Case Report

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PRF Dressing as a Boon for FGG Donor Site; A Clinico-Histopathologic Case Report.

Abstract:

Aims and objectives: FGG is a widely used mucogingival surgery for gingival recession, but it has some disadvantages such as longer healing time and painful donor site. Reduction of this discomfort is possible by using an autologous biomaterial,PRF. The objectives of this study are to describe the favourable effects of PRF on the recovery of FGG donor sites and tocompare the donor site's healing with or without PRF.

Materials and methods: Two systemically healthy 19-year-old female patients who needed gingival augmentation were included in study. Procedure was carried out involving the palate as donor sites,wherein one patient's donor site was allowed to heal conventionally and the other site wascoated with PRF membrane to analyse differences in healing process.

Results:The results showed better and faster healing along with significantly reduced post operative pain of the PRF donor site as compare to the conventional site.

Conclusion: By accelerating the healing process, reducing patient suffering, and addressing one of the key concerns associated with the use of this treatment, this case study demonstrates PRF is an effective method in FGG patients.

Key-words: Palatal dressing, Free gingival graft, Platelet rich fibrin, Donor site

Introduction:

Free gingival grafts are most commonly used periodontal plastic surgery which are frequently obtained from the keratinized gingiva of hard palate. This autologous free gingival graft (FGG) aimed at widening the keratinized gingiva was first introduced by Bjorn (1963). The major drawback of this treatment is the need for a second surgical site, resulting in an open wound that is prone to bleeding, pain, and slow healing [1].Despite these limitations, its handling is rarely reported in the literature.

Recent studies have suggested that Choukroun's platelet-rich fibrin (PRF); second generation platelet concentrate have a stimulatory effect on wound healing as PRF stimulates the growth of osteoblasts but inhibits the growth of oral epithelial cells [T13].Platelets are natural source of growth factors that aid in healing and regeneration of lesions at the site of injury and do not induce an inflammatory response at the transplant site [T14]. Moreover, platelet-rich fibrin (PRF) is the easiest and inexpensive way to use self-adhesives [2]. Blood should be drawn without anticoagulants and immediately centrifuged. The natural coagulation process readily forms a leukocyte-platelet-rich fibrin (L-PRF) clot. PRF clots form a strong fibrin matrix and can be compacted into strong membranes that are slow to be absorbed by the host [3]. Choukron's Study confirm that PRF is involved in three major mechanisms of wound healingie. angiogenesis, immunity and epithelial proliferation. It is also used to treat non-healing wounds [4].

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Overall, PRF possesses interesting physical and biochemical properties for use in wound healing. For these reasons, the purpose of this article is to examine the use of PRF membranes as palatal dressings and the resulting effect on postoperative morbidity. An attempt was also made to compare conventional donor site healing (without PRF) and donor site healing with a PRF membrane.

Case Report: Two systemically healthy female patients with the age of 19 years reported to the department of periodontology with the chief complaints of receding gum from 2-3 years. On clinical examination, gingival recession with inadequate keratinized tissue was present with respect to lower central incisors. The surgical procedure i.e gingival augmentation was explained to the patients and the informed consent had been obtained. The first step in surgery was the preparation of the recipient bed for FGG. Gingival augmentation procedure was performed by harvesting FGG from palatal donor site. The first patient's palatal donor site was allowed to heal conventionally while the second patient's donor site was covered with PRF membrane as a palatal dressing to assess differences in the healing process.

Preparation of PRF membrane: 10 ml of intravenous blood was drawn by venipuncturing the subject's antecubital vein. The blood was collected in 10-ml sterilized glass tubes, without any anti-coagulating agent. The Choukroun et al. protocol was used to prepare the PRF. The blood containing tubes was immediately centrifuged (at 3000 rpm for 10 minutes) using the centrifuge (Forco Scientific Udyogpvt. Ltd)™. The centrifuged blood mass due to differential densities separated in three fractions.

Acellular platelet poor plasma (PPP)– top layer
Platelet rich fibrin (PRF)- middle layer
Red blood corpuscles (RBC)- bottom layer

The fibrin clot was easily separated from the centrifuged blood and spread on a sterile gauze followed by squeezing gently between two pieces of gauze to form a PRF membrane. After preparing the PRF membrane, it is cleaved and precisely sized according to the size of the donor site. The membr aneis sutured with4-0non-absorbablemersilksuture (Ethicon®). Palatal healing was assessed using a healing index after 7, 14, 21, and 30 days (Landry et al. 1988). On day 21, biopsies were taken from donor sites in both the patient to confirm the healing process. The degree of tissue inflammation around the donor site, the appearance of the wound borders, and epithelialization (clinically measured by looking for wound closure)[4] are all factors in determining how well a wound has healed. Patients were asked to score their postoperative pain using the Wong and Baker Face Scale (WBFS)[5] in order to determine the postoperative morbidity. During the first week following surgery, the PRF patient was seen to be relatively comfortable than the non-PRF patient. Samples were taken from the donor sites of both patients and sent to the pathology department for preparation of histopathological reports showing the healing process of both sites with and without PRF.

Figure 1: Gingival recession with lack of attached gingiva buccal to the left central incisor

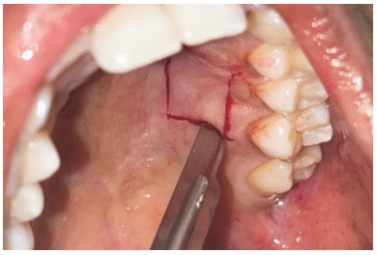

Figure 2: Donor site preparation

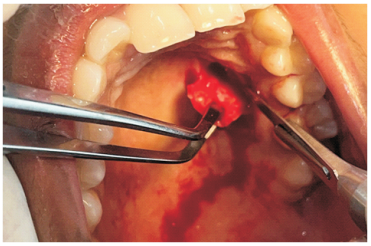

Figure 3: FGG procurement

Figure 4: Healing of donor site without PRF 7 days post-operative

Figure 5: Donor site healing 14 days post-operative

Figure 6: Post-operative healing at 21 days

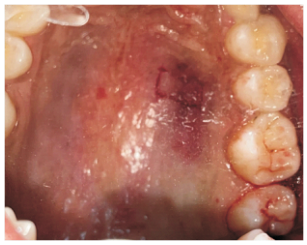

Figure 7: Biopsy sample collection at 21 days post-operative

Figure 8:Healing after 30 days post-operative

Figure 9: Lack of attached gingiva buccal to the central incisor

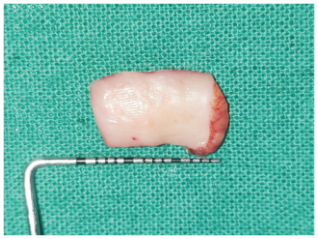

Figure 10: Harvested FGG from the palate

Figure 11: Blood collection for PRF preparation

Figure 12: Platelet rich fibrin

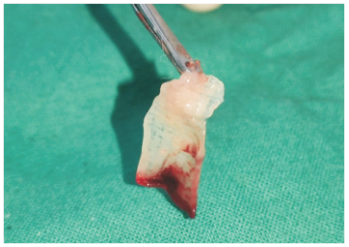

Figure 13: Platelet-rich fibrin membrane

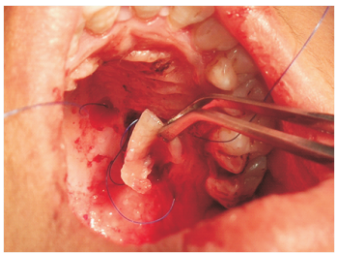

Figure 14: Placement of PRF membrane at FGG donor site

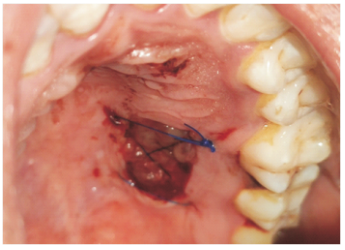

Figure 15: Platelet-rich fibrin membrane secured to the palate

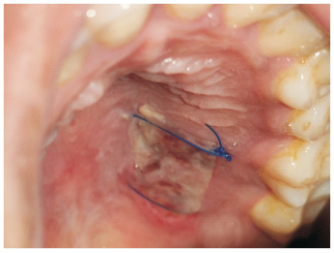

Figure 16: Donor site 7 days post-operatively

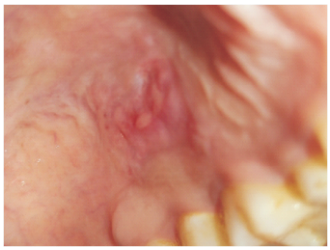

Figure 17: Donor site healing 14 days post-operatively

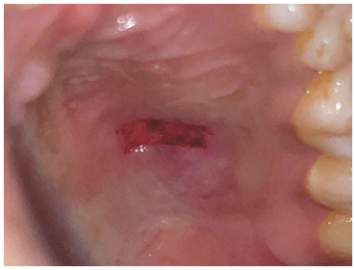

Figure 18: Biopsy sample collection at 21 days post-operative

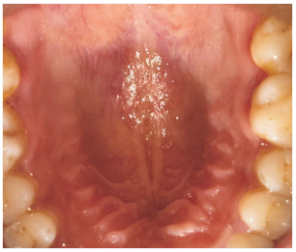

Figure 19: Donor site healing 30 days post-operatively

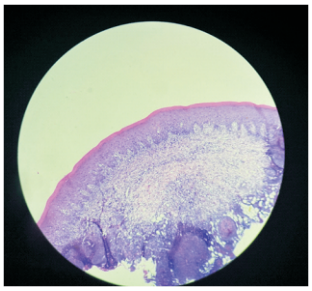

Figure 20: Histopathological view of the healing process of the donor site where PRF was not used, histopathological findings are suggestive of "Granulation tissue".

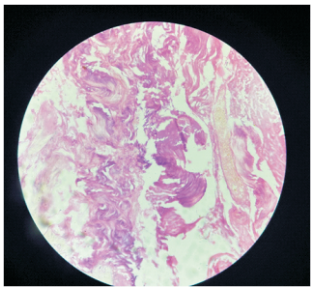

Figure 21: Histopathological view of the healing process of the donor site where PRF was used, histopathological findings are suggestive of "normal mucoperiosteum".

Result:

The healing was evaluated clinically at 7th, 14th,21th and 30th day by using healing index (Landry et al. 1988) and biopsies were performed at 21th day to check the healing status of both the patient. The healing index showed higher values in second patient which confirmed improved healing at the donor site where PRF was placed. Histopathology report showed the presence of granulation tissue in patient without PRF and a area without granulation tissue and normal mucoperiosteum in the second patient. The donor site without the PRF membrane healed completely after 4 weeks. considerably lesser time was required for healing by PRF membrane site resulted in lesser post-operative discomfort to the patient.

Discussion:

Successful coverage of exposed roots for esthetic and functional reasons is the main goal of various mucogingival procedures. The long-term study of FGG for augmentation of attached gingiva. FGG's long-term study for augmentation of attached gingiva has revealed sustainable outcomes for up to 25 years[6]. FGG is therefore considered to be the most reliable gingival graft material for augmenting keratinized gingiva. Even though FGG has outstanding clinical outcomes, focusing on the donor site is also very important since post-operative issues like chronic bleeding, pain, and discomfort at the palatal donor site make the surgery less popular. Studies have indicated that the healing of the palatal donor site of FGG procedures by secondary intent are associated with greater discomfort and morbidity[7,8].

Choukroun'sPRF[4], a second-generation platelet concentrate is a simple and inexpensive procedure that does not require biochemical blood processing. Its 3-dimensional fibrin network promotes neovascularization, accelerates wound closure, and fast cicatricial tissue remodeling. Numerous autologous growth factors are offered by PRF, which promote cell migration and proliferation. Because there are no additives used in the preparation of PRF, fibrin polymerization happens naturally, resulting in a scaffold fibrin network during natural healing [9].

In our case, it was observed that applying PRF to the FGG donor site sped up hemostasis. According to a study by Choukrounet al.[10], PRF fibrin controls the early stages of angiogenesis by the binding of different growth factors including FGF, PDGF, VEGF and angiopoietin and it influences neutrophil activity and triggers migration of

epithelial cells to speed up the healing process. The strong healing response shown in our patients [Figure 17] supports the idea that the PRF catalyses recovery not only by releasing growth factors but also by offering a solid fibrin scaffold and inducing hemostasis.

To assess the histological course of PRF healing on day 21, a biopsy was obtained from the base of the palate. According to the histological findings of the first patient(without PRF), Granulation tissue was present where as in the second patient's histology findings (with PRF) revealed normal mucoperiosteum. The healing index employed in this investigation also indicated that the PRF membrane produced better outcomes(table 1).

Healing index (Landry, Turnbull and Howley)

Table 1

1 Very poor	tissue colour: ≥ 50% of gingiva red • response to palpation: bleeding • granulation tissue: present • incision margin: not epithelialised, with loss of epithelium beyond incision margin • suppuration present
2 Poor	tissue colour: ≥ 50% of gingiva red • response to palpation: bleeding • granulation tissue: present • incision margin: not epithelialised, with connective tissue exposed
3 Good	tissue colour: ≥ 25% and < 50% of gingiva red • response to palpation: no bleeding • granulation tissue: none • incision margin: no connective tissue exposed
4 Very good	tissue colour: < 25% of gingiva red • response to palpation: no bleeding • granulation tissue: none • incision margin: no connective tissue exposed
5 Excellent	tissue colour: all tissues pink • response to palpation: no bleeding • granulation tissue: none • incision margin: no connective tissue exposed

The second patient who underwent treatment with PRF to cover the palatal donor site reported having little to no pain following surgery, while the first patient complained of pain at the palatal site for a few days. The patient with PRF treatment had the following significant characteristics:

1. Wound that was nearly completely closed after one week
2. no inflammation at the edges of the healing wound, and
3. effective bleeding control throughout surgery.

In this current case report, patient with PRF as palatal dressing on the donor site had quicker donor site healing as evidenced by nearly full wound closure at 7 days followed by complete wound closure and epithelialization at 14 days after surgery compared to the patient who didn't receive any palatal dressing. To lend even more support to these results, well planned and controlled research must be conducted.

Conclusion:

After harvesting FGG, this case report compared the healing of the palatal donor site alone and by using Choukroun's PRF as a dressing. The results showed better and faster healing along with significantly reduced post operative pain of the PRF donor site as compare to the conventional site. This in turn removes one of the main issues related to the FGG procedure, thereby helping the clinicians to accelerate the soft tissue healing.

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