

## Coronally advanced flap with Platelet Rich Fibrin- An effective mode of treating gingival recession: A case report

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### Abstract

Soft tissue recession leads to root exposure which results in root caries, unaesthetic appearance and dentinal hypersensitivity. Aesthetic treatment such as root coverage procedures have become integral part of periodontal treatment. Platelet Rich Fibrin (PRF) is a new promising autogenous, less invasive and effective mode of treating gingival recession. This case report highlights the use of PRF in Miller Class I gingival recession defects.

**Keywords:** Coronally Advanced Flap, Gingival Recession, Platelet Rich Fibrin, Periodontal Plastic Procedure, Root Coverage.

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### Background

Gingival recession is the exposure of the root surfaces to the oral cavity due to the migration of the gingival margin apical to the cemento-enamel junction. It may be a common cause of concern for the patient for a number of reasons like cosmetic, dentinal hypersensitivity, root caries or attachment loss. It may be localized to a single tooth or may involve multiple adjacent teeth in the arch.<sup>(1,2)</sup>

Multiple adjacent gingival recession defects present a further challenge because several recessions on adjacent teeth must be treated at a single surgical session to minimize patient discomfort. The most reported techniques are the coronally advanced flap (CAF) or its modified approach,<sup>(3)</sup> the supraperiosteal envelope technique, and its progression, the so-called "tunnel technique". Numerous materials have been offered to improve clinical outcomes. The addition of fibrin glue (FG) has been tested in conjunction with tetracycline root conditioning, but this may not enhance the clinical outcome of the CAF procedure.<sup>(1)</sup>

### Platelet rich fibrin (PRF)

Platelet-rich fibrin (PRF) was first developed by Choukroun et al. (2001)<sup>(4)</sup>, it is a second generation platelet concentrate and is defined as an autologous leukocyte and platelet-rich fibrin biomaterial. Choukroun's PRF is a fibrin matrix in which platelet cytokines and cells are trapped which are released after a certain time, and that can serve as a resorbable membrane. Though leukocyte cytokines and platelets play an important role in the biology of this biomaterial, the fibrin matrix supporting them, that certainly constitutes the determining element, which is responsible for the real therapeutic potential of PRF.<sup>(5-9)</sup> Cytokines are rapidly used and destroyed in a healing wound. The harmony between cytokines and their supporting fibrin matrix has highly important than any other parameter. A physiologic fibrin matrix (such as

PRF) will affect in a different manner than a fibrin glue enriched with cytokines (such as PRP), which will have a profound uncontrollable and short-term effect.

Autologous PRF, considered to be a healing biomaterial, was initially used in oral implantology by its promoters, and currently, studies have shown its application in combination with bone graft materials for periodontal regeneration, ridge augmentation, and sinus lift procedures for implant placement and for coverage of recession defects in the form of a membrane.<sup>(1,10,11)</sup> This PRF 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<sup>5</sup>. When using PRF membrane, this technique is less invasive, less postsurgical discomfort by eliminating the donor site. It promotes rapid soft tissue healing and minimal post-operative edema compared other techniques. Here we present a case reports using PRF with CAF for root coverage in isolated Miller's class I gingival recession.

### Case Description

A 28 year old male patient reported to the Department of Periodontology, Manipal College of Dental Sciences, Manipal University Mangalore, with the complaint of sensitivity to cold water in the upper left back tooth region. No relevant medical and dental history was reported.

On clinical examination, oral hygiene of the patient was fair and isolated Miller's class I type defect was identified on 24, with probing depth of 2 mm and attachment loss of 4 mm (Fig. 1).

### Presurgical therapy

Preparation of the patient included scaling and root planning of the entire dentition and oral hygiene instructions had been reinforced several visit to the patients. The surgical procedure was explained to the

patient and the informed consent was obtained before starting the surgical procedure.

### Surgical phase

#### Surgical procedure

The operative site was anaesthetized using 2% lignocaine with adrenaline (1:200000).

Recession height (2 mm) and width (3 mm at the level of CEJ) was measured using William's graduated periodontal probe. (Fig. 1, 2) A sterile endodontic file with a stopper was used to measure the thickness of the keratinized gingiva, which was found 2 mm at apical of the gingival margin. (Fig. 3) A coronally advanced (positioned) flap technique was performed at the surgical site. This surgical technique was defined by two oblique releasing incisions at the mesial and distal aspects and horizontal incision at the base of interdental papilla adjacent to recession. (Fig. 4) Sulcular incision was given around the affected tooth. A full thickness followed by a split thickness flap was raised apical to area of recession, this is followed by a horizontal releasing incision was made in the periosteum, at the base of the flap, to facilitate

Tension-free coronal repositioning of the flap. (Fig. 5) After flap elevation exposed root surfaces were scaled and root planed using both hand and ultrasonic instruments. Adjacent interdental papillae were de-epithelized. The recipient site was covered by moist gauze till the PRF membrane was prepared.

#### Preparation of PRF membrane

After the preparation of recipient site was completed, 10 ml of patient's own blood was drawn in a test tubes without an anticoagulant and centrifuged immediately, using a tabletop centrifuge (Remi R8C Laboratory®) for 10 minutes at 3,000 rpm. The resultant product consists of the following three layers: Top most layer consisting of acellular PPP (platelet poor plasma) PRF clot in the middle (buffy coat) RBCs at the bottom (RBC rich zone). (Fig. 6(a)) After centrifugation, the RBC base was separated from the PRF clot using scissors, and with help of sterile tweezers, the PRF clot was placed in a sterile container. A gentle digital pressure was applied to obtain a PRF membrane after placing the PRF clot on moist gauze. (Fig. 6(b)) At the recipient site, the PRF membrane was placed over the exposed root surfaces and the flap was coronally advanced and sutured with 5-0 black silk sutures. (Fig. 7, 8) The periodontal dressing was placed over the surgical area to protect the area.

#### Post-operative care

The patients were prescribed antibiotics (amoxicillin- 500 mg, tid x 5 days), analgesic (paracetamol 500 mg 6 hourly for 3 days) and 0.2% chlorhexidine gluconate mouth rinse (0.2% Clohex™) two times a day for two weeks. Patients were advised to follow routine post-operative periodontal oral hygiene

instructions. The dressing and sutures were removed 10 days after surgery. Patients were followed at end of 4th week, 12<sup>th</sup> week. [Fig.9, 10] Clinically complete root coverage, good soft tissue healing with excellent gingival contour and texture, and the reduction in dentinal hypersensitivity was observed at 12<sup>th</sup> week follow-up. [Fig. 10]



Fig. 1: Pre-operative



Fig. 2: Preoperative



Fig. 3: Thickness



**Fig. 4:**



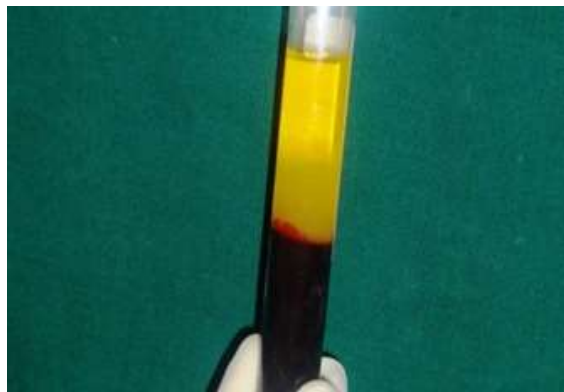
**Fig. 7:**



**Fig. 5:**



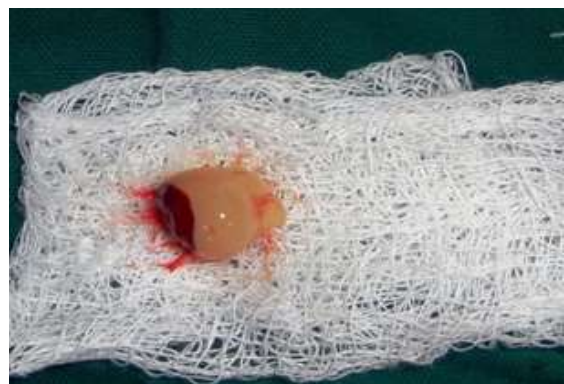
**Fig. 8:**



**Fig. 6 a:**



**Fig. 9:**



**Fig. 6: b**



**Fig. 10:**

## Discussion

With the increasing demand for aesthetic treatment, the treatment of gingival recession in the anterior segment of arch is becoming an important therapeutic issue with the goal of achieving complete root coverage. Many techniques have been used and shown a various degree of success. A coronally positioned flap has been demonstrated to be a reliable and predictable treatment modality for isolated type of gingival recession cases.<sup>(12)</sup>

In the present case the complete root coverage was achieved using the PRF with CAF is a less invasive procedure compare to autogenous subepithelial connective tissue graft, which requires 2<sup>nd</sup> surgical site to harvest the soft tissue graft in more invasive, time consuming and precised manner.

The use of PRF in dentistry has been introduced recently. The scientific rationale behind the use of PRF (platelet preparations) lies in the fact that a crucial role played in hard and soft tissue repair mechanism by various growth factors that are present in the platelet  $\alpha$ -granule.<sup>(10,11,13,14)</sup>

These include platelet-derived growth factors (PDGFs), transforming growth factor beta (TGF- $\beta$ ), and vascular endothelial growth factor (VEGF), and epidermal growth factor (EGF), insulin like growth factor-1 (IGF-1). These growth factors exhibit chemotactic and mitogenic properties that promote and modulate cellular functions involved in tissue healing, cell proliferation, and regeneration.<sup>(15)</sup> A number of factors related to the preparation, handling and storage of the platelet preparation are responsible for the release of these growth factors.

PRF is a matrix of autologous fibrin, in which a large quantity of platelet and leukocyte cytokines are embedded during centrifugation.<sup>(5,6)</sup> The cytokines incorporated intrinsically within the fibrin mesh, release progressively over time (7-11 days), as the network of fibrin disintegrates<sup>(16)</sup>. The easily applied PRF membrane acts much like a fibrin bandage<sup>(18)</sup>, serving as a matrix to accelerate the healing of wound edges.<sup>(19)</sup> It also protect the surgical site postoperatively and seems to accelerate the integration and remodeling of the grafted biomaterial.<sup>(6-8)</sup>

The platelet cytokines (PDGF, TGF-  $\beta$ , IGF-1) are slowly released with the resorption of fibrin matrix, thus creating a perpetual process of healing<sup>(16,19)</sup> and, the presence of leukocytes and cytokines in the fibrin network can also play a significant role in the self-regulation of inflammatory and infectious events within the grafted material.<sup>(20)</sup>

## Conclusion

The case presented here demonstrates that the complete recession coverage with excellent gingival contour and texture were observed. The use of PRF is less invasive, economical and effective mode of treating gingival recession compared to traditional graft

procedures. Thus PRF as a natural and optimized blood clot seemed the adequate adjuvant to secure this technique and to improve the gingival recession. Further researches for histology and clinical aspects are needed to prove its short and long term effectiveness.

## Clinical significance

With the elimination of donor site, using PRF membrane for recession coverage is less invasive and less postsurgical discomfort. The presence of a fibrin 3-D polymerized matrix in a specific structure, and incorporation of platelets, leukocytes, growth factors and presence of circulating stem cells, it promotes rapid soft tissue healing and minimal post-operative edema compared to other invasive techniques.

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