

CASE REPORT

COMBINATION OF PLATELET RICH FIBRIN MEMBRANE WITH CORONALLY ADVANCED FLAP IN TREATMENT OF GINGIVAL RECESSION: A CASE REPORT

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ABSTRACT:

Aesthetics is a foremost concern of a dentist. Recession coverage is one of the major interest in aesthetic dentistry. Platelet rich fibrin membrane is a novel treatment option available for various mucogingival defects with varied outcome. Treatment of gingival recession has become an important therapeutic issue due to increasing cosmetic demand. Multiple surgical procedures have been developed to obtain predictable esthetic root coverage. More specifically, after periodontal regenerative surgery, the aim is to achieve complete wound healing and regeneration of the periodontal unit. A recent innovation in dentistry is the preparation and use of platelet-rich plasma (PRP), a concentrated suspension of the growth factors, found in platelets. These growth factors are involved in wound healing and postulated as promoters of tissue regeneration. This paper reports the use of PRF membrane for root coverage on the labial surface of the right maxillary canine. This was accomplished using coronally advanced flap in combination with PRF membrane.

Keywords: Gingival recession, Periodontal surgery, platelet rich fibrin.

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INTRODUCTION

Isolated gingival recessions have been treated by several techniques.¹ The main goal of these plastic periodontal surgical procedures is to obtain root coverage and an optimal esthetic appearance together with complete root coverage and the blending of mucosa and/or gingiva. These root-coverage procedures are usually based on the coronally advanced flap (CAF), and the outcome, when combined with a connective tissue graft (CTG) (bilaminar technique), is considered the gold standard. In a systematic review¹ of treatments of single recession defects, a mean root coverage of 83% was found with CAF. Many materials have been proposed to improve clinical outcomes. Fibrin glue (FG) has been tested in conjunction with tetracycline root conditioning, but the addition of FG may not enhance the outcome of the CAF procedure². The autologous platelet-rich fibrin clot (PRF) was used initially in implant surgery to improve bone healing³. Despite a lack of scientifically proven clinical benefit, the homogeneous fibrin network that is obtained is considered by the promoters of the technique to be a healing biomaterial and is commonly used in implant and plastic periodontal surgery procedures⁴ to enhance bone regeneration and soft tissue wound healing. Compared to PRP, there are few references in the literature about the biologic properties of PRF. However, it contains platelets, growth factors, and cytokines that may enhance the healing potential of bone as well as soft tissues⁵. The aim of our report was to determine whether the addition of an autologous fibrin clot

to CAF improved root coverage of multiple Miller Class I or II gingival recessions compared to CAF alone.

Platelet-rich fibrin is a second generation platelet concentrate and is defined as an autologous leukocyte and platelet-rich fibrin biomaterial. It was first developed by Choukroun et al⁶. (2001). It has been used extensively in combination with bone graft materials for periodontal regeneration, ridge augmentation, sinus lift procedures for implant placement and for coverage of recession defects in the form of a membrane. The PRF membrane can be prepared using specially designed preparation box (PRF Box® Process, Nice, France). This membrane consists of a fibrin 3-D polymerized matrix in a specific structure, with the incorporation of platelets, leukocytes, growth factors and presence of circulating stem cells. The PRF clot exudate is frequently discarded. However, it has been found to be rich in proteins; fibronectin and vitronectin and thus, can be used as a part of regeneration therapy.⁶

CASE REPORT

A 38 year male patient reported to the department of periodontology Seema Dental College & Hospital, Rishikesh, with chief complaint of receding gums and sensitivity to hot and cold in relation to upper anterior teeth. Clinical examination revealed a class II Miller's defect in relation to maxillary right canine.

Pre surgical therapy

The surgical procedure was explained to the patient and a written informed consent was obtained. Preparation of the

patient include scaling and root planning of the entire dentition and oral hygiene instruction.

PRF preparation:- The advantages of PRF over PRP are its simplified preparation and lack of biochemical handling of the blood. Just prior to surgery the required quantity of blood is drawn in 10 ml test tubes without an anticoagulant and centrifuged immediately. Blood is centrifuged using a tabletop centrifuge (REMY laboratories) for 10 minutes at 3000 rpm.⁷

The resultant product consists of the following three layers:-

- Top most layer consisting of acellular PPP
- PRF clot in the middle
- RBCs at the bottom

Because of the absence of an anticoagulant, blood begins to coagulate as soon as it comes in contact with the glass surface. Therefore, for successful preparation of PRF, speedy blood collection and immediate centrifugation before the clotting cascade is initiated, is absolutely essential. PRF can be obtained in the form of a membrane by squeezing out the fluids in the fibrin clot.⁷

Surgical therapy: After proper isolation of the surgical field, the operative sites were anaesthetized using two percent xylocaine hydrochloride with adrenaline (1:200000) Recession defects were thoroughly scaled using Gracey curets. No root conditioning was used. A CAF technique was undertaken using a sling suturing technique. The flap design was as follows:

Horizontal incision was given at the level of CEJ at the interdental area, and crevicular incision was made around the teeth with recession defects in continuation with horizontal incisions. vertical releasing incisions upto mucogingival junction were given to raise a trapezoidal full thickness flap, vertical incisions were advanced beyond mucogingival junction to raise further a partial thickness flap to allow coronal repositioning of the flap without tension. All papillae were deepithelialized to create a connective tissue bed. At the recession defect, the

previously prepared fibrin clot was positioned just below the CEJ. The PRF membrane was stabilized by putting pressure on it so that it gets closely adapted to the bed prepared. The gingival flap was repositioned, with its margin located on the enamel, at the level of CEJ to cover the membrane. It was held in that position with the help of interrupted sling sutures. Vertical incisions are sutured with a simple loop sutures. The blood clot was achieved by the application of gentle pressure for 3 minutes. Periodontal dressing (COE pack) was placed.

Post-operative care: Patients were placed on 0.12% chlorhexidine gluconate mouth rinse for four weeks. Systemic antibiotics i.e Augmentin 625 two times daily for three days were prescribed and advised to follow routine postoperative periodontal mucogingival instructions, patient was warned to avoid pulling on their lips to observe the surgical site. Both dressings and sutures were removed 10 days after surgery to ensure proper adaptation and stabilization of the flap and membrane on its new position.

Healing: Post operative examination was done after one month, and then 3 months and 6 months. In this case healing was eventful without any complication.

Measured from fixed reference point with the help of surgical stent.

As per the clinical examination the results come out to be positive, there is significant reduction in pocket probing depth and gingival recession & gain in clinical attachment level.

The percentage of root coverage was calculated using the formula⁸:

$$\frac{\text{preoperative RD} - \text{Postoperative RD}}{\text{preoperative RD}} \times 100$$

As per the formula

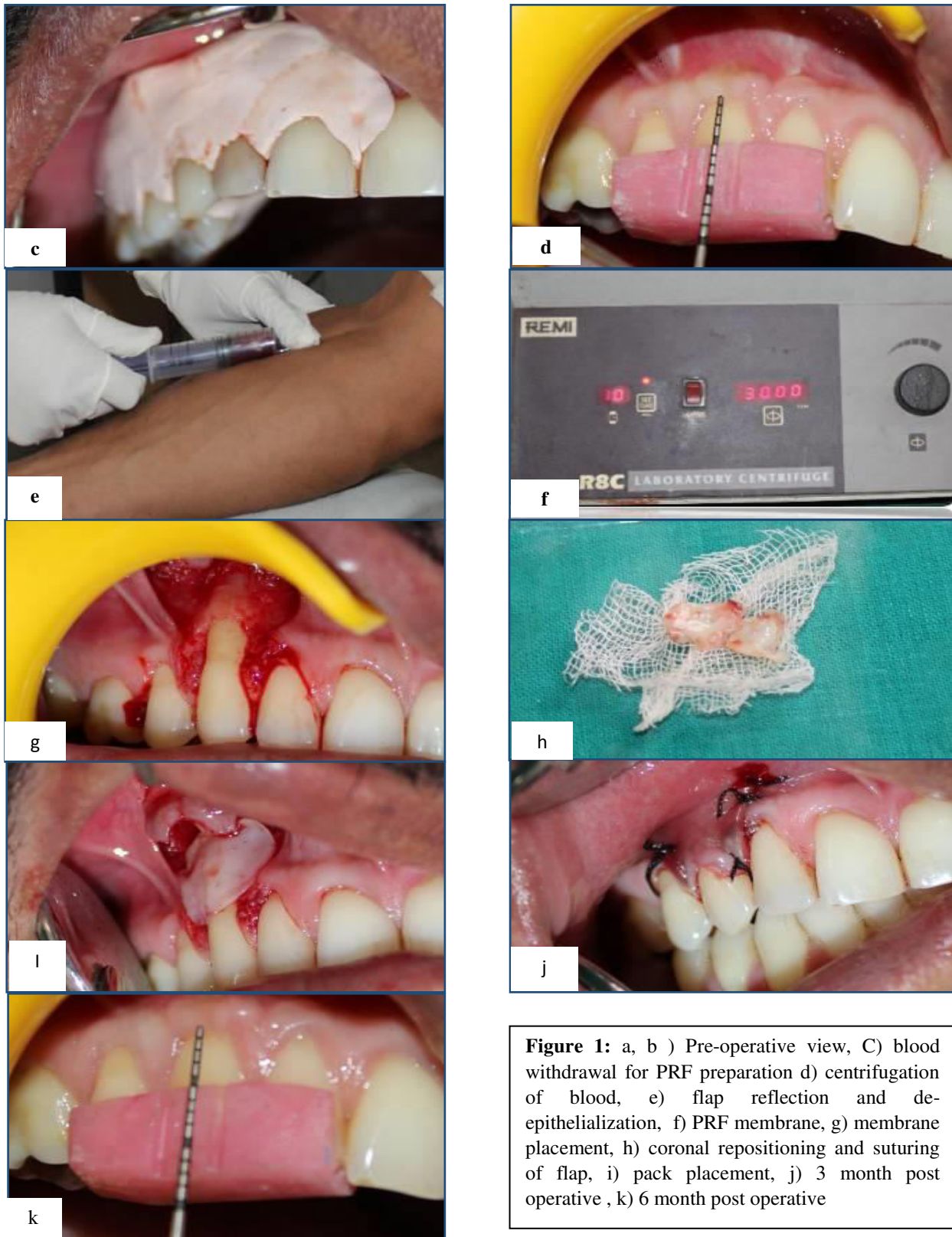
Preoperative recession defect (RD) – 3 mm

Post-operative recession defect – 0mm

So the percentage of root coverage attained is 100%.

	Probing pocket depth			Clinical attachment level			Gingival recession		
Recall	(FRP-BP)-(FRP-GM) mm			(FRP-BP)-(FRP-CEJ) mm			(FRP-GM)-(FRP-CEJ) mm		
Baseline	1	1	1	1	4	1	0	3	0
3 months	1	1	1	1	2	1	0	1	0
6 months	1	2	1	1	2	1	0	0	0





DISCUSSION: The scientific rationale behind the use of platelet preparations lies in the fact that the platelet á-granules are a reservoir of many growth factors that are known to play a crucial role in hard and soft tissue repair mechanism.^{9,10} These include platelet-derived growth factors (PDGF), transforming growth factor beta (TGF), vascular endothelial growth factor (VEGF), and epidermal growth factor (EGF), insulin like growth factor-1 (IGF-1). Platelet growth factors exhibit chemotactic and mitogenic properties that promote and modulate cellular functions involved in tissue healing and regeneration, and cell proliferation.¹¹

The ultimate goal of any therapeutic intervention aimed at root coverage should be to restore the tissue margin at the cemento-enamel junction (CEJ) and to achieve an attachment of the tissues to the root surface so that a normal healthy gingival sulcus with no bleeding on probing and a minimal probing depth is present.¹² Various surgical procedures have been described to treat gingival recessions, but these have been demonstrated to heal with a long junctional epithelium, and regeneration has been observed only in the most apical portion of the lesion. Although the bilaminar technique using subepithelial connective tissue grafts still holds the most promising results in root coverage, histological studies show unpredictable healing. The use of PRF membrane in our case report to attain root coverage may alleviate the need for donor site procurement of connective tissue. This has encouraged investigations of a more regenerative nature. The use of enamel matrix protein is one trend aiming at periodontal regeneration and root coverage.¹³ The use of barrier membranes is another trend.¹⁴

In general, a recent innovation in dentistry has been the preparation and use of platelet-rich fibrin (PRF), a concentrated suspension of the growth factors found in platelets. These growth factors are involved in wound healing and postulated as promoters of tissue regeneration. It is both nontoxic and nonimmunoreactive.¹⁵ Early studies have focused on PRP application to bone graft material, showing that it leads to earlier bone regeneration and soft tissue healing.⁹ PRP can also be infused into resorbable barrier membranes to retard epithelial migration, as well as to provide localized growth factors to accelerate hard and soft tissue maturation.¹⁶ PRP may be obtained from autologous blood by the use of plasmaphoresis. PRF was first developed in France by Choukroun et al.¹⁷ This second generation platelet concentrate eliminated the risk associated with the use of bovine thrombin. Placement of PRF membrane in recession defects can be used to restore the functional properties of the labial gingiva of the mandibular anterior teeth by repairing gingival defects and re-establishing the continuity and integrity of the zone of keratinized gingiva.

A recent 6-month study evaluated the use of PRF in the treatment of multiple gingival recessions with coronally

advanced flap procedure and found the significant improvement during the early periodontal healing phase with a thick and stable final remodeled gingiva.¹⁸ However, another randomized clinical trial in the same year reported inferior root coverage of about 80.7% at the test site (CAF+ PRF) as compared to about 91.5% achieved at control site (CAF), but an additional gain in gingival/ mucosal thickness compared to conventional therapy.¹⁹ An increase in thickness of the keratinized tissues reported in both studies may contribute to a long term stable clinical outcome with reduced probability of recurrence of recession.

CONCLUSION: The use of autologous platelet preparations like PRF allows the clinician to optimize tissue remodeling, wound healing and angiogenesis by the local delivery of growth factors and proteins. This case report reflects the success of this biomaterial for coverage of multiple recession defects and the ability to increase the thickness of the keratinized gingival tissue. The novel technique described enables the clinician to gainfully harvest the full regenerative capacity of this autologous biologic material.

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