



## PINHOLE SURGICAL TECHNIQUE - A MINIMALLY INVASIVE APPROACH FOR MANAGEMENT OF GINGIVAL RECESSION USING INJECTABLE-PLATELET RICH FIBRIN (I-PRF): A CASE REPORT

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**ABSTRACT** Treatment of gingival recession has become an important therapeutic issue due to increasing cosmetic demand. This case report highlights the achievability of novel pinhole surgical technique (PST) in the treatment of gingival recession (GR) along with injectable platelet rich fibrin (i-PRF). A 23-year-old systemically healthy male patient with Miller's class I GR were treated with PST. i-PRF was procured from the patient's blood at the time of the surgery and used for the procedure. The follow-up was performed at 3-month postsurgery. The percentage of root coverage was found to be statistically significant with minimal complications. PST is a minimally invasive surgical technique, which has given better results which are further augmented by the application of i-PRF. This technique provides a conservative approach to treat the recession defects without any vertical releasing incision which results in scar formation, with less surgical time, post-operative bleeding, swelling and pain.

**KEYWORDS** : Minimally invasive, pinhole surgery, root coverage, recession, injectable platelet-rich fibrin

### INTRODUCTION

Gingival recession (GR) is a common mucogingival condition that can cause several therapeutic challenges to the clinician. Patients with recession often complaints of sensitivity and unesthetic appearance. Gingival recession is the exposure of the root surface by an apical shift in the gingival position.<sup>1</sup>

Maynard and Wilson proposed the term "marginal tissue recession" in 1979 to indicate exposure of the root surface due to apical migration of the soft tissue margin. The term has been widely accepted because the soft tissue margin may not always consist of the gingiva; in some instances, it can be formed only by the alveolar mucosa.

The etiology of marginal tissue recession includes high frenal pull, thin alveolar bone, abrasive and traumatic tooth brushing techniques, improper restorations, gingival inflammation, calculus, malposition of teeth, and self-mutilation or orthodontic tooth movement through a thin buccal plate.<sup>2</sup>

Several techniques have been used to treat GR defects, which include pedicle flap and free soft tissue grafts like free gingival grafts, free connective tissue grafts, as well as guided tissue regeneration. Despite a considerable number of studies that have been done on root coverage (RC), surgical difficulties, time, and patients' discomfort remain major obstacles.<sup>3</sup> However, the morbidity associated with the secondary graft sites has sparked interest for other modalities to meet the esthetic and functional requirements without complications, while ensuring the patient comfort and satisfaction.<sup>4</sup> This case report outlines the benefits of injectable platelet rich fibrin (i-PRF) using a minimally-invasive surgical technique which is a pinhole surgical technique (PST) as it reverses GR without using donor graft or flap elevation.

### Case Report

A 23-year-old systemically healthy male patient reported to the department of Periodontics with the chief complaint of unesthetic exposure of upper left back tooth. Clinical examination revealed Miller's class I gingival recession in 24 and a diagnosis of chronic gingivitis with localised periodontitis in relation to 24 was made.

### Pre-surgical therapy

The surgical procedure was explained to the patient and informed consent was obtained. Preparation of the patient included oral prophylaxis of the entire dentition and oral hygiene instructions. At the time of presentation, clinical examination revealed periodontal probing depth (PPD) of 2mm, gingival recession of 2mm and clinical attachment loss of 4mm.

### Preparation of the injectable platelet-rich fibrin (i-PRF):

5 ml of the patient's blood sample was taken in the operating room during the surgery. Immediately after the blood was drawn, the dried monovettes (without anticoagulant) were centrifuged at 700 rpm for 3 min in a tabletop centrifuge (REMY<sup>®</sup> Laboratories). The i-PRF liquid above from the red layer of RBCs is drawn off into an insulin syringe from the tube.<sup>5</sup>

### Surgical technique

Following local anesthesia, a horizontal incision was made in the base of the vestibule just apical to the recession of 24. By keeping the tip of the interdental papilla intact at both mesial and distal sites a sulcular incision was given. A blunt dissection was given using a bevelled tunneling instrument (transmucosal periosteal elevator) which was inserted through the pinhole. The entire mucogingival tissues was passively mobilized until the tissues advance coronally and i-PRF was injected at the pin hole incision. An anchored horizontal mattress suture was used to coronally position the mucogingival complex. A 4-0 black braided silk suture with 3/8 reverse cutting needle was used and a horizontal mattress suture was placed at a distance of 2-3 mm from gingival margin. The suture was secured with composite stops to prevent apical relapse of the gingival margin during initial stages of healing. A periodontal dressing - COE-PACK<sup>™</sup> (GC America, Alsip, IL, USA) was placed on the surgical site for 1-week.<sup>5</sup> Paracetamol 500mg for 3days was prescribed to the patient to control postoperative discomfort. No antibiotics were prescribed.

### Post-operative care

Patient was refrained from brushing at the surgical site for 4 weeks and was advised 0.2% chlorhexidine mouthwash twice daily for 15 days. The dressing was removed on the 7<sup>th</sup> day of surgery, and all the clinical

parameters were taken at 7<sup>th</sup> post-operative day and 3-month follow-up. Complete root coverage was achieved in relation to 24.

### Healing

The sutures were removed 7 days after the surgery. The surgical site was examined for uneventful healing. Complete coverage was achieved three months after the procedure, with excellent tissue contour and color. The patient was instructed to use a soft toothbrush for mechanical plaque control in the surgical area by a roll brushing technique. Oral hygiene instruction and professional cleaning was performed at each follow-up visit when indicated.<sup>6</sup>

### RESULTS

Clinical parameters such as Probing Pocket Depth (PPD), Recession depth (RD), Recession width (RW), Keratinized tissue width (KTW), and Clinical attachment level (CAL) were observed at baseline and at 3-month recall visits. At baseline, the mean value of PPD was 2mm, RD was 2mm, RW was 2mm and clinical attachment loss (CAL) was 4mm, at the end of 3-month complete root coverage was achieved. At baseline the KTW was 3mm and at the end of 3-month there was gain in KTW of 4mm. The percentage of root coverage was calculated as follows: (baseline RD – RD at 3months)/baseline RD and the result multiplied by 100. The mean values at 3 months (100%) were found to be statistically significant.

### DISCUSSION

Coronally advanced flap (CAF) with subepithelial connective tissue graft (SCTG) is accepted as the gold standard procedure for root coverage and has shown greater predictability for obtaining CRC. However, to avoid the second surgical site for procurement of CTG, the use of injectable platelet rich fibrin has been used along with CAF giving almost equal results as demonstrated in various clinical trials.<sup>7,8</sup>

John Chao in 2012 introduced a novel minimally invasive approach using a Pinhole Surgical Technique (PST) to reverse multiple GR defects. The minimally invasive procedure, PST, adopted in this case report overcomes the drawbacks of CAF, i.e., without any vertical releasing incisions and elevation of full-thickness flap that restricts the blood supply, scar formation, and shortening of vestibule.

Injectable platelet-rich fibrin (i-PRF) is a third-generation platelet concentrate, it has a three-dimensional fibrin meshwork, like that of a PRF clot and retains the fluid nature, just like platelet-rich plasma (PRP). Moreover, the injectable form of PRF is produced by using blood without anticoagulant and centrifuged at 700 rpm (60 g) for 3 min in plastic tubes without any coatings. The plastic tubes used in this protocol do not effectively initiate the coagulation process, since they possess hydrophobic surface. Therefore, this method allows the separation of blood components in the first few minutes of centrifugation, placing a yellow layer (plasma, clotting factors, and platelets) at the top of the tube. The achieved layer is easily aspirated and can be applied in an injectable form.

Growth factors and mesenchymal cells from i-PRF further stimulate fibroblast growth and cell migration thereby repopulating the root surface and assisting flap attachment to the root surface. Moreover, i-PRF showed enhanced mRNA levels of TGF- $\beta$  at 7 days, PDGF at 3 days, and collagen 1 expression at both 3 and 7 days when compared with PRF used alone, thus improving soft-tissue healing, which is important in treatment of gingival recession.<sup>5</sup>

In the initial study performed by Chao on the use of pinhole surgical technique, the mean root coverage obtained was 88.4%.<sup>10</sup> In accordance with his study, the mean root coverage obtained in our case report was 100% at 3-month follow-up. At baseline the clinical attachment loss was 4mm, at the end of 3months complete root coverage was achieved.

The higher success rate of this novel surgical technique might also be attributed to minimal invasiveness and instant esthetic results can be obtained using i- PRF which are obvious to patients. This technique also has additional benefits such as lesser surgical time, post-operative bleeding, swelling and pain. The esthetic acceptance in terms of color match and tissue blending was also good.<sup>9</sup> This result was corresponding to Kerner et al who concluded that gingiva color and esthetic outcomes is the main goal of patient satisfaction rather than the percentage of root coverage, which was also accomplished in our study.<sup>11</sup>

The limitations of the present technique might be utilization of specialized instrument and technique sensitivity.

### CONCLUSION

We conclude that, PST is a minimally invasive surgical technique, which has given better results which are further augmented by the application of i-PRF. Thus, this technique is a predictable approach to treat Miller's Class I gingival recession.

### Clinical Significance:

This technique provides a conservative approach to treat the recession defects without any vertical releasing incision which results in scar formation, with less surgical time, post-operative bleeding, swelling and pain.

### Images



Figure 1: Baseline showing marginal tissue recession



Figure 2: Periodontal measurements were done using UNC-15 periodontal probe



Figure 3: Surgical procedures- Horizontal incision of around 2-3 mm was made in the base of the vestibule Sulcular incision given



Figure 4: Subperiosteal tunnel preparation



Figure 5: Creation of tunnel from gingival margin to the pinhole



Figure 6: Platelet-rich-fibrin



Figure 12: One month postoperative view



Figure 7: i-prf injection placed

**Footnotes**

**Financial support and sponsorship**

Nil.

**Conflicts of interest**

There are no conflicts of interest.

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Figure 8: Acid etching done



Figure 9: Coronally anchored sutures with composite stops



Figure 10: Periosteal dressing coe pak placed



Figure 11: One week postoperative view