



“A SIMPLE APPROACH FOR INCREASING THE GINGIVAL PHENOTYPE WITH AUTOLOGOUS INJECTABLE PLATELET RICH FIBRIN(i-PRF)- A CLINICAL PILOT STUDY”

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ABSTRACT In ordinary clinical treatment, aesthetic expectations have risen dramatically over time. A nice grin may instil extreme self-assurance in a person's attitude. The right balance of white (teeth) and pink (gingival) show determines a great grin. Excessive gingival show, sometimes known as a 'gummy grin,' is a key flaw in a person's entire demeanour. This case study shows how a lip repositioning treatment combined with crown lengthening may be used to treat excessive gingival presentation. In 1,2 weeks, 1 month follow-up, surgical healing was acceptable with little post-operative sequelae and a considerable decrease in gingival display. This method is a low-cost, minimally intrusive option.

Objective: To evaluate the increase in the gingival thickness using i-PRF in individuals with thin gingival thickness.

Materials And Methods: 2 subjects between the age group of 18-50 years having thin gingival biotype were selected from the Out Patient Department, Department of Periodontics, Coorg institute of dental sciences, Karnataka. The protocol of the study was thoroughly explained to the patients and written consent was obtained from them.

Conclusion: Within the limitations of this study, we concluded that Injection of i-PRF has proven beneficial for increasing the gingival thickness.

KEYWORDS :

INTRODUCTION:

Different gingival biotypes react differently to inflammation, restorative treatment, trauma, and parafunctional habits¹ These traumatic events cause diverse sorts of periodontal abnormalities that respond to different therapies. Ochsenbien and Miller discussed the importance of "thick vs. thin" gingiva in restorative treatment planning.² Seibert and Lindhe coined the term "periodontal biotype," which classified gingiva into "thick-flat" and "thin-scalloped" biotypes. A thick biotype has a gingival thickness of >1.5 mm, while a thin biotype has a gingival thickness of less than 1.5 mm.³ Thick gingival tissue has a broad keratinized tissue zone and a flat gingival contour, indicating thick bone architecture, and is also more resistant to inflammation and trauma. Thin gingival tissue has a thin keratinized tissue band, a scalloped gingival contour that suggests thin bony architecture, and is more prone to inflammation and trauma. Periodontal inflammation causes greater pocket development and gingival recession, in thick and thin tissues, respectively.⁴ Blood is the most vital autogenous source for soft and hard tissue healing in the body.⁵ Platelet-rich fibrin (PRF) was prepared by centrifuging blood in glass tubes without the use of anticoagulants or activators.⁶ Higher concentrations of polypeptide growth factors are carried by autologous blood concentrates to periodontal wounds, indicating progress. Platelet-rich fibrin (PRF) is a 2nd generation preparation described by Choukroun et al. among numerous platelet concentrates (2001).⁷ PRF is a surgical biologic preservative generated from manipulating autologous blood.^{8,9} It has a unique structure and is one of the most often employed platelet concentrates in dentistry. It was used to transport cells for the application of tissue regeneration. PRF has been found to be efficient and successful in bone regeneration when utilised in plastic surgeries^{10,11} oral and maxillofacial surgeries¹² and implant¹³.

Injectable PRF is the most current advancement in the field of PRF. When compared to PRP, one disadvantage of PRF is that it is acquired in the form of a gel, which makes it not conducive to be injected. A liquid or injectable form of PRF has recently been developed.^{7,14-17} It is unique in terms of human tissue regeneration. It has progressed by injecting patients autologous PRF into affected soft tissue, mucous

membranes, or skin.¹⁷⁻²⁰ Various invasive and non-invasive methods were proposed to measure tissue thickness.

These include:

- 1) direct measurement²¹
- 2) probe transparency method²²
- 3) radiographic method²³

OBJECTIVE

To evaluate the increase in the gingival thickness using i-PRF in individuals with thin gingival thickness.

MATERIALS AND METHODS

2 subjects between the age group of 18-50 years having thin gingival biotype were selected from the Out Patient Department, Department of Periodontics, Coorg institute of dental sciences, Karnataka. The protocol of the study was thoroughly explained to the patients and written consent was obtained from them.

The preparation of I-PRF will be done according to the protocol given by Mourao et al where the intravenous blood will be withdrawn from the patients and centrifuged in centrifugal machine at 3,300 rpm for 2 minutes. The I-PRF will be injected in sites with thin gingival thickness with the use of microneedle. The patients will be recalled after a month and the thickness of gingiva will be measured again. Gingival biotype will be assessed on the basis of Visual method, Transgingival probing. In probe transparency method, the gingival biotype is considered thin if the outline of the probe is seen through the gingival margin from the sulcus. In transgingival probing method, it will be measured 3 mm below the gingival margin at the attached gingiva or the alveolar mucosa using a #15 endodontic K-file with a silicone disk stop at three points i.e. mesial, mid-facial, distal. The mucosal surface will be pierced at a 90° angle with slight pressure until hard tissue is reached. The silicone stop on the K-file would be slide until it was in close contact with the gingiva. After removal of the K-file, the distance between the tip of the K-file and the inner border of the silicone stop was measured.

Inclusion Criteria:

1. Patients within the age group of 18 to 70 years
2. Patients having thin gingival biotype
3. Non smokers
4. Patients with no systemic illness

Exclusion Criteria:

1. Patients having Class IV gingival recession
2. Patient using any antibiotics in past 3 months
3. Patients with high frenal attachments and ulcers
4. Patients undergoing orthodontic treatment.
5. Patients who are under any medications that was known to influence periodontal tissues.

CASE PRESENTATION

The gingival biotype is gaining considerable attention as one of the key elements influencing esthetic treatment outcome. Patients with a thick gingiva have been shown to be relatively resistant to gingival recession following surgical and/or restorative therapy.²⁴ The final aim of periodontal therapy is to restore the lost periodontal structure to its complete function and esthetics. PRF being a reservoir of soluble growth factors and cytokines (transforming growth factor beta-1, insulin-like growth factor 1 and 2, platelet-derived growth factor, cytokine vascular endothelial growth factor, and interleukin 1,4, and 6) that not only help in tissue regeneration but also accelerate wound healing²⁵.

CASE 1:

A 24 year old male patient who reported to the department was enrolled into the study after obtaining the verbal and written consent.

Gingival thickness was measured under local anaesthesia by visual method and by transgingival probing using an endodontic file with a rubber stopper.

5 ml blood was drawn from the brachial blood vessel and centrifuged according to the protocol to obtain autologous i-PRF. The i-PRF was collected in a 10 unit insulin syringe and administered below the mucogingival junction between 43-44.

Oral hygiene measures were reinforced and Patient was periodically reviewed for a time period of 29-30 days.

CASE 2:

A 32 year old female patient was enrolled in the study after obtaining a verbal and written consent.

Gingival thickness was measured under local anaesthesia by visual method and by transgingival probing using an endodontic file with a rubber stopper.

5 ml blood was drawn from the brachial blood vessel and centrifuged according to the protocol to obtain autologous i-PRF. The i-PRF was collected in a 10 unit insulin syringe and administered below the mucogingival junction between 23-24.

Oral hygiene measures were reinforced and Patient was periodically reviewed for a time period of 29-30 days.

RESULTS

Both the patients were recalled after 30 days to check the difference in the gingival thickness using both the transgingival and visual method. Case 1 presented with significant increase in the gingival thickness under visual method which was confirmed with an Endodontic file which showed a 1mm increase in the length than pre-op.



Figure 2: I-PRF obtained after centrifugation of blood for 2 mins at 3300rpm



Figure 3: Collected I-PRF in a microneedle syringe



Figure 4: Administration of I-PRF to the test site.



Figure 5: Re-evaluation of the thickness using an endodontic K file after 1 month



Figure 1: Measurement of gingival thickness using endodontic K file.

DISCUSSION

The first generation involves a lack of homogeneity in the PRP preparation protocol, as different platelet concentrations have different storage times, the release of growth factors for a shorter period resulting in coagulopathies and infrequent bleeding episodes. This limits the therapeutic application of PRP, necessitating the development of other, clinically viable techniques. PRF is a platelet concentrate that only requires one spin and does not require anticoagulants for its procurement. The clinical benefit of PRF is determined by the time interval between the speed of handling blood collection and the centrifugation procedure.

When compared to PRP, one disadvantage of PRF is that it is acquired in the form of a gel, which makes it difficult to inject. The development of injectable PRF is one of the most recent advancements in PRF technology (i-PRF). Liquid PRF is a concentrate of platelets, leukocytes, and their growth factors in a liquid fibrinogen based matrix that was prepared using low speed centrifugation.²⁶

It is feasible to make either a solid or a liquid PRF matrix without anticoagulants, depending on the blood collecting tube and centrifugation process. In the present study, we used a liquid injectable PRF matrix that was successful in increasing gingiva thickness and changing gingival phenotype in both the cases. In just one month, transgingival probing with an endodontic file revealed an increase in thickness from 1mm to 2mm.

A study done by **Richard J. Miron et al**²⁷ in 2016 discovered that PRP and i-PRF, despite having dissimilar characteristics, were capable of affecting cell activity of gingival fibroblasts. i-PRF increased cell migration and mRNA expression of TGF- β , PDGF, and COL1a². It was also shown that i-PRF created a small clot, most likely due to fibrin components acting as a dynamic gel with cells presumably contained within its hydrogel. It was thus believed that even after 10 days, an additional release of growth factors from i-PRF might still be expected, whereas PRP had completely dissolved after 10 days.

Turer et al. in 2020²⁸ compared the efficacy of coronally advanced flap (CAF), connective tissue graft (CTG), and I-PRF in recession coverage efficacy of Miller's class I and II gingival recession sites to a group that did not use I-PRF. They discovered that the I-PRF group gained considerably more Keratinized tissue width than the control group. The reduced no of cases and limited recall intervals could be perceived as a potential limitation of this study. Higher sample size, long-term application, and follow-up calls are the only ways to ensure long-term results.

CONCLUSION:

Within the limits of this investigation, we came to the conclusion that injecting i-PRF into the gingiva has been useful in enhancing gingival thickness. It affects osteoblastic behaviour by releasing a large amount of growth factors either alone or in combination with biomaterials. However, additional research is needed to evaluate the cell differentiation activity of i-PRF components.

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