
PRF As An Alternative Membrane to Autogenous Gingival Graft in The Treatment for Gingival Recession

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ABSTRACT: Gingival recession is a term when the marginal gingiva apically shifts from its normal position to the root surface level beyond the cementoenamel junction. Gingival recession can cause aesthetic and functional problems. Coronally advanced flap combined with Platelet-Rich Fibrin (PRF) is considered a better therapy for the autogenous gingival graft because it doesn't require a second surgical site. PRF is a potential growth factor for periodontal regeneration. The existence of leukocytes and various cytokines contained in PRF enables the self-modulation of infectious and inflammatory processes. This case report aims to describe the use of PRF for root coverage on the labial surfaces of the mandibular anterior teeth. Case Presentation: A female 42 years old, systemically healthy, non-smoking patient came with a chief complaint that the mandibular teeth often feel sensitive when exposed to iced or something cold. Clinical examinations revealed Miller's Class I in #42 and #43. Case Management: The patient said that she doesn't want a second surgical site. After initial therapy and maintenance, the patient was treated with a coronally advanced flap combined with PRF. Conclusion: The growth factors in PRF are involved in wound healing and is proposed as tissue regeneration promoter. PRF with coronally advanced flap has been shown to be a promising and successful approach for root coverage procedures. It significantly presents a significant gain in clinical attachment and also simultaneously helps with the gingival recession.

KEYWORDS: gingival recession, platelet rich fibrin, coronally advanced flap.

1. INTRODUCTION

Gingival recession is a term when the marginal gingiva apically shifts from its normal position to the root surface level beyond the cementoenamel junction. Gingival recession can cause aesthetic and functional problems. (1) The prevalence of gingival recession is ranging from 40% to 100% depending on both the population and the methods of analysis (2). Treatment approaches for gingival recession are nonsurgical, surgical, or a combination of surgical restorative. Gingival recession can be performed non-surgically with local desensitizing agents to reduce dentin hypersensitivity or for aesthetic requirements with advanced coronal or lateral pedicle flaps in combination with free connective tissue grafts. The treatment of gingival recession should be treated based on aesthetic and functional considerations (3).

The etiology of gingival recession is multifactorial. Other morphological factors include the anatomy, size, and shape of the bone structure, tooth position, and surrounding soft tissues such as gingiva, mucosa, and muscle also play a role (2). Another etiology that most happens among the functional factors is mechanical trauma, which is most caused by improper and excessive brushing. Another important etiology is the excessive accumulation of dental plaque, which results in periodontal tissue inflammation and loss of clinical attachment. Female sex and age were also mentioned as possible risk factors. (4)

The most used classification for gingival recession is Miller's Classification. Miller divided the class into four classes; Class I: The recession has yet to reach the mucogingival junction (MGJ). There is no periodontal loss (bone or soft tissue) in the interdental area, and 100% root coverage can be expected. Class II: The recession of marginal tissue extends to or beyond the MGJ. There is no periodontal loss (bone or soft tissue) in the interdental area, and 100% root coverage can still be expected. Class III: The recession of marginal tissue extending to or beyond the MGJ. 100% root coverage is impossible due to loss of bone or soft tissue in the interproximal area or misaligned teeth. A partial root cover is expected. Root coverage can usually be determined preoperatively using a periodontal probe. Class IV: The recession of marginal tissue extending to or beyond the MGJ. Loss of

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bone or soft tissue in the interdental area and misalignment of the teeth severe that root coverage cannot be expected 7/17/2024 11:21:00 AM. (5)

Recession depth was measured to calculate the treatment success concerning root coverage and defects due to complete root coverage and to allow comparisons between different treatment techniques. Therefore, the precision of recession depth measurements is essential for diagnosis and also the option for treatment. (6) A coronally advanced flap (CAF) with a connective tissue graft (CTG) is considered the gold standard for Miller class I or II buccal recession in terms of clinical outcome. (7) However, the disadvantage of using CTG is the necessity for a second surgical site and the morbidity associated with acquiring autologous donor palatal mucosa. Because of that reason, Platelet-Rich Fibrin (PRF) was considered because it came from autologous and was less invasive compared to the CTG. (8)

Platelet-Rich Fibrin (PRF) is a biomaterial obtained from the human blood, consists of platelet concentrate, fibrin matrix, cytokines, growth factors, and cells. PRF was recently evaluated for the procedure of root coverage. PRF is a concentrated platelet aggregate designed for easy preparation. It generally simulates the microcirculatory system, releases growth factors essential for soft tissue healing, and acts as a resorbable membrane. (9) By securing the PRF membrane to the recession defect, it regenerates the gingival components, usually on the labial side of the upper and lower teeth and restores the functions of the keratinized gingiva. This case report aims to describe the use of PRF for root coverage on the labial surfaces of the mandibular anterior teeth.

2. CASE REPORT

A 42-year old, systemically healthy, non-smoking patient woman came to Periodontology Clinic, Dental Hospital, Universitas Airlangga with chief complaints that the mandibular teeth often feel sensitive when exposed to iced or something cold. Clinical examinations showed that the oral mucosa is normal, but there are recessions on teeth 42 and 43, revealing Miller's Class I. Teeth 13, 23, 35 were missing



Radiographic results show there is no bone loss. Diagnosis by AAP 1999 is Chronic Gingivitis on 31, 41, 42, 43 and AAP 2018 is Clinical Gingival Health in Reduced Periodontium non-Periodontitis patient, accompanied by mucogingival deformity and condition around the teeth (gingival recession) on 17-14, 22, 24-26, 37-35, 33-42, 45-47. The gingival phenotype is thin. The etiology of this case is dental plaque and mechanical trauma (tooth brushing faulty).

Initial periodontal therapy was conducted, and the patient was given education on oral home care. A further periodontal treatment plan was explained to the patient and she was planned to have monthly periodontal evaluation and maintenance. After discussion and clinical examination, a diagnosis was made, and the treatment chosen for this patient is a coronally advanced flap with PRF.

3. CASE MANAGEMENT

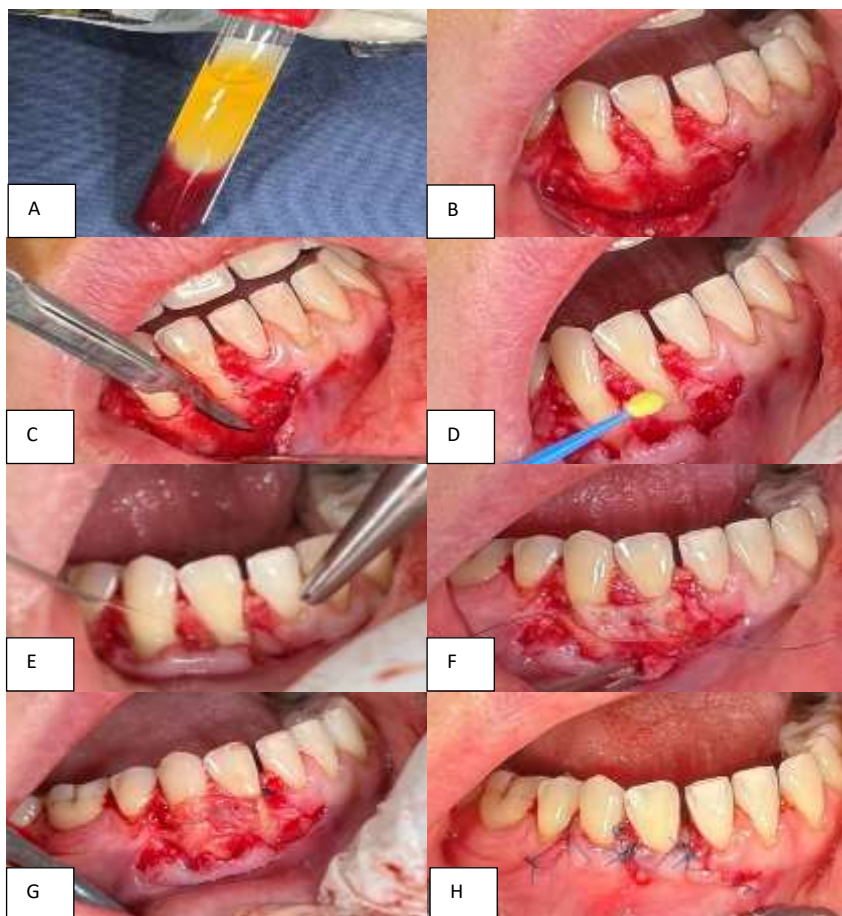
Before the procedure began, the patient understood the procedure, risks, side effects and was asked to sign an informed consent. The treatment was a coronally advanced flap using PRF.

First, extra-oral and intra-oral asepsis were performed using 10% povidone-iodine (Figure 1A). Continue with the administration of local anesthetic (lidocaine HCl 2% with epinephrine 1:100,000) in the mucobuccal fold and interdental teeth 42 and 43 (Figure 1B). Continued with sulcular and vertical incision using blade #15C (Figure 1C) and continued with the flap's opening using raspatorium (Figure 1D).

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Eight milliliters of blood were drawn in test tubes without an anti-coagulant and centrifuged immediately. Blood was centrifuged using a tabletop centrifuge for 12min at 2500 rpm (Figure 2A). After that, it will result in three layers. The upper layer contains PRP, the middle layer contains PRF, and the lower layer contains deposits of red blood cells. The PRF layer is taken by cutting out the part between PRF and the red blood cells. It will result in membrane form and then be immediately placed on the surface of prepared roots. On the other hand, the flap was retracted after the incision (Figure 2B). Continued with partial-thickness flap (Figure 2C). The muscle was freed to position the coronally without tension, and the exposed root surface was conditioned using tetracycline HCl (Figure 2D). Tetracycline HCl (250 mg/ml) was made by mixing 500 mg in 2 ml of sterile water. This procedure aims to remove the root instrumentation smear layer and any remaining root surface contaminants. After that, continued with irrigation using saline (NaCl) (Figure 2E). The prepared PRF membrane was positioned over the recession defects, just below the CEJ. The PRF was adapted and sutured using a 5/0 suture with a coronal sling suture (Figure 2F and 2G). The final sutures were done and knotted (Figure 2H).



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The patient was given antibiotics, analgesics, and anti-inflammatory drugs for five days. The patient was instructed to rinse their mouth with a 0.12% chlorhexidine solution three times a day for 1 minute for 4 weeks. The sutures were removed after 3 weeks. The restitution of mechanical tooth cleaning using an ultrasoft toothbrush and a roll technique was instructed at the end of the first postoperative month. The patient was recalled at 5, 10 weeks for evaluation and prophylaxis.



4. DISCUSSION

Gingival recession is defined as apical displacement of the gingival margin relative to the cemento-enamel junction (CEJ). Although it was not associated with increased tooth loss, gingival recession is considered an aesthetic problem for many patients. It is also associated with dentin hypersensitivity and carious/non-carious cervical lesions of exposed root surfaces. (10)

Coronally advanced flap is the first-choice surgical technique when there is a lack of adequate keratinized gingiva in the recession defect. Optimum root coverage results, a good color blending of the treated area, and recovery of the original morphology of the soft-tissue margin can be predictably accomplished. Studies by Rehan and Zuccheli concluded that the mean root coverage obtained from this technique varies from 60% to 100%, which is one of the most practiced techniques.(11,12) The CAF technique alone used for gingival recession is unstable within an extended period because a recession may reoccur. The potential of CAF to cover the recession depends on the keratinized tissue in apicocoronal, which is an essential parameter in preventing another recession.(13) Usually, CAF is combined with CTG because of the better result. From the patient's point of view, it is essential to find alternatives for the CTG because this treatment concept is associated with higher morbidity due to the second surgical site.(14)

Another option is using biomaterials, such as acellular dermal matrix, collagen membranes, or enamel matrix derivatives, but patients often reject them because of financial issues.. Nevertheless, the patient will choose another alternative option due to the need for second surgical sites. An option using PRF is one of the options that has been chosen for the alternative.

Platelet-rich fibrin derived from human blood is based on fibrin. It is a membrane made up of components that do both healing and also regeneration. The advantages of being chairside, it can be obtained quickly from the patient's blood and is a little time-consuming and cost-effective. PRF was found in France by Choukroun et al. It was second-generation platelet concentrates manufactured using a simplified scheme compared to PRP, with no biochemical treatment of blood or the use of coagulation agents such as calcium chloride, and bovine thrombin. (15) There are also no risks associated with using PRF as a material.

PRF comprises three major growth factors: transforming growth factor β -1 (TGF β -1), platelet-derived growth factor AB (PDGF-AB), vascular endothelial growth factor (VEGF), and a critical coagulation matrixcellular glycoprotein (thrombospondin-1, TSP-1) in 7 days after application. Apart from these, PRF also secretes EGF and FGF. Under this content, PRF can accelerate hemostasis and wound healing and has a supportive effect on the immune system, cell migration, and proliferation.(16) A study reported that the healing process using the PRF technique was taken less time and was better, especially in the first and second

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weeks after surgery. This success was related because there was 100 times more fiber in PRF. (13) This is also in line with the study by Kuka et al. showed that the CAF with PRF procedure clinically resulted in better soft tissue healing. PRF membrane usage significantly increased tissue thickness.

At the time of trauma right when PRF is applied, it will form fibrin clots that will activate growth factors that play a role during the inflammatory process, PDGF and TGF- β 1. Next, the process of angiogenesis and activation of fibroblasts by VEGF growth factor will occur. (16)

5. CONCLUSION

The growth factors in PRF are involved in wound healing and is proposed as tissue regeneration promoter. Based on these studies, PRF with coronally advanced flap is a promising and successful approach for root coverage procedures. It significantly presents a significant gain in clinical attachment and also simultaneously helps with the gingival recession. The increase in the thickness of keratinized gingiva is significant in preventing further recession and maintaining gingival integrity for an extended period.

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