintaining gingival health when planning for subgingival restorations.

Friedman[12] in 1962 said that an adequate amount of the gingiva is any dimension of the gingiva that is compatible with gingival health or that prevents gingival margin during movements of the alveolar mucosa. According to Trombelli [13]gingival augmentation should be taken into account whenever a change in mucogingival morphology will facilitate plaque control.Hall[14] mentioned that areas with <2 mm of AG should be checked for active recession.

According to Karring et al.[15]the main factor determining the nature of the epithelial surface that will develop over the exposed periosteum is the origin of the epithelial cell that will migrate over the wound and is eventually surrounded by the KT.As the epithelial cells migrating from margins of the wound to cover the exposed connective tissue are keratinized in nature, which results in the formation and maturation of KT. This will prevent the proliferation of non-keratinized cells originating from the oral mucosa to the surgical area. Hence, it gives a predictable gingival color match with surrounding tissue.

The results of this case report showed that MARF is an effective and efficient technique to increase the keratinized and attached tissue width. A major limitation of the MARF technique is a need

for ≥0.5 mm AG to be present pre-surgically. This is necessary to allow for the full perimeter of the wound to be surrounded by KT and is important in origin of the granulation tissue during healing. The presence of bone dehiscence is another factor contraindicated in MARF technique. If a distance of more than 0.2 mm is present at the bottom of the pocket and bony crest, root dehiscence is likely to occur when a flap is positioned apically, which enhances the probability of the gingival recession.

CONCLUSION

MARF is a reliable technique to increase the width of attached gingiva. MARF is a simple surgical procedure when compared to other mucogingival procedures for gingival augmentation. It offers considerable advantages such as good esthetic results and no requirement of a second surgical site. MARF can be used as an alternative to other invasive procedures such as FGG with comparable and reliable results and minimal patient discomfort. Definitely, more number of cases are needed to ensure the predictability and success of this technique.

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