



PIN HOLE SURGICAL TECHNIQUE WITH I-PRF IN A SINGLE TOOTH RESSION – A CASE REPORT

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INTRODUCTION:

Periodontal plastic surgical procedures are performed to prevent or correct anatomical, developmental, traumatic, or plaque disease-induced defects of the gingiva, alveolar mucosa, and bone [American Academy of Periodontology (AAP) 1996]. The migration of the gingival margin below the cemento-enamel junction with exposure of the root surface is called gingival recession, which can affect all teeth surfaces, although it is most commonly found at the buccal surfaces. Gingival recession has been associated with tooth-brushing trauma, periodontal disease, tooth malposition, alveolar bone dehiscence, high muscle attachment, frenum pull, and iatrogenic factors (Wennstrom 1996).¹

Yadav et al in a systematic review estimated the global prevalence of gingival recession (GR) in the general population and overall pooled prevalence was 78.16%.² Several techniques have been used to treat GR defects, such as free gingival grafts, laterally positioned flaps or semilunar coronally positioned flaps, as well as guided tissue regeneration and connective tissue grafting. Despite the considerable number of studies that have been done for root coverage (RC), surgical difficulties, time and patients' discomfort are still the main obstacles.³

The use of least traumatic surgeries has led to the development of minimally invasive techniques which not only obtain root coverage but also have a color match and tissue blending with adjacent tissues of the defect site. Currently, the technique which is considered a gold standard for the correction of root coverage is subepithelial connective tissue graft along with CAF. However, this technique is associated with creation of a second surgical site increasing the patients' morbidity and inclusion of vertical releasing incisions, which results in scar formation, thus compromising the esthetics.⁴ To avoid these disadvantages, the vestibular incision subperiosteal tunnel access approach was developed.⁵ Following the similar concept, a novel minimally invasive technique was introduced by Chao in 2012, pinhole surgical technique (PST). This technique provides a conservative approach to treat the recession defects.⁶

The use of plasma that is rich in growth factors (GFs) for tissue regeneration in periodontal plastic surgery has been proposed. Studies have demonstrated that the GFs in the plasma concentrates stimulate the repair and regeneration of soft and hard tissues and that the plasma reduces inflammation and subsequent pain and discomfort. Platelet-rich plasma (PRP) is a fraction of plasma that provides a rich source of GFs. While initial experiments revealed PRP contained high concentrations of autologous GFs including platelet-derived GF, vascular endothelial GF and transforming GF- α , PRF has since been shown to release even higher total GFs over a more extended period of time. Major advantages of PRF include having completely immune compatible GFs collected at relatively no costs without anticoagulants. Initial PRF formulations lacked a liquid concentrate of proteins, as standardized PRF contains the majority of GF concentration encapsulated within its fibrin matrix (FM). Therefore, major

developments and advancements were recently made with the aim of developing a liquid formulation of PRF (i-PRF) (Miron et al., 2017). Recent studies have shown that despite slight or no increase in blood cell concentrations and growth factors, i-PRF was capable of inducing higher cell migration and mRNA expression of TGF- β , PDGF, osteocalcin and significant increase in type I collagen gene expression when compared to PRP and blood clot. It has been suggested that i-PRF provides a three-dimensional fibrin clot network embedding platelets, leucocytes, type I collagen, osteocalcin and growth factors acting as a dynamic gel with additional release of growth factors up to 10 days.⁷

In our study, we used a recent non-invasive surgical technique which is called pinhole surgical technique (PST) with i-PRF as it reverses GR without using donor graft, flap elevation, or sutures. This technique was introduced by John Chao in 2012 as a needle is used to make a small hole in the alveolar mucosal tissues. Through this pinhole, special instruments like tunneling instruments are utilized to loosen the gingival tissues gently and slide the gingiva to cover the denuded root surface. Hereby, all the muscular and fibrous adhesions are released until the flap can freely move coronally without any tension.⁶

CASE PRESENTATION:

A 29-year-old female patient came to our Department of Periodontology, Meenakshi Ammal Dental College with the chief complaint of sensitivity in relation to 22. On elaboration, the patient did not present any medical history. Extra-oral examination revealed no palpable lymph node, no facial asymmetry, and no pain or clicking sound of TMJ. Intra-oral examination revealed that the patient presented with Class I Miller's recession in relation to 22. Since adequate width of attached gingiva was present, root coverage was planned with a minimally invasive pin hole surgical technique in relation to 22 along with the i-PRF gel.

At the initial visit, the patient underwent Phase 1 therapy and was instructed strict oral hygiene maintenance. To rule out any underlying systemic conditions, the patient underwent a blood investigation before the surgical procedure. The patient was informed about the surgery and the patient's consent was taken.

i-PRF preparation:

Before the surgical procedure, 1 tube of 10 mL peripheral venous blood was collected from the patient and immediately centrifuged in a PRF centrifuge machine according to i-PRF protocol (800 rpm for 8 minutes) by Miron RJ et al. The i-PRF was removed from the tube using smaller diameter needle (Insulin syringe). The i-PRF membrane was applied to recipient site immediately.

Surgical Technique:

Following administration of local anesthesia, i.e., local infiltration of 2% lidocaine with a concentration of 1:200000 epinephrine, using a no. 12 scalpel (Bard-Parker), a minimal horizontal incision of 2 to 3

mm was made in the alveolar mucosa near the base of the vestibule, apical to the recipient site. A sulcular incision was given keeping the tip of the interdental papilla intact at both mesial and distal sites. A tunneling instrument (transmucosal periosteal elevator) was inserted through the pinhole and used for blunt dissection. The flap was then extended coronally and horizontally to allow for elevation of two adjacent papillae on each side of denuded root. The interproximal extension of flap allowed the coronal advancement of the mucogingival complex beyond the cemento-enamel junction at the defect site. i-PRF membrane was then injected via the pin hole and intrasulcularly. Gentle digital pressure was applied to the flap for approximately 5 minutes. The entry incision was left to heal by first intention, without suturing. Vertical mattress sutures were placed to coronally reposition the tissue and sutured at the new position with orthodontic buttons. Periodontal dressing was placed on the surgical site. The patient was instructed to rinse with a 0.2% chlorhexidine solution for 2 weeks and to take amoxicillin 500mg thrice daily for 5 days and analgesic (Paracetamol 500mg +Aceclofenac 100 mg) twice daily for three days. The patient was instructed to be cautious while mastication and to avoid tooth brushing at the surgical site for 14 days.

DISCUSSION:

The novel minimally invasive technique, PST, used in this case series overcomes the limitations of CAF, i.e., vertical releasing incisions and elevation of full-thickness flap that compromise the blood supply to the flap, scar formation, and shortening of vestibule. Our results revealed that there was an increase in gingival volume and biotype thickness in relation to 22, these outcomes were also supported by Chao who concluded that PST is capable of increasing the tissue volume and gave stable predictable results if the presented tissue thickness is 0.8–1 mm minimally. Furthermore, there was an increase in WKT in both teeth from baseline to 8 months. These results were also concluded by Anuroopa et al, Reddy, Agarwal et al and Chao.⁹

The intra-operative discomfort was low, and post-operative bleeding, swelling, and pain were mild and for short duration. The esthetic acceptance in terms of color match and tissue blending was also good. The higher success rate of this novel surgical technique might also be attributed to minimal invasiveness. Moreover, instant esthetic results can be obtained which are obvious to patients. This technique also has an additional benefit of not hampering vascular supply (no vertical releasing incisions involved), no scar formation, and lesser surgical time. The limitations of the present technique might be utilization of specialized instrument, technique sensitivity and need of experience to improve the handling of soft tissues.

CONCLUSION:

PST is a promising modality to obtain promising results in the treatment of Miller's Class I and II recession defects. Also, using i-PRF protocol in periodontal surgeries should be considered due to higher cellular migration and influence on osteoblastic behaviour with a tremendous release of growth factors. However, more clinical and histological studies are highly recommended to be addressed and to compare different approaches of the pinhole technique for root coverage.



Figure 1: Pre-Operative View



Figure 2: Recession Width



Figure 3: Recession Height



Figure 4: Sulcular Incision



Figure 5: Pin Hole Created



Figure 6: Tunneling Done



Figure 7: Tunnel Created



Figure 8: I-Prf Injected



Figure 9: Suturing Done



Figure 10: Coe Pak Placed



Figure 11: Post-operative 1 Month

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Conflict Of Interest:

The authors report no conflicts of interest related to this study.

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