

Use of Free Gingival Graft and PRF to Increase the Width of the Attached Gingiva: A Novel Approach

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ABSTRACT

Inadequate width of attached gingiva can lead to difficulty in maintaining oral hygiene, can cause recession and if the patient is undergoing orthodontic treatment the bands and brackets might get engrossed in the buccal mucosa. Therefore, increasing the width of attached gingiva is necessary. Here, authors presents a case of 19-year-old female patient who was referred from the Department of Orthodontics for impinging of bands into gingiva which was identified to be because of in adequate width of attached gingiva. Horizontal incision was given at mucogingival junction from tooth 34 to 44 region. Full-thickness flap was raised till the required vestibular depth recipient site is required. Free Gingival Graft (FGG) of size 15×10 mm in size was harvested from left palatal mucosa from distal to 24 to mesial to 26 region. Harvested FGG was sutured from 32 to 42 region in the recipient site. Platelet Rich Fibrin (PRF) membrane was prepared using patients own blood and this membrane was sutured at 33 and 43 region at the recipient site. An aluminium foil was kept at the donor site and above the membrane at the recipient site on which periodontal pack was given. After 21 days of healing, the width of attached gingiva increased from 2 mm at baseline to 8 mm. According to Visual Analog Scale (VAS), mild pain was felt by the patient and no difference in the colour was seen at both recipient and donor site at 21 days after surgery. Use of FGG and PRF helps to achieve improved results for increase width of attached gingiva.

Keywords: Attached gingiva width, Platelet rich fibrin, Vestibuloplasty

CASE REPORT

A 19-year-old female patient was referred to the Department of Periodontics from the Department of Orthodontics for impinging of crimpable hooks into gingiva in 31, 32, 41 and 42 region [Table/Fig-1]. She did not have any significant medical history or any habits of consumption of alcohol or smoking. There was no significant extraoral findings. Patient was undergoing orthodontic treatment for correction of irregularly placed teeth. On intraoral examination, the width of attached gingiva in 31, 32, 41 and 42 region was 2 mm, respectively. Furthermore, the impinging of crimpable hooks into gingiva was identified, because of inadequate width of attached gingiva. Treatment plan decided to be followed was to increase the width of attached gingiva using free gingival graft.

Treatment plan: After the phase I therapy, all the necessary oral hygiene instructions were given with emphasis on proper plaque control. Informed consent of the patient was obtained, surgical procedure was explained to the patient. Under all aseptic condition and precautions and under local anesthesia [4,5]. Horizontal incision was given at mucogingival junction from 34 to 44 region. Full thickness flap was raised till the required vestibular depth at the recipient site [Table/Fig-2]. An aluminum foil was used to make a template with the size of the recipient bed and transferred to the palate. Initial incision of 2 mm depth was given on all four sides of the aluminium foil. Free Gingival Graft (FGG) of size 15×10 mm was harvested from left palatal

mucosa from distal of 24 to mesial of 26 region 3 mm away from the gingival margin [Table/Fig-3]. The harvested FGG was compressed and sutured at the recipient site i.e., from 32 to 42 region using absorbable thread 6-0 (Vicryl-Ethicon, Johnson and Johnson) [Table/Fig-4]. An aluminium foil was kept at the palatal donor site on which periodontal pack was given and 4-0 silk threads suture was placed to promote haemostasis and stabilisation of blood clot and periodontal pack [Table/Fig-5]. Platelet Rich Fibrin (PRF) membrane was prepared using patients own blood of a desired size and placed over 33 and 43 region and sutured using 6-0 absorbable suture at the recipient site [Table/Fig-6]. An aluminium foil was kept above the FGG and PRF membrane at the recipient site so as to place periodontal pack over it [Table/Fig-7,8].

Postoperative medications given was 0.2% chlorhexidine mouthwash two times a day for 4 weeks. Aceclofenac 100 mg and paracetamol 325 mg was given twice a day for 5 days and oral hygiene instructions were given to the patient.

After 14 days, the sutures were removed from the donor and recipient locations. Patient did not experience any postoperative pain or discomfort. There was uneventful healing at both the surgical site. After 14 days of healing the width of attached gingiva increased from 2 mm at baseline to 8 mm at site where FGG and PRF membrane was placed [Table/Fig-9,10]. According to visual analog scale, mild pain was felt by the patient and slight difference in the colour was seen at both recipient and donor site at 14 days



[Table/Fig-1]: Impinging of crimpable hooks into gingiva. **[Table/Fig-2]:** Full-thickness flap elevated. **[Table/Fig-3]:** Harvesting FGG of size 15×10 mm. **[Table/Fig-4]:** Placement of FGG from 32 to 42 region on recipient. **[Table/Fig-5]:** An aluminium foil was kept on donor site followed by periodontal pack placement. **[Table/Fig-6]:** PRF membrane placed on contralateral recipient site. (Images from left to right).

after surgery. Complete surface healing was observed at 21 days after surgery [Table/Fig-11].



[Table/Fig-7,8]: An aluminium foil was kept above the FGG and PRF-membrane at the recipient site on which periodontal pack was given.



[Table/Fig-9]: Width of attached gingiva 2 mm at the baseline.
[Table/Fig-10]: Width of attached gingiva 8 mm 14 days after surgery. (Images from left to right).



[Table/Fig-11]: Complete healing seen 21 days after surgery.

DISCUSSION

Attached gingiva is defined as the tissue between the mucogingival junction and the projection on the external gingival surface of the most apical portion of the gingival sulcus or the periodontal pocket [1]. The associated gingival width is genetically determined, varies in different parts of the dentition, and can fluctuate during life [2]. The presence of an adequate amount of gingiva has long been seen to be a cornerstone for periodontal health. It is more prominent in the incisor area 3.5-4.5 mm in the anterior maxilla 3.3-3.9 mm in the anterior mandible. In the posterior tooth area it is narrower, 1.9 mm in the maxilla premolar and 1.8 mm in the mandible premolar [2]. Attached gingiva width is small in newly erupted permanent teeth and gradually increases as permanent teeth emerge. Adequate zone of attached gingiva is always a matter of discussion. As it affects gingival health in various ways, subgingival plaque development is aided by an insufficient zone of attached gingiva. If the patient is undergoing orthodontic treatment, the bands and brackets might get engrossed in the buccal mucosa [3]. Therefore, it is necessary to increase the width of attached gingiva.

Vestibuloplasty is a procedure for hard and soft tissue augmentation in the vestibular area. There have been several procedures documented for increasing the quantity of keratinised mucosa and deepening the vestibulum (vestibuloplasty). The free gingival graft is a common procedure for vestibuloplasty [1,2]. It was initially described by Bjorn H, and it is commonly utilised because of its stable and predictable results [4]. It has a number of drawbacks, including the requirement for a second surgical area, a longer healing process on the palate, and cosmetic

outcomes that are impaired. Several grafting materials, including autogenic, allogenic, xenogenic, and alloplastic, have been offered as alternatives for the free mucosalpalatal graft in recent decades, with varying degrees of success [5,6]. Currently used substitute for FGG is Acellular Dermal Matrix Allograft (ADMA) which is derived from donated human skin. But the supply of ADMA is limited supply and is costly. Temmerman A et al., evaluated the use of the Leukocyte and Platelet Rich Fibrin (L-PRF) membranes in increasing the width of the Keratinised Mucosa (KM) around implants [7]. Authors concluded that use of L-PRF can increase the width of KM around implants. Kothiwale S and Ajbani J, increased the width of attached gingiva using Chorion Membrane (CM) along with PRF membrane and concluded that CM and PRF can be effectively incorporated to increase the width of attached gingiva and depth of vestibule [8]. Singal A et al., evaluated FGG procured from different anatomical sites to increase the width of attached gingiva [3]. Authors concluded that FGG is a viable and effective modality for increasing the width of attached gingiva and can be procured from sites other than palate.

For the development of an autologous fibrin matrix, PRF preparation is a simple and affordable method. PRF includes a variety of growth factors, including Platelet Derived Growth Factor (PDGF), transforming growth factor, vascular endothelium growth factor, and epidermal growth factor and it acts as a scaffold for epithelial cell migration and proliferation [9]. PRF is easy to use biological patient derived biomaterial, which can be used in daily practice on a routine base [7]. The PRF membrane has got the properties of adhesion by virtue of fibrin glue and it has got sufficient mechanical strength that play a role in preventing infection and inflammation on both the surgical and donor sites of the operative field [10].

CONCLUSION(S)

The Platelet Rich Fibrin (PRF) membrane approach for vestibuloplasty indicated that it might be a good alternative to other extensively used treatment options in practice. The study period was too short to fully assess the benefits and drawbacks of the PRF membrane grafting material in this innovative variation of the vestibuloplasty procedure. Despite this, both FGG and PRF showed good healing and aesthetic outcome. To compensate for the shrinkage of FGG and PRF can be used along with it. Using both together there was adequate increase in width of attached gingiva. Furthermore, controlled studies with adequate sample size should be undertaken to evaluate and compare the outcome of PRF with other grafting material to validate its application as a substitute material.

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