

Coronally Advanced Flap Along with Autologous Platelet Rich Fibrin: Boon for Recession Coverage- A Case Report

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ABSTRACT

Introduction: Gingival recession results due to the apical migration of gingival margin. Correction of such gingival recession is necessary to enhance aesthetic as well as functional demand. Variety of periodontal plastic surgical procedures including coronally advanced flap (CAF) are described, each having advantages and disadvantages. To improve the clinical outcome of such surgical procedures, several regenerative materials have been combined with it. Though platelet rich fibrin (PRF) is one of the best regenerative material, it is not frequently used along with the periodontal plastic surgical procedures. In the present case report, PRF is combined with CAF for the treatment of multiple gingival recessions.

Case report: 29 years female reported to our department with complain of gingival recession. CAF surgery along with the incorporation of PRF was carried out to treat the gingival recession.

Conclusion: The addition of PRF to CAF procedure provided complete root coverage. This case report helped to focus treatment outcomes and predictability of autologous PRF when used along with CAF for the treatment of recession defects on multiple adjacent teeth.

Keywords: Recession, Platelet rich fibrin (PRF), Coronally advanced flap (CAF), Regeneration, Root coverage.

INTRODUCTION

Gingival recession is the displacement of the soft tissue margin apical to cemento-enamel junction with exposure of root in the oral cavity.¹ It is one of the major aesthetic concern seen in the field of periodontology. Root hypersensitivity is a common complaint associated with gingival recession, resulting because of root exposure and subsequent exposure of dentinal tubules in the oral cavity. It also results in attachment loss and root caries.² One or more etiologic factors are responsible for gingival recession includes inflammatory periodontal disease; mechanical trauma from tooth brushing; occlusal trauma; high frenal attachment; tooth malposition or root prominence leading to the thinning of bony plate; orthodontic tooth movement in unusual direction; underlying alveolar dehiscence; thin gingival biotype; and other periodontal treatment-related factors.³

Various periodontal plastic surgical procedures are offered to treat gingival recession. Most commonly used techniques are free graft which includes free gingival graft and subepithelial connective tissue graft; and pedicle flap which includes lateral pedicle flap and coronally advanced flap (CAF). With the use of free gingival grafts, gingival tissue color matching is always a problem which results in an unsatisfactory aesthetic. Though subepithelial connective tissue graft is satisfactory in terms of aesthetic and recession coverage, it requires a second surgical site. CAF technique have also

shown more predictable recession coverage with apparently acceptable aesthetic results.² CAF when used alone is unstable on long-term, in spite of having many advantages.⁴ Such procedure does not always result in the regeneration of lost attachment apparatus such as cementum, periodontal ligament, and alveolar bone, which may act as a future risk factor in the recurrence of gingival recession. To avoid such further risk of recurrence, CAF is often combined with various regenerative materials like guided tissue regeneration membranes, enamel matrix proteins derivatives, alloderm, living tissue-engineered human fibroblast derived dermal substitute which helps to regenerate functional attachment apparatus as well as enhances root coverage.²

Various new regenerative materials have been tried with CAF. One of such material is autologous platelet concentrates.² Platelet rich fibrin (PRF) is an autologous platelet concentrate system which require simplified process of preparation, and also does not need addition of any anticoagulant during its preparation.⁵ The prepared PRF has a three dimensional fibrin network incorporated with platelets, leukocytes, different growth factors, and circulating stem cells. Use of PRF is increasing in the periodontal and implant surgical procedures because of it's enhanced capacity for bone regeneration and soft tissue wound healing.²

Thus by considering various advantages of PRF, the multiple gingival recession shown in the present case report, was treated using autologous PRF membrane combined with CAF.

CASE REPORT

A 29 year old female patient reported to the department of periodontology in CSMSS Dental College, Aurangabad with the chief complaint of unaesthetic appearance and teeth sensitivity in maxillary anterior region. Patient noticed the presence of such unaesthetic appearance 1 year back.

During clinical examination, Miller's class-I gingival recession noticed with maxillary right central incisor, left central incisor and lateral incisor i.e. with 11, 21 and 22. Gingival recession of 2 mm, 3mm and 1.5mm were recorded with teeth 22, 11 and 21 respectively (Fig 1). The teeth presented shall

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low probing depth with slide bleeding on probing. Gingival biotype was thin, width of attached gingiva was adequate and labial frenum was terminated into the attached gingiva. To correct such recession defects, CAF + PRF procedure was decided to carry out. Aims behind the use of PRF in this surgical procedure were to correct the thin gingival biotype in recession area and to improve wound healing.

Whole surgical procedure was explained to the patient and written consent was obtained. Complete hemogram check-up was done before surgical procedure. Scaling and root planing was carried out. Coronoplasty was done as indicated. Oral hygiene instructions were given mainly in terms of proper brushing technique. Three weeks following this initial therapy, the periodontal re-evaluation was done for oral hygiene maintenance and to record gingival tissue response to the initial therapy. After re-evaluation surgical procedure was carried out.

Surgical procedure

Before proceeding to surgical procedure, The PRF was prepared following the protocol developed by *Choukrounet al.*⁶ 10 ml of intravenous blood (by a venipuncture of the antecubital vein) was collected into two test tubes (each containing 5 ml of blood) without anticoagulant and immediately centrifuged at 3000 revolutions/min for 10 minutes. At the end of centrifugation, three layers were seen, the top layer containing supernatant serum, the fibrin clot at the middle layer, and the bottom layer containing the red blood corpuscles (RBC). The fibrin clot was easily separated from the RBC base (preserving a small RBC layers) using sterile tweezers and scissors.² It was placed in a sterile dappen dish and was left aside. Before use, it was slightly squeezed with the gauze piece to remove its serum content.

After giving local anaesthesia (1: 200000 adrenaline), a full thickness trapezoidal flap was elevated on the buccal aspect of the teeth being treated. Initially, an intrasulcular incision extending horizontally from distal side of 11 to the distal side of 22 was given and two vertical incisions starting from its distal extremities i.e. from distal line angle of 11 and 22 were given extending beyond the mucogingival junction. All incisions were given using blade number 15. Full thickness flap was followed apically with a partial thickness dissection beyond mucogingival junction (Fig 2). Freely movable flap was advanced coronally with its margin located on enamel and the vertical sutures were given to create an envelope, which was interposed with the previously prepared two PRF membranes (Fig 3). Suturing was done using 4-0 non resorbable silk sutures. Gentle pressure was applied at the surgical site with moistened gauze to achieve hemostasis and followed by periodontal dressing. At the same time frenotomy was performed with maxillary labial frenum to avoid muscle pull on the flap tissue (Fig 4).

Patients were prescribed with antibiotics and analgesics (Cap. Amoxicillin 500mg, TDS and Tab. Paracetamol + Ibuprofen, TDS for 3 days). Post-operative instructions were given and patient was informed to report after 10 days for suture removal. Complete root coverage was noticed at that time.

Professional scaling and oral hygiene reinforcement were provided at each follow-up visit whenever indicated. Follow

up recorded 3 months post operatively shown 100% root coverage (Fig 5).

DISCUSSION

Treatment of gingival recession is becoming an important issue in clinical periodontology due to the increasing demand for cosmetic treatment. Problems relate particularly to the fact that very often, the patient exposes only the most cor-



Figure-1: Gingival recession of 2 mm, 3 mm and 1.5 mm with 11, 21 and 22 respectively recorded at baseline (shown by black lines)



Figure-2: Flap reflected beyond mucogingival junction by giving intrasulcular and vertical incisions



Figure-3: PRF placed in the recession defects



Figure-4: Interrupted sling sutures given to CAF and frenotomy was performed



Figure-5: 3 months follow up showing 100% root coverage

onal millimeters of the recession when smiling. Thus, only surgical procedures that provide the clinician with a very high percent of complete root coverage should be included in the mucogingival plastic surgical techniques. The present case report aimed at treating Miller's Class-I gingival recessions, with an initial recession height of 2 mm, 3 mm and 1.5 mm with teeth 11, 21 and 22 respectively. Such type of recession defect could be treated with pedicle soft tissue grafts, free soft tissue grafts or combinations of the two. Among the pedicle grafts, the CAF is one of the valid surgical options to cover exposed root surfaces. It has many advantages over other surgical procedures used to treat gingival recessions: it does not require a separate surgical site to obtain a graft; the tissue of the pedicle provides a perfect color and contour match with the surrounding tissue; the procedure is simple to perform; and does not require an extended surgical or recovery time.⁷

Most of the studies support the hypothesis that therapy with CAF alone can be successfully applied when the residual gingiva is thick and wide.⁸ Accordingly the adjunctive use of a graft could be restricted to sites with thin residual gingiva. Therefore in the presented case report, PRF was used along with CAF. PRF also promotes more rapid attachment to the tooth with stable result. In addition, PRF slows down the blood activation process, which could induce an increased

leukocyte degranulation and cytokine release from proinflammatory mediators, such as interleukin (IL)-1 β , IL-6, and tumor necrosis factor- α , to anti-inflammatory cytokines, such as IL-4, different growth factors like transforming growth factor-1 β , platelet derived growth factor- α β , and vascular endothelial growth factor, and glycoproteins (thrombospondin-1) over more than 7 days. Leukocytes seem to have a strong influence on growth factor release, immunoregulation, anti-infectious activities and matrix remodelling during healing. As a healing material, it stimulates the gingival connective tissue on its entire surface with growth factors and impregnates the root surface with key matrix proteins for cell migration (fibronectin, vitronectin, and thrombospondin-1). Moreover, the fibrin matrix itself shows mechanical adhesive properties and biologic functions like fibrin glues: it maintains the flap in a high and stable position; enhances neoangiogenesis; reduces necrosis and shrinkage of the flap; and guarantees maximal root coverage.⁹

Thamaraiselvan M *et al* compared CAF with and without PRF in the treatment of isolated Miller's class-I and class-II gingival recession. The CAF group showed a non significant gingival thickness (GTH) increase of 0.03 ± 0.04 mm which is similar to other studies. Interestingly, the addition of PRF to CAF resulted in a 0.30 ± 0.10 mm GTH increase, which was statistically significant when compared both within and between the groups and concurs well with Arocaet *al* study. This gain in GTH should be considered clinically significant since abundant empirical evidence suggests that thick tissue, resists occlusal trauma and subsequent recession, enables tissue manipulation, promotes creeping attachment and exhibits less clinical inflammation.² Biju RM *et al* used PRF along with CAF to treat gingival recession of around 2-3 mm with 22 and 23. Superior results were obtained after the treatment with residual recession of only 1mm remained with 23 after 6 months.⁹

The result from the present case report are in accordance with the studies by Wiltfanget *al.* and Corsoet *al.* who have confirmed the successful use of PRF membranes in the management of both single and multiple gingival recession defects. In a similar study Erenand Atilla accepted that the PRF method is practical and simple to perform. Additionally, they found PRF to be superior to subepithelial connective tissue graft since it eliminates the requirement of a donor site.

Some of the studies found inferior result of PRF for root coverage. Arocaet *al* combined PRF to a modified coronally advanced flap and compared with modified coronally advanced flap alone (control group) for the treatment of multiple gingival recession. Similarly, Rajaram V *et al* evaluated the effect of PRF, when used along with double lateral sliding bridge flap for the coverage of multiple gingival recessions. No added benefits of PRF was seen in both studies.¹⁰

Baseline recession depth is important in determining the treatment outcome. Greater baseline gingival recession depth is always associated with decreased results in terms of root coverage.⁷ Gingival recession depth is not only factor which determines the clinical outcome. Other factors like root prominence, tooth position, vestibular depth, high frenal pull, gingival thickness as well as tooth brushing technique of the patient have to be considered and should be corrected

before carrying out root coverage procedure. This enhances the treatment outcome and helps to maintain long term results. Therefore in the present case report, frenotomy was performed simultaneously to avoid frenal pull on the healing tissue after coronal advancement of flap.

Thus, in the presented case report, addition of PRF to CAF helped to obtain favorable clinical outcome in terms of root coverage. No histologic evaluation was performed to assess the type of healing. Therefore, the effect of PRF on the establishment of a connective tissue attachment remains to be determined. Further evaluation of PRF to CAF is necessary to find out the type of healing, histologically as well as long term follow up of the clinical case.

CONCLUSION

PRF is used frequently in periodontics as it has several beneficial effects including periodontal regeneration and rapid healing. It gave promising clinical outcome when combined with CAF in the present case report. Though the mechanism involved in improving the treatment outcome is poorly understood, still PRF has a bright scope in different periodontal plastic surgical procedures.

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