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Gingival Recession Treatment with Platelet Rich Fibrin (PRF) And Coronally Repositioned Flap (CRF) With And Without Tetracycline Hydrochloride (HCl) Root Biomodification: Case Report Of Two Cases

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Abstract

Gingival recession is becoming a more common condition in many people's oral health and should be addressed as soon as it is discovered. This condition may be associated with periodontal disease or related to mechanical factors such as tooth brushing. Gingival recession usually creates an aesthetic problem and may also lead to root sensitivity, cervical caries, or abrasion. Pedicle gingival grafts, free autogenous gingival grafts, and connective tissue grafts are some of the methods that can be used to surgically cover the root.

This case report was conducted with a recession defect on the labial surface of the maxillary anterior. Case 1 was treated with a coronally repositioned flap with platelet-rich fibrin with root biomodification using tetracycline HCl, and Case 2 was treated with a Coronally repositioned flap with platelet-rich fibrin for coverage of areas of isolated gingival recession. Recession length was measured at baseline, 1 month, and 3 months. Both the treatment modalities demonstrated a significant improvement in the recession length, recession width, and clinical attachment level with no post-operative discomfort, but Case 1 was found to be better than Case 2.

INTRODUCTION

One of the most common aesthetic concerns associated with periodontal tissues is gingival recession [1]. Gingival recession (GR) is defined as the exposure of the root surface due to the displacement of the gingival margin apical to the cementoenamel junction (CEJ) [2]. This phenomenon can lead to a cascade of sequel, including dentinal hypersensitivity, increased susceptibility to caries, and compromised aesthetics [3]. The

etiology of gingival recession is multifaceted, with periodontal disease and improper oral hygiene practices representing the two primary contributing factors.
Results from pedicle flap techniques like coronally or laterally advanced or combination surgeries might be predicted [4].
While subepithelial connective tissue grafts (SCTG) represent a gold standard treatment for gingival recession, the procedure can necessitate a larger donor tissue volume [5]. This often translates to a more invasive surgical approach involving palatal tissue harvesting, which can elevate both surgical complexity and potential complications. Guided tissue regeneration and biologically active alternatives such as platelet platelet-rich plasma (PRP), enamel matrix derivatives, and acellular dermal matrix allograft can help reduce these drawbacks, and the second-generation autogenous Platelet Rich Fibrin (PRF) has been the recent adjunct and have created new possibilities in the treatment protocol for the root coverage procedures [6].
Perhaps the oldest and most frequently attempted type of periodontal regeneration has involved chemical modification of tooth surface.
This strategy was justified by the fact that the migration and attachment of connective tissue cells to the root surface are essential for the regeneration of connective tissue attachment to a denuded, periodontitis-affected root [3]. Hence, a biomodification of root procedure has been introduced by using a variety of agents, including root conditioners, e.g., citric acid [7], tetracycline [8], and enamel matrix proteins (EMP) [9].
Hence, this case report aims to compare the root coverage obtained on areas of isolated gingival recession by combination of CRF and PRF with or without root conditioning with tetracycline hydrochloride (HCl).

CASE PRESENTATION

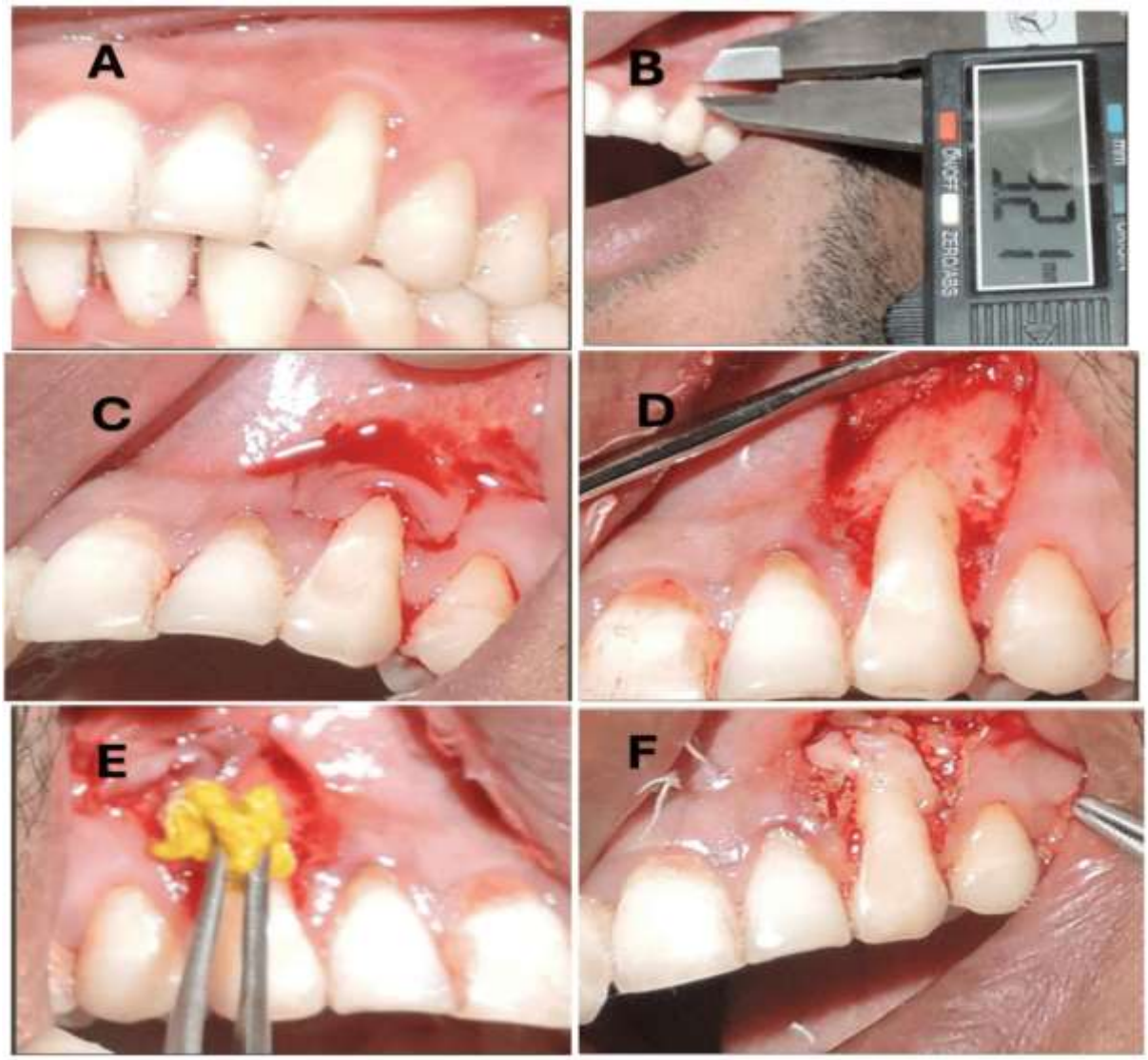

Figure 1: CASE 1 - Root coverage using Coronally repositioned flap (CRF) and Platelet rich fibrin (PRF) with root conditioning with tetracycline hydrochloride (HCl)

Figure *1A*- Pre-operative recession site
Figure *1B*- Pre-operative recession length measured using vernier calliper
Figure *1C*-Coronally repositioned flap incision given
Figure *1D*-Coronally repositioned flap reflected
Figure *1E*-Root biomodification done using tetracycline HCl
Figure *1F*-Platelet rich fibrin placed over defect site

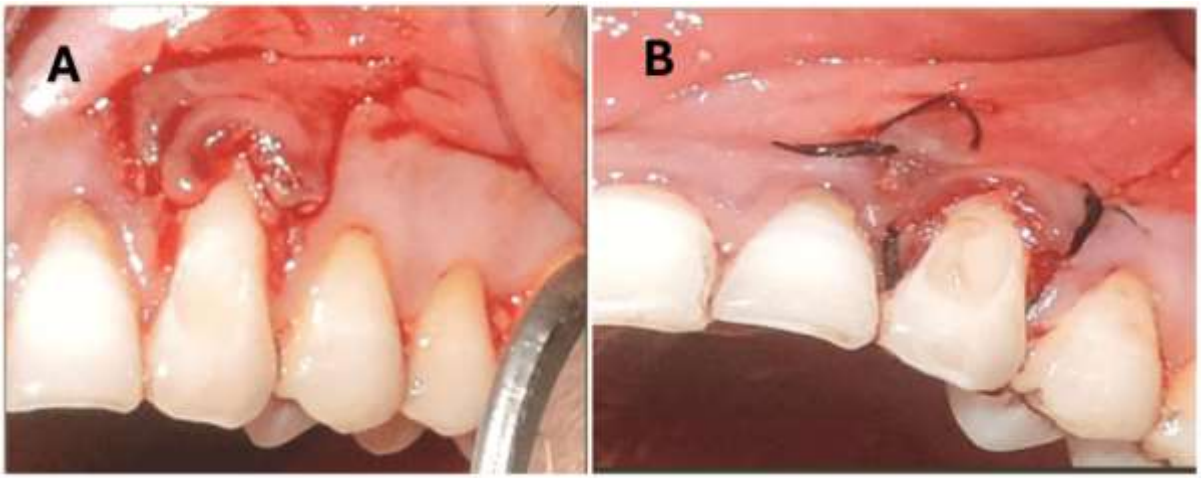

Figure 2: CASE 1 CONTINUED - Root coverage using Coronally repositioned flap (CRF) and Platelet rich fibrin (PRF) with root conditioning with tetracycline hydrochloride (HCl)

Figure *2A*- Flap repositioned coronally
Figure *2B*- Suturing done using 5-0 sutures

Recessing gums in the right and left upper front tooth region for the previous six months was the main complaint of two patients who came to the Subharti Dental College and Hospital's periodontology and implantology department in Meerut. On examination isolated Miller Class I gingival recession at the labial surface of the canine was present.

CASE 1 - Root coverage using Coronally repositioned flap (CRF) and Platelet rich fibrin (PRF) with root conditioning with tetracycline hydrochloride (HCl)

On taking a detailed intraoral examination, patient gave the history of aggressive tooth brushing and an isolated Miller Class I gingival recession at the labial surface of the canine was present. Thorough scaling and root planing was done on the first visit, and the patient was instructed to maintain good oral hygiene. After a week, they were called back for evaluation.. Before starting with the surgical intervention intra-oral asepsis was performed using 0.2% Chlorhexidine gluconate as pre-procedural mouth rinse and Povidone-iodine solution was used to carry out extra-oral asepsis protocol.

Before starting the procedure recession length was measured using vernier calliper (Figure *1B*). After which, Two apically divergent vertical releasing incisions were made under local anesthesia. These incisions extended apically into the lining mucosa and from a position coronal to the cemento-enamel junction at the tooth's mesial and distal line axis (Figure *1C*). Following a precise dissection mesial and distal to the recession, a split thickness flap was created and attached with an intracrevicular incision. A full thickness flap was raised apical to the receding soft tissue boundary on the tooth's face aspect in order to preserve the maximum thickness of the tissue flap that would be utilized for root covering (Figure *1D*). To relieve muscular tension, a blunt dissection was performed into the vestibular lining mucosa after a horizontal incision through the periosteum was made around 3 mm apical to the bone dehiscence. The mucosal graft can be easily placed coronally at the level of the cemento-enamel junction because the blunt dissection was prolonged both buccally and laterally. After the flap was reflected, a solution of tetracycline hydrochloride was used to burnish the exposed root surface (Figure *1E*). The tetracycline concentration in the solution was 125 mg per millimeter (mm) of saline. Using cotton pledges, a 500 mg over-the-counter tetracycline capsule was split into four separate 125 mg tetracycline parts and dissolved in 1 ml of saline. The exposed root surface was then burnished for three minutes, rinsed with water, and dried with air from a 3-way syringe. The PRF membrane was then placed 2-3 mm beyond the bone edge, over the root coronal to the CEJ (Figure *1F*). The flap was then positioned coronally

to cover the membrane (Figure *2A*), and 5.0 silk suture was used to fix it with sling suture (Figure *2B*). Additionally, 5.0 silk interrupted loop sutures were used to close the vertical wounds.

CASE 2 – Root coverage using Coronally Repositioned flap (CRF) and Platelet Rich Fibrin (PRF)
Similar procedure was done in case 2 except root bio modification was not done in this case (Figure *3A*-3*F*).

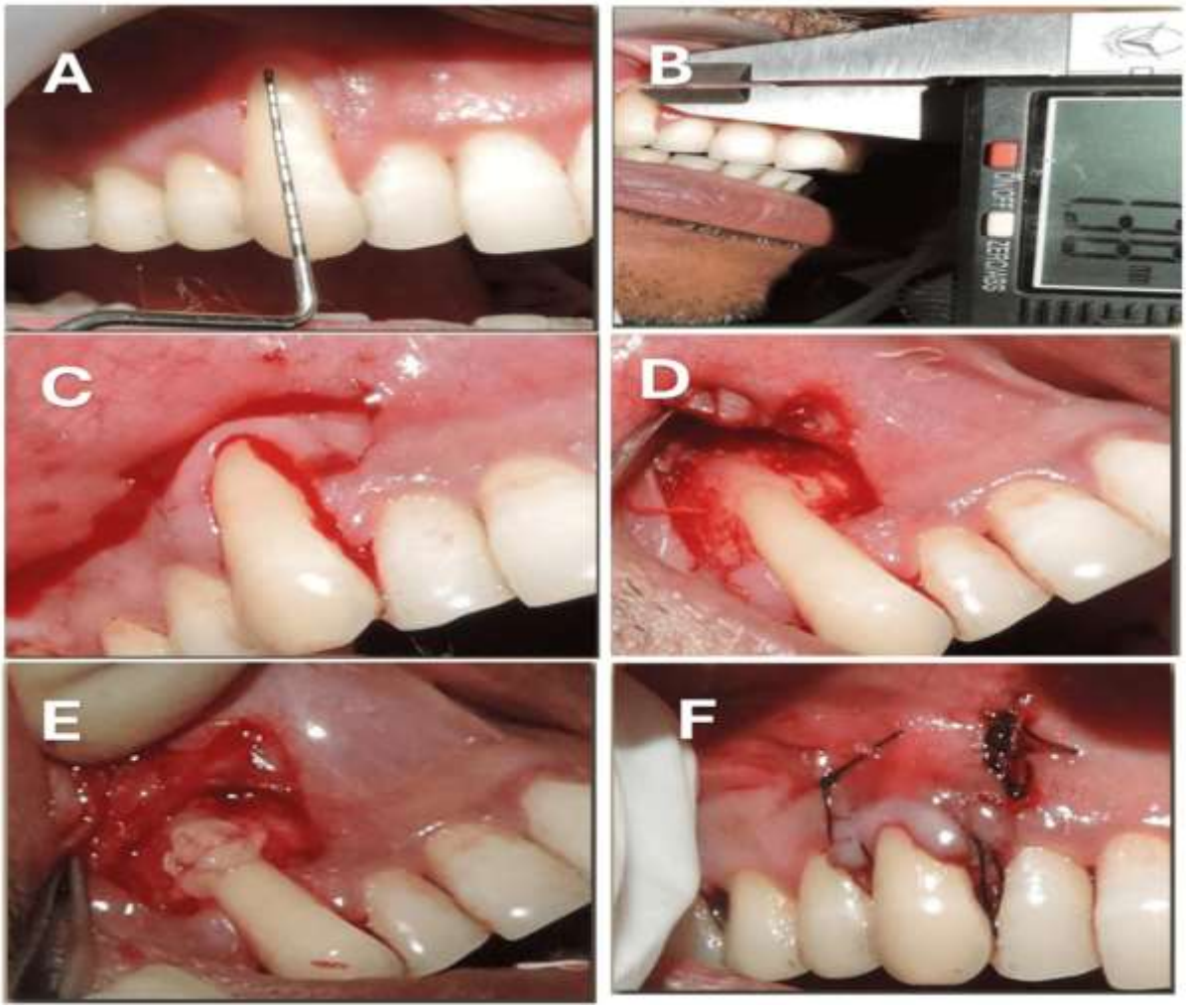

Figure 3: CASE 2- Root coverage using Coronally repositioned flap (CRF) and Platelet rich fibrin (PRF)

Figure *3A*- Pre-operative recession length measured using UNC-15 probe
Figure *3B*- Pre-operative recession length measured using vernier calliper
Figure *3C*- Coronally repositioned flap incision given
Figure *3D*- Coronally repositioned flap reflected
Figure *3E*- Platelet rich fibrin placed over the site
Figure *3F*-Suturing done using 5-0 sutures

Figure 4: Post-operative recession length comparision after 3 months for both cases

Figure *4A*- Post-operative recession length measured using vernier calliper after 3 months for Case 1 i.e CRF with PRF with root biomodification using tetracycline hydrochloride

Figure *4B*- Post-operative recession length measure using vernier calliper after 3 months for Case 2 i.e CRF with PRF

After one and three months, both cases were recalled for follow-up.

Both patients showed good healing, and the treated sites had complete root coverage that held steady at one and three months after surgery. Throughout follow-ups, the treated sites remained plaque-free, and the patient expressed great satisfaction with the course of treatment. After three months, both cases had full root coverage; however, case 1 showed superior clinical attachment and results as compared to case 2 (Figure *4A* & 4*B*).

DISCUSSION

Improving periodontal health is the primary objective of periodontal therapy, which helps patients maintain functional dentition throughout their lives. However, in the present case, the patient had class I gingival recession with concerns regarding unpleasant esthetics and hypersensitivity [4].

The advantage of pedicle over free soft tissue grafts is the retention of flap vascularity. Zucchelli et al. [10] compared root coverage and esthetic outcomes of the CAF with and without vertical releasing incisions in the treatment of multiple gingival recessions and concluded both CAF techniques were effective in reducing recession depth. The envelope type of CAF was associated with an increased probability of achieving complete root coverage and with a better postoperative course.

This case report utilized tetracycline 125 mg in 1 ml of saline applied after air drying for a period of three minutes and Platelet Rich Fibrin which is isolated from peripheral blood and are an autologous source of growth factors [11].

Marx et al. [12] reported the first clinical dental results with PRP to improve graft incorporation in mandibular reconstructions in patients who had received cancellous bone marrow grafts after tumor removal.

It has been proved from various studies like Hanes et al. [13], who used a 0.5% solution of tetracycline and showed that conditioning the root surfaces will not only eliminate the surface smear layer selectively but may also have positive benefits by preventing bone resorption and collagenase activity, as well as by having antibacterial properties locally. Among the citric acid, tetracycline, and doxycycline, tetracycline HCl showed the best conditioning results, showing that the 250 mg/ml concentration of tetracycline HCl is best suited to be used as a root conditioning agent.

CONCLUSION

CRF is a minimally invasive technique that can be used for the treatment of recession coverage. Platelet-rich fibrin, a fully autologous material, provides a mesh that acts as a scaffold for the release of enormous growth factors and molecules stimulating repair. Also, due to its proven regenerative potential and being economical with simple chairside preparation protocols, PRF may act as a suitable alternative to the autologous as well as to the expensive synthetic cellular and acellular biomaterial with encompassing encouraging and promising results in the treatment of Root coverage procedures whereas tetracycline HCl provides better attach along with PRF.

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