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Case Report

A Novel Approach for Root Coverage Using Autologous Platelet Rich Fibrin with Coronally Advanced Flap - A Case Report

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Abstract

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. 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: Gingival Recession; Platelet Rich Fibrin (PRF); Coronally Advanced Flap (CAF); Regeneration

Abbreviations

PRF: Platelet Rich Fibrin; CAF: Coronally Advanced Flap; MCAF: Modified Coronally Advanced Flap; RBC: Red Blood Corpuscles; IL: Interleukin; PDGF : Platelet-Derived Growth Factors; TGF: Transforming Growth Factor; VEGF: Vascular Endothelial Growth Factor; EGF: Epidermal Growth Factor; IGF-1: Insulin Like Growth Factor-1

Introduction

Gingival recession is defined as the displacement of the soft tissue margin apical to cemento-enamel junction with exposure of root surface in the oral cavity [1]. The major etiologic factors responsible for gingival recession includes mechanical trauma from faulty tooth brushing; periodontal disease, trauma from occlusion, high frenal attachment, thinning of bony plate due to tooth malposition or root prominence; unusual orthodontic tooth movement, thin gingival biotype etc [2]. Various periodontal plastic surgical procedures have been developed that offer to treat gingival recession defects. One of the most widely employed procedures is the coronally advanced flap (CAF) procedure. The treatment outcomes vary between 9 - 95%. CAF technique have also shown more predictable root coverage with better and acceptable aesthetics [3].

The main goal of these plastic periodontal surgical procedures is to obtain root coverage and an optimal esthetic appearance together with the blending of mucosa and/or gingiva. A further challenge is to treat multiple adjacent recession-type defects at a single surgical session to minimize patient discomfort. The most reported techniques are the CAF or its modified approach (MCAF) [4], the supraperiosteal envelope technique [5] and its evolution, the so-called ‘‘tunnel technique” [6].

Various new regenerative materials have been tried with CAF. One of such material is autologous platelet concentrates [3]. Platelet rich fibrin (PRF) is an autologous second generation platelet concentrate system that does not need addition of any anticoagulant during its preparation and is a simplified process of preparation [7]. The prepared PRF is found to be rich in fibronectin and vitronectin proteins. Use of PRF is increasing in the periodontal and implant surgical procedures because of its enhanced capacity for bone regeneration and soft tissue wound healing. Thus by considering various advantages of PRF, in the present case report the multiple gingival recession defects were treated using autologous PRF membrane combined with CAF [3].

Case History

A 25 year old male patient reported to the department of periodontology in Seema Dental College, Rishikesh with the chief complaint of unaesthetic appearance and teeth sensitivity in maxillary left anterior region. Patient noticed the presence of such unaesthetic appearance 1 year back. During clinical examination, Miller’s class-I gingival recession noticed in relation to 22, 23, 24 (Figure 1) with shallow probing depth, slight bleeding on probing, thick gingival biotype and adequate width of attached gingiva. CAF + PRF procedure was decided to carry out to correct the recession defects. Whole surgical procedure was explained to the patient and written consent was obtained. Complete blood investigations were advised before surgical procedure. Scaling and root planing was carried out. Oral hygiene instructions were. Three weeks following this initial therapy, the periodontal re-evaluation was done. After re-evaluation surgical procedure was carried out.

Figure 1: Preoperative gingival recession in 22, 23, 24 recorded at baseline.

Surgical procedure

Before proceeding with the surgical procedure, The PRF was prepared following the protocol developed by Choukroun., et al [8]. Required quantity of blood was drawn in 10 ml test tubes without anticoagulant and immediately centrifuged at 3000 revolutions/min for 10 minutes. At the end of centrifugation, three layers were seen, the topmost layer consisted of platelet poor plasma, platelet rich fibrin at the middle, and red blood corpuscles (RBC) at the bottom. The fibrin clot was easily separated from the RBC base (preserving a small RBC layers) using sterile tweezers [3]. It was placed in a sterile glass slab. Before use, it was slightly squeezed with the gauze piece to remove its serum content. After giving local anaesthesia, initially, an intrasulcular incision extending from distal side of 22 to the distal side of 24 was given and two vertical incisions using blade number 15 starting from its distal extremities i.e. from distal line angle of 22 and 24 were given extending beyond the mucogingival junction (Figure 2a). A full thickness trapezoidal flap was elevated on the buccal aspect of the teeth being treated Full thickness flap was followed apically with a partial thickness dissection beyond mucogingival junction (Figure 2b). The flap was coronally advanced with its margin located on enamel and the vertical sutures were given to create an envelope, which was interposed with the previously prepared PRF membrane (Figure 2c). 4-0 non-resorbable silk sutures were used for suturing (Figure 3) followed by periodontal dressing. Patient was discharged with post-operative instructions and prescription and was recalled after 10 days for suture removal (Figure 4). Complete root coverage was noticed at that time. Follow-up recorded 3 months post operatively shows 100% root coverage (Figure 5).

Figure 2a: Intrasulcular and vertical incisions placement.

Figure 2b: Flap reflection beyond mucogingival junction.

Figure 2c: Placement of PRF membrane in the recession defects.

Figure 3: Sutures placement.

Figure 4: 10 days post-operative.

Figure 5: 3 month post-operative.

Discussion

Due to the increasing demand for esthetics, treatment of gingival recession is becoming an important issue in the field of clinical periodontology. However, only those surgical procedures 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 multiple Miller's Class-I gingival recessions with coronally advanced flap and platelet rich fibrin. PRF has numerous advantages as it slows down the blood activation process, which could induce an increased leukocyte degranulation and cytokine release from proinflammatory mediators. PRF also serve as a reservoir of various growth factors such as platelet-derived growth factors (PDGFs), transforming growth factor beta (TGF-β), vascular endothelial growth factor (VEGF), and epidermal growth factor (EGF), insulin like growth factor-1 (IGF-1). Platelet growth factors exhibit chemotactic and mitogenic properties. As a healing material, PRF 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, 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].

The result from the present case report are in accordance with the studies conducted by Wiltfang., et al. and Corso., et al. who have confirmed the successful use of PRF membranes in the management of both single and multiple gingival recession defects. Thus, in the presented case report, addition of PRF to CAF helped to obtain favorable clinical outcome in terms of root coverage. However, to assess the type of healing no histologic evaluation was performed. 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

Periodontal regeneration and rapid healing effects have popularized the use of PRF in various surgical procedures in periodontics. In the present case report use of PRF along with CAF gave good clinical outcome and esthetic results. Though the mechanism involved in improving the treatment outcome is poorly understood, still PRF has a bright scope in different periodontal plastic surgical procedures.

Conflict of Interest

Nil.

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