

Pouch and Tunnel Techniques with and without the Use of Platelet-rich Fibrin for Root Coverage: Case Reports

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ABSTRACT

Root coverage procedures for managing gingival recessions are found to be effective; however, each technique varies in its indication and its surgical procedure.

Coronally advanced flap (CAF) is a widely used surgical procedure for root coverage. Several regenerative materials, such as platelet-rich plasma and platelet-rich fibrin (PRF), are also combined with it to improve the clinical outcome. This case report compares CAF in combination with PRF and CAF alone, to overview on the technique that has been carried out and provided better results and complete root coverage.

Keywords: Appearance, Gingival recession, Periodontal disease, Platelet-rich fibrin, Surgery.

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INTRODUCTION

Dental esthetic plays a main role in the esthetic appearance of a patient's smile.¹ The esthetic appearance depends on the overall status of oral and periodontal health, which includes assessment on physical measurements of the periodontium (e.g., attachment level, probing depth, bone loss, mobility, recession, and degree of inflammation).² Periodontal health is defined as the absence of the signs and symptoms of periodontal disease.²

Gingival recession is considered as one of the common esthetic problems associated with the periodontal tissues. Gingival recession is defined as the displacement of gingival margin apical to the cemento-enamel junction with exposure of root surface in the oral cavity.³ Root exposure in the oral cavity causes hypersensitivity, attachment loss, and increased risk of caries development. Certain factors responsible for gingival recession include mechanical factors (faulty tooth brushing), anatomical factors (high frenal attachment, trauma from occlusion, thin gingival biotype, thinning of bony plate due to tooth malposition, or root prominence), and periodontal disease.⁴

There are different root coverage procedures to overcome this common periodontal problem, such as coronally advanced flap (CAF), laterally positioned flaps (LPF), and connective tissue graft (CTG), free gingival graft, semilunar flap, pedicle flap, transpositional flap, and guided tissue regeneration,⁵ where each technique varies in indication and surgical procedure.

According to Miller's classification, Class I and Class II gingival recession defects are usually treated using CAF surgical technique, one of the most widely used treatments.⁶ This technique is simple, second surgical site not required, excellent and acceptable esthetic results, adequate root coverage, good color blending of the treated area with adjacent tissues, and complete healing of soft tissue, and shows the effectiveness of this procedure to be an ideal technique for root coverage.⁶ Newer modifications for CAF technique have been developed in past few years.

One of the modifications is the pouch and tunnel technique, which is more effective for anterior maxillary region, with good vestibular depth and gingival thickness, provides minimal trauma to the tissues and adequate blood supply to donor tissue, with excellent esthetic result.⁷ Use of graft materials such as CTG, synthetic allograft,

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platelet-rich plasma, and platelet-rich fibrin (PRF), enamel matrix derivative additionally also provides more amount of thickness in the recession defect area thereby overcoming the thin gingival biotype.^{8,9}

An autologous second-generation platelet concentrate contained in a fibrin matrix without anticoagulants called PRF can be gathered (750 gm) from the superficial layer of centrifugation tubes following a single centrifugation cycle.¹⁰ This concentrate consists of white blood cells, platelets, fibrin, cytokines, and circulating stem cells as well as growth factors, for example, platelet-derived growth factor, transforming growth factor β 1, vascular endothelial growth factor, and glycoprotein, such as thrombospondin, which has the capacity for bone regeneration and soft tissue wound healing; hence, use of PRF is increasing in the periodontal and implant surgical procedures. This process is more effective, cheaper, and easier; therefore, regenerative membranes are more easily formed.¹¹

CASE REPORT

Case 1

A 24-year-old male patient reported to the Department of Periodontology, AB Shetty Memorial Institute of Dental Sciences, Deralakatte, Mangaluru, with a chief complaint of sensitivity in teeth on the front upper region. A 4 mm Class II gingival recession defect was diagnosed on examination on the maxillary incisor region (Fig. 1). Proper explanation of the risks and benefits of

the clinical procedure planned was given to the patient, and the patient's informed consent was obtained. The patient was systemically healthy and had no contraindications for periodontal surgery. CAF using pouch and tunnel technique was planned to perform the maxillary front region (21).

On the buccal aspect of the tooth, a concentration of 1:80,000 of 2% lignocaine hydrochloride containing adrenaline was given as local anesthesia. An intrasulcular incision was made by using Bard-Parker number 15 blade (B.P. blade) through each recession area, not extending the incisions till the tip of the interdental papilla. Care was taken to reduce the tension on the flap, by extending the incision beyond the mucogingival junction, to facilitate coronal displacement, later undermining of the tissues gently, without detaching it by extending it laterally about 3 to 5 mm.

Sutures were placed (Fig. 2) and postoperative instructions that include the use of 0.2% chlorhexidine gluconate mouth rinse twice daily for 2 weeks was given to the patient. The patient was prescribed an analgesic to reduce postoperative pain and discomfort. After 1 month of postsurgery, the patient was recalled for reevaluation (Fig. 3), followed by instructing the patient to resume the mechanical cleaning with a soft toothbrush and oral hygiene motivation.

The surgical site healed uneventfully with no postoperative complications, a significant reduction in recession depth, and recession width after surgery. The patient reported satisfactory results and less sensitive. However, a complete coverage of root surface was not obtained due to lack of attached gingiva. This case has to be followed up with a second surgical procedure to increase the width of the attached gingival and obtain additional root coverage.

Case 2

A 32-year-old male patient reported to the Department of Periodontology, AB Shetty Memorial Institute of Dental Sciences, Deralakatte, Mangaluru, with a chief complaint of sensitivity in teeth in the left upper back region. A 3 mm Class I gingival recession defect (Miller, 1985) was diagnosed on examination in the maxillary left first premolar (Fig. 4). Informed consent was obtained from the patient after a thorough explanation of the risks and benefits of the clinical procedure planned. The patient was systemically

healthy and had no contraindications for periodontal surgery. It was planned to perform root coverage of the maxillary left first premolar (24) with the CAF using pouch and tunnel technique along with PRF graft.



Fig. 2: Pouch and tunnel technique, sutures placed



Fig. 3: Postoperative 1-month follow-up



Fig. 1: Maxillary left incisor (21)



Fig. 4: Left first premolar (24)

A concentration of 1:80,000 of 2% lignocaine hydrochloride containing adrenaline was used as local anesthesia, on the buccal aspect of the tooth. An intrasulcular incision was made by using Bard-Parker number 15 blade (B.P. blade) through each recession area, not extending the incisions till the tip of the interdental papilla, extending beyond the mucogingival junction, so as to reduce the tension on the flap to facilitate coronal displacement.

A tunnel was prepared adjacent to the recession, undermining the tissues gently, without detaching it by extending it laterally about 3 to 5 mm (Fig. 5).

With the help of a sterile syringe, 10 mL of blood was drawn from the patient's antecubital vein and collected in a sterile glass test tube. The tube was carefully transferred to a centrifugation machine and immediately centrifuged at 3,000 rpm for 12 minutes at room temperature. After 12 minutes, the blood was divided into three fractions: acellular plasma on the surface, a PRF clot formed in the middle part of the tube, and red blood cells at the bottom (Fig. 6). Using a sterile tweezer, the PRF clot was removed carefully from the tube. A sterilized scissor was used to gently detach the RBC layer from the PRF

clot and the clot was placed on woven gauze, compressed between other pieces of gauze to form a PRF membrane (Fig. 7). Later, the membrane was inserted into the tunnel from the sulcus, with the help of a sterile tweezer, and finger pressure was applied to compress the membranes and also to mobilize the flap coronally.

A nonresorbable black 3.0 suture material was placed (Fig. 8). Postoperative instructions such as the use of 0.2% chlorhexidine gluconate mouth rinse twice daily for 2 weeks were given to the patient. The patient was prescribed an analgesic to reduce postoperative pain and discomfort. After 1 month of postsurgery, the patient was recalled for reevaluation (Fig. 9), followed by instructing the patient to continue their oral hygiene with help of a soft toothbrush and motivating about oral hygiene.

The surgical site healed uneventfully with no postoperative complications, with a significant amount of reduction in recession depth and width after surgery was obtained. The patient reported satisfactory esthetic results and loss of hypersensitivity.

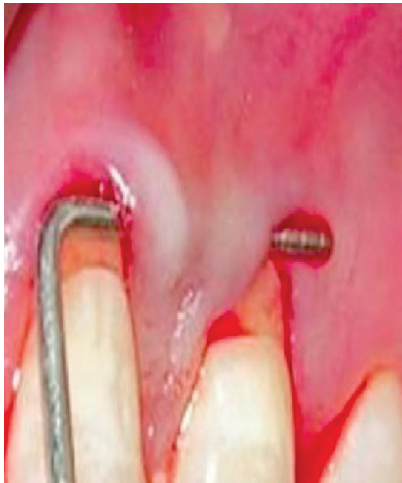


Fig. 5: Pouch and tunnel technique

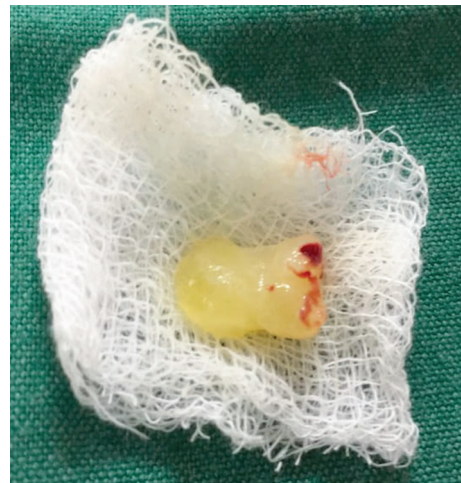


Fig. 7: PRF membrane prepared



Fig. 6: PRF preparation



Fig. 8: PRF placed and sutured

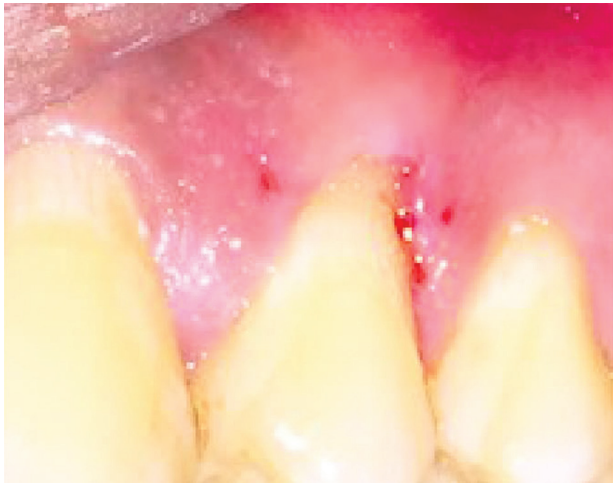


Fig. 9: One-month follow-up

DISCUSSION

Early years periodontal treatment procedures focused at reducing the risk of progression of existing periodontal disease. However, these surgical procedures are modified due to increasing esthetic demands by various periodontal plastic surgical procedures to restore form and function.¹²

An ideal surgical procedure is considered effective where there is good tissue blending, obtaining predictable root coverage, reduce the degree of discomfort to the patient.¹² Factors, such as uncooperative patients, habitual behavior, like smoking, lack of proper oral hygiene measures, poor case selection, improper surgical technique selection, lack of sufficient blood supply to the recipient site from the surrounding tissues, and insufficient amount of soft and hard tissues, produce unsatisfactory results.¹²

In this study, 100% root coverage was shown using the pouch and tunnel technique. A modification of the envelope technique was the tunnel technique, which preserves the papillary height increase the thickness of keratinized gingiva, maintaining the blood supply to the underlying graft, provide better esthetic results, and a decrease in clinical attachment loss was obtained compared to the CAF procedure alone, proven to be more effective in the coverage of the gingival recession.

Another advantage of PRF is that it secures the flap in a favorable position, thereby stimulating the growth factors on the entire gingival connective tissue surface, also drop-off the blood activation process, reduces necrosis and shrinkage of the flap.¹²

Thus, for root coverage surgical procedures in addition of PRF to CAF in the presented case report, helped to obtain favorable results.

CONCLUSION

For the esthetic purpose, CAF is the procedure mainly performed, but in this case report, we performed CAF in addition with PRF in the posterior region, which gave a good clinical outcome, better healing, and esthetic results compared to CAF alone.

For root coverage, CAF with PRF could be used as an effective procedure in both anterior and posterior regions for treatment of gingival recession rather than CAF alone.

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