

# TRUTH OR DARE! RECONSIDERING THE EFFECT OF USING PLATELET RICH FIBRIN MEMBRANE IN ROOT COVERAGE

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## ABSTRACT

Periodontal plastic surgery procedures are prevalent to treat gingival recession. Currently the use of bioactive materials to achieve a better result has become a common practise. The platelet rich fibrin (PRF) membrane is recently one of the most researched biomaterials. Because of the various advantages of PRF, its use has been popularised these days.

A systemically healthy patient with Miller's class I gingival recession was selected. After achieving the goals of phase I therapy, the conventional coronally advanced flap was done and PRF membrane was positioned at the surgical site. The flap was stabilised in a coronally advanced position with the help of a sling suture. Post operative followups were taken at the interval of 1 month, 3 months and 6 months respectively.

Result obtained thus showed that the use of PRF had no added advantage in root coverage. However, its role in post operative healing is further analysed, considering the biology of this biomaterial.

## KEY WORDS

**Platelet rich fibrin membrane, coronally advanced flap.**

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## INTRODUCTION

The reconstruction of the gingival soft tissue is widely in practise over the years. This is commonly done to correct the conditions like gingival recession. Gingival recession is the shift of the soft tissue margin apical to cemento-enamel junction with exposure of root in the oral cavity.<sup>1</sup> This is mostly caused by mechanical trauma due to tooth brushing and also from periodontitis. However, other etiologic factors like malposition of tooth, high frenum, occlusal trauma, thin gingival phenotype can also predispose to such condition.<sup>2</sup> According to Miller's classification, it was possible to achieve 100% root coverage in Class I and II cases, while only partial coverage of recession was possible in class III.<sup>3</sup> Current classification by Cairo has established the correlation between the interdental clinical attachment loss and prognosis of the root coverage treatment.<sup>4</sup> This can be gained by free mucosal grafts or pedicle flaps like rotational flaps, advanced flaps, semilunar flaps. It has been seen that satisfactory root coverage and optimum colour matching can be achieved by coronally advanced flap technique.<sup>5</sup> However, various factors influence the ultimate outcome of this technique like, the width of the keratinised gingiva, height of the interdental papilla, vestibular depth and frenal attachment.<sup>6</sup> Since long term successful stability could not be achieved with conventional coronally advanced flap technique, many adjuncts have been used to improve the clinical results.<sup>7</sup> The platelet rich fibrin (PRF) membrane is one of the most widely researched biologically active material. Its easy availability and rich source of growth factors is increasing its acceptance in various surgical techniques.

Choukroun et al in 2001 had developed the PRF in France.<sup>8</sup> In this fibrin matrix, platelets, cytokines and leukocytes are entrapped in the equilateral meshwork. The cytokines and the growth factors are released over a period of time and the membrane resolves in 7 days. This second-generation platelet concentrate has a lot of advantages which include an ease of preparation/application, minimum expenditure and lack of biochemical modification as no bovine thrombin or anticoagulant is required for its preparation unlike platelet rich plasma (PRP). A natural human blood clot consists of 95% red blood

cells (RBCs), 5% platelets, less than 1% white blood cells (WBCs), and a lot of fibrin strands. While a platelet concentrate contains 4% RBCs, 95% platelets, and 1% WBCs.<sup>9</sup> The fibrin clot entraps the platelets and leucocytes, which are released slowly over time. The abundance of the numerous growth factors and its ease of preparation and handling has popularised this biomaterial.

## CASE REPORT

A patient reported in the Department of Periodontics, Guru Nanak Institute of Dental Sciences and Research, Kolkata, with the chief complaint of sensitivity of maxillary anterior teeth. On examination, Miller's class I gingival recession was appreciated in the maxillary canines (Figure 6). Owing to the advantages of using PRF membrane in coronally advanced flap, the treatment was adopted simulating such technique. Informed consent was taken from the patient. The adequacy of attached gingiva and reduction of the inflammatory condition was ensured before the treatment. The clinical parameters of recession depth, recession width, probing depth and the width of the attached gingiva were recorded at the baseline. Coronally advanced flap along with PRF membrane placement was planned. Complete hemogram checkup was advised before initiating the surgical procedures. Scaling and root planing was completed. Coronoplasty was performed wherever required. Proper oral hygiene instructions were given. Three weeks after achieving the goals of the phase I therapy, the gingival tissue response was evaluated. After re-evaluation surgical procedure was performed.

The PRF was prepared before preparing the surgical site. Following Choukroun's protocol, 10 ml of intravenous blood (by a venipuncture of the antecubital vein) was collected in a test tube without anticoagulant and immediately centrifuged at 3000 revolutions/min for 10 minutes. After centrifugation, three layers were obtained, such that, the top layer contained supernatant serum, the fibrin clot at the middle layer, and the bottom layer contained the red blood corpuscles (RBC) (Figure 1). To separate the RBC base from the fibrin clot, scissors and tweezers were used. The clot hence obtained was placed in the PRF box and the lid was placed in position, exerting 66gm force (Figure 2) and left for three minutes to prepare the PRF membrane. The membrane hence obtained was of uniform thickness and easy to handle.

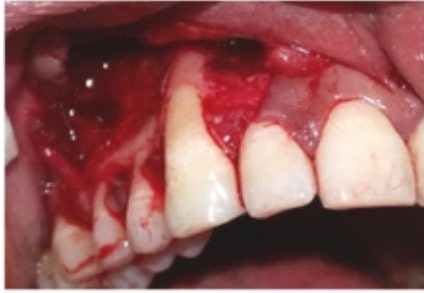
After giving local anaesthesia at the surgical site, incisions were placed in the interdental areas, and intrasulcular incisions were placed around those teeth with recession defects. Split-full-split flap was raised in coronal–apical direction (Figure 3). The prepared PRF membrane was placed at the surgical site (Figure 4) and stabilised with digital pressure. The flap was made freely mobile and advanced coronally such that its margin lies on the enamel to ensure overclosure to combat the shrinkage. Independent sling suturing was done using 4-0 non-resorbable sutures (Figure 5). Antibiotics and analgesics were advised as required. Post-operative instructions were given and patient was informed to report after 21 days for suture removal. The recession depth and recession width were measured at the interval of 1 month, 3 month and 6 month (Figure 7-9).



Figure 1: Centrifuged blood



Figure 2: PRF membrane



**Figure 3: Split-full-split thickness flap raised**



**Figure 4: PRF membrane placed at the site**



**Figure 5: Independent sling sutures placed**



**Figure 6: Pre operative view**



**Figure 7: 1 month post operative view**



**Figure 8: 3 months post operative view**



**Figure 9: 6 months post operative view**

## DISCUSSION

The apical migration of gingival margin usually occurs following the hard tissue defect. In patients with a residual amount of keratinized tissue apical to the recession defect, the coronally advanced flap may be recommended.<sup>10</sup> Various studies have been carried out in search of an ideal biomaterial for added advantage in root coverage procedures. The evolution of platelet concentrates have proven to be a boon in such a condition. In a comparative study of bilateral

recession defects, where one side was treated with coronally advanced flap and the other side in adjunct with PRF membrane, it was seen that the resultant root coverage was comparable on 6 months followup.<sup>11</sup>

The adjunctive use of PRF membrane had no extra benefit in root coverage. There was increase in gingival tissue thickness due to growth factor induced increased proliferation of fibroblasts.<sup>11</sup> The use of platelet concentrates was expected to result in long

term stability of conventional root coverage procedures and have a beneficial effect on soft tissue wound healing. The microcirculation of the connective tissue post operatively, is dependent on the flap thickness and the kind of incision placed. For all these days, the major focus was on the advantageous effect of the growth factors present in PRF. However, chances are there, that the interposition of the PRF membrane interferes with the collateral circulation and disrupts the healing of thin flaps.

The healing process is thought to be promoted by the efficient and sustained migration of cells and cytokines in a better organised fibrin meshwork like PRF. Due to the slower release of growth factors from PRF as compared to PRP, better healing could be appreciated with PRF.<sup>12</sup>

## CONCLUSION

The role PRF membrane as an adjunct to conventional coronally advanced flap procedure in achieving root coverage is questionable. Considering the biology of PRF, faster healing is expected. Other factors such as PRF consistency, position of the membrane in relation to CEJ and PRF preparation protocol should further be considered for concluding the efficacy of the biomaterial.

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