

Free Gingival Graft Along With I-Prf for Recession Coverage and Interdental Papilla Augmentation: A Case Report

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Abstract: Among the various esthetic and functional problems related to periodontal tissues, gingival recession and loss of interdental papilla resulting in black triangles are quite common but also challenging to treat at the same time. Gingival recession has been well studied over time with various surgical procedures and their modifications available and high success rates in Miller's class I and class II gingival recessions. Free gingival graft procedure has been practiced since long with quite predictable results depending upon case selection. Interdental papilla reconstruction on the other hand is something for which various surgical and non surgical methods have been tried but the results are uncertain most of the times. Platelet rich fibrin (PRF) is now extensively being used for various periodontal regenerative procedures and has even been tried for papilla reconstruction. The purpose of this case report is to describe a novel approach of papilla augmentation using Injectable-PRF (i-PRF). Here we describe a case of gingival recession with 31 and loss of interdental papilla in relation to 31,32 and 31,41.

Free gingival graft (FGG) procedure was done in relation to 31 and i-PRF was prepared and injected into the facial gingival tissue and interdental papilla at intervals and observed over a period of 6 months. A definite increase in the height of interdental papilla and thickness of gingiva was observed.

Key words: Interdental papilla, I-PRF, periodontal plastic surgery, regeneration.

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I. Introduction:

Increased consciousness of patients regarding dental esthetics has resulted in increased number of patients reporting for root coverage procedures. There are many causes for gingival recession. Among others, thin gingival biotype and inadequate width of attached gingiva are two common causes for the mandibular anterior tooth region. The main concern for the patient in such cases is increased sensitivity in the affected teeth. Also, the loss of interdental papilla occurs resulting in other problems like those related to function, phonetics and esthetics. Because of resulting black triangles there is increased food lodgement and this adversely affects the health of the periodontium.¹ Height of the crestal alveolar bone, size of the interproximal space, biotype of the soft tissue, type of contact area and biologic width are some of the factors that determine the size of interdental papilla.² according to Tarnow's principle, when the distance between the contact point and the crest of interdental bone is ≤ 5 mm, the interdental papilla fills the entire embrasure space. But when the distance is 6mm only 56% of space is filled and for 7mm it is 37% only.³

Interdental area is more prone to periodontitis and its rapid progression because of the complexity of its anatomy and its vascular supply. Other causes for loss of interdental papilla include presence of diastemas, tapered tooth forms, divergent roots and iatrogenic causes.

Enhancement of interdental papilla is very challenging. Many surgical techniques are available for papilla reconstruction but are very complicated and have unpredictable outcomes.

There have been studies using PRF for papilla reconstruction with good results.^{4,5,6} PRF contains various growth factors including platelet derived growth factor, transforming growth factor- β , insulin-like growth factor -1. It also contains leukocytes and cytokines that control the inflammation.⁷ Injectable platelet rich fibrin (i-PRF) is the injectable form with same properties as PRF and seems to be more convenient to use. It has been found to have higher concentration of growth factors and more number of regenerative cells as compared to other platelet concentrates because of slower and shorter centrifugation.^{8,9}

In this paper we present a case report where i-PRF was used along with free gingival graft (FGG) for increasing the thickness of the gingiva and reconstruction of interdental papilla.

II. Case Report

A 42 years old healthy female presented to the department of Periodontology in our institute with the chief complaint of sensitivity in her lower front tooth and also food lodgement in the spaces between her lower front teeth. There was no history of smoking or any allergy.

On clinical examination it was found that there was Miller's class III gingival recession in relation to 31.¹⁰ The gingival recession was measured using UNC 15 probe after marking the cementoenamel junction (CEJ). The distance between CEJ and the gingival margin was found to be 3mm [figure 1] with the loss of interdental papilla height. The gingival recession was found to be associated with shallow vestibule, high frenal attachment of mandibular labial frenum and thin gingival biotype.

Also a decrease in the height of interdental papilla in relation to 31,41 and 31,32 was observed [figure 1]. No overt inflammation was observed in the soft tissues and Jemt's modification of papilla index score (PIS) was recorded as 1 that is less than half of the papilla height was present but a convex curvature of the interdental soft tissue was noted between 31,41 and 31,32.¹¹

Surgical procedure:

Patient was asked to rinse her mouth with 0.12% chlorhexidine digluconate for 30 seconds and then 2% lignocaine hydrochloride was injected for adequate local anesthesia. Vestibuloplasty was performed using a number 15 blade [figure 2]. Then the recipient bed was prepared for free gingival graft in relation to 31 using microsurgical instruments [figure 3]. Root planning was carried out and root biomodification was done using tetracycline [figure 4].

FGG was harvested from the palate [figure 5 and 6] and was sutured on to the recipient site using Ochsenshein sutures [figure 7]. A periodontal pack was placed on the recipient site and retainer with pack was given for the donor site on the palate. Patient was prescribed Ibuprofen 400mg twice daily for 3 days and chlorhexidine digluconate rinses twice daily for 10 days. Sutures were removed after 15 days [figure 8]. Follow up was maintained at regular intervals. At 3 months, gingival recession was reduced to 1.5mm [figure 9] but the interdental spacing was still present.

Injectable platelet rich fibrin preparation:

Armamentarium used for Iprf preparation and injection: Blood collecting glass tube, head cap, sterilized gloves, kidney tray, mouth mirror, explorer, UNC- 15 periodontal probe, lignocaine 2% (local anaesthetic), centrifuge : remi c-854/6, needles [Table 1] and syringes [Table 2] [figure 10]

Table 1: Needles used in the procedure

DIAMETER			LENGTH	USES
In Gauge	In millimetre	In inches	In millimetre	
25	0.45	0.0179	38	i. For injecting L.A. i. For injecting iPRF i. For withdrawal of iPRF from PRF tube
21	0.70	0.028	32	For blood withdrawal

Table 2: Syringes used in the procedure

SYRINGE	DIAMETER
2ml	9.83mm
10ml	15.96 mm

Protocol for preparation of i-PRF and injection procedure:

First the patient was given local anesthesia by infiltration.

For i-PRF, 3ml of blood was collected under aseptic conditions from the patient and put into a blood collecting tube without any additives. It was then centrifuged at 700 rpm (60g) for 3 minutes.¹² i-PRF formed the top layer which was immediately collected into a 2ml syringe with 25 gauge needle. The i-PRF was then injected by inserting the needle at a 45° angle in an area 2 to 3 mm below the interdental papilla tip. A one-point injection technique was performed on the connective tissue of the interdental papilla, ensuring the bevel was up by pointing the slant of the needle upward while injecting the I-PRF. Injection was followed by gentle massage of

the area for 1 min. Some I-PRF was also injected into the adjacent gingival tissue on the facial surface of 31 [figure 11 and 12].

This procedure of injecting i-PRF was carried out 3 months after the free gingival graft placement and was repeated for a total of 6 times at an interval of 15 days each. After each treatment session, patients were asked to not do the mechanical plaque control in the area for a day. An improvement in the height of the interdental papilla was observed at 3 months to a score 3 of PIS [figure 13] and the results were quite stable after 6 months [figure 14]. PIS score 3 was given since papilla filled the interproximal embrasure to the same level as in the proximal teeth and is in complete harmony with the adjacent papillae. Also observed was the improved thickness of gingiva in the region. Patient reported decreased sensitivity and decreased incidence of food lodgement.

III. Discussion:

People now have become more conscious about their dental esthetics and therefore demand precise root coverage. Various surgical options are now available for root coverage but in our case the cause was reduced width of attached gingiva and high mandibular labial frenum attachment, so FGG procedure was decided to be performed following vestibuloplasty. Also, studies have shown that despite the availability of other procedures FGG is considered the best method to increase the apico-coronal dimension of the keratinized mucosa.¹³

Also, it has been demonstrated by Miller¹⁴, Holbrook and Ochsenbein that free gingival autografts are very efficient in covering large gingival recessions.¹⁵ FGG is the ideal technique for mandibular anterior teeth region where gingival recession is usually associated with inadequate amount of keratinized gingiva.

After the free gingival graft procedure the next concern of the patient was black triangles. Interdental papilla protects the underlying periodontal tissues and has esthetic importance. Causes for the loss of interdental papilla are multiple and they must be clearly identified and eliminated before initiating the papillary reconstruction. Papilla reconstruction has been tried by various researchers using a variety of surgical techniques starting from repeated curettage of papilla as proposed by Shapiro et al¹⁶ to roll technique¹⁷, pedicle graft with coronal displacement of gingivo-papillary unit, subepithelial connective tissue graft¹⁸, buccal and palatal split thickness flap with inter-positional subepithelial connective tissue grafting¹⁹, reconstruction of interdental bone to support the reconstructed papilla²⁰ and pedicle graft. But, not only these procedures are complicated, the results of these surgical procedure are unpredictable and lack the long term stability. The main causes of these limitations could be that in the interdental area there is insufficient blood supply as it is a small area walled by nonvascularized tooth surfaces which makes it difficult for any form of free grafts to survive.¹⁸

So, as free gingival grafts cannot survive and subepithelial connective tissue graft will create a secondary surgical site, PRF offers a good alternative. PRF is a second generation platelet concentrate first developed in France by Choukroun et al.²¹

PRF has also been used in some studies^{4,5,6} with good results. Some of the advantages of PRF are that it is autologous, easy to prepare in a short period of time and little biochemical handling. It has a matrix of fibrin which has trapped platelets, leukocytes and cytokines. It acts as a source of growth factors which are released slowly over a period of 7 days and play an important role in remodeling of interdental papilla.²²

I-PRF also has similar properties as PRF and in addition to that it is available in injectable form. As i-PRF is a liquid concentrate, its growth factors and other components are not encapsulated in a fibrin matrix and so are readily available. But, the major advantages of i-PRF over other platelet concentrates have been proposed to be due to the 'slow speed concept' of blood centrifugation as proposed by Ghanaati et al. because of which it contains more number of regenerative cells and leukocytes.⁸ Leukocytes have been known to play an important role in wound healing and tissue regeneration.²³⁻²⁵ With the increased number of cells there is possibly increased release of growth factors. According to Miron et al. i-PRF forms a small clot which acts as a 'dynamic hydrogel' containing cells that can release additional growth factors over the next 10 days.¹² I-PRF has also been found to have antibacterial properties.²⁶

There have not been any studies using i-prf for papilla reconstruction. In the present study after the root coverage was done for the recession, i-prf was used for papilla reconstruction by repeated injection of i-prf over a period of 3 months until favourable results were obtained which seemed to be stable at 6 months follow up. Thus i-PRF can serve as an easy to prepare and use alternative for gaining the interdental papillary height with excellent results.

IV. Conclusion:

The case report shows a novel approach using I-PRF to reconstruct interdental papilla. Patient showed good acceptability to the treatment. Studies with longer period of follow up are required to confirm the long term stability of the treatment results.



Figure 1:Gingival recession with 31



Figure 2: Vestibuloplasty performed



Figure 3: Recipient bed prepared



Figure 4: Tetracycline for root biomodification



Figure 5: Donor site for FGG



Figure 6: FGG harvested



Figure 7: FGG sutured at the recipient site



Figure 8: 15 days postoperative after FGG



Figure 9: 3 months postoperative after FGG

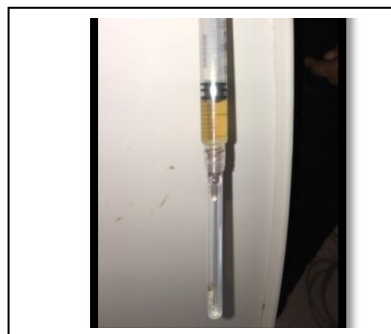


Figure 10: i-PRF in 2ml syringe



Figure 11: Injection of i-PRF irt 31,41



Figure 12: Injection of i-PRF irt 32,32



Figure 13: 3 months after i-PRF injection



Figure 14: 6 months after i-PRF injection

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