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(CASE REPORT)

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Treatment of root coverage with platelet rich fibrin and coronally advanced flap: A case report

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Abstract

Background: Gingival recession was one of disorder that frequently found in periodontal tissue. It is a result in exposed root surface and causing discomfort on patient due to the dentin hypersensitivity. One of various modification of gingival recession treatment is the use of platelet-rich fibrin (PRF) in combined with coronally positioned flap. Objective: The present case aims to describe the effectiveness of coronally advanced flap (CAF) in combined with PRF in root coverage of Miller's class 1 gingival recession.

Case: A 23 years old female patient complains that she feels a slight pain discomfort on her upper right teeth while taking cold beverages. Clinical findings shows that her upper right premolars having a gingival recession, making her root exposed.

Case management: Prior the surgery, patient was performed scaling and root planning. Afterward, coronally advanced flap in combined with PRF was done on premolar region to cover the exposed root surface.

Results: Clinical observation of three weeks revealed a complete root coverage with an adequate keratinized tissue and good healing.

Conclusion: Coronally advanced flap in combination with platelet-rich fibrin provide an effective treatment in root coverage.

Keywords: Gingival Recession; Platelet-Rich Fibrin; Coronally Advanced Flap; Root Coverage

1. Introduction

Gingival recession was one of disorder that frequently found in periodontal tissue. 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]. It could be considered as a gateway to multiple defects in periodontium. As a result in exposed root surface, it is causing a discomfort on patient because of dentin hypersensitivity. It also clinically related to a higher incidence of root caries, periodontal attachment loss, hypersensitivity, unaesthetic gingival appearance and cervical wear [2]. If it left untreated, it could leads to bone resorption, and eventually tooth loss [3].

There are so many periodontal plastic procedures available that offer to treat gingival recession. The main goal is to obtain root coverage, along with giving the optimal esthetic appearance. The most widely known procedure is the

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coronally advanced flap (CAF) procedure. The CAF combined with sub epithelial connective tissue graft is considered as a gold standard approach. However, pain and discomfort from the donor site is always being a great concern [4].

In addition to overcome, various new regenerative materials was used with CAF. One of the modifications of gingival recession treatment is the use of platelet-rich fibrin (PRF). Platelet has a vital role in periodontal regeneration because of the growth factors and cytokines that comes in it. The slow polymerization during centrifugation and fibrin meshwork provides platelet-rich fibrin (PRF) with better healing properties compared to other platelet concentrates5. In the recent years, platelet rich fibrin (PRF) has emerged as a healing biomaterial which is autologous in nature and promotes hard and soft tissue healing and regeneration6. PRF is also stated to be preferred for the treatment of Classes I and II gingival recessions [7], and increased tissue thickness significantly [8].

2. Case Report

A healthy 23 years old female patient came to the postgraduate periodontics clinic at RSGM Faculty of Dentistry Airlangga University, stated that she didn't have any record of systemic disease or any allergic reaction before. She is a nonsmoker as well. She complains that she feels a slight pain discomfort on her upper right teeth while taking cold beverages.

Clinical findings shows that her upper right premolars having a gingival recession, making her root exposed. Miller Class I gingival recession was noticed in her both upper right premolars: 2mm bucally in first premolar, and 1mm bucally in second premolar (Fig.1a, b). The amount of keratinized gingiva is also measured, using a periodontal probe, the distance between the mucogingival junctions to the gingival margin. Measured clinically keratinized tissue bucally in first premolar is 4,5mm, and 4mm in second premolar (Fig.1c, d).

Figure 1 Clinical findings on gingival recession on first premolar: 2mm (1a), and second premolar: 1mm (1b). Keratinized gingiva on first premolar: 4,5mm (1c), and 4mm in second premolar (1d)

With the sufficient amount of keratinized gingiva, surgical planning was directed to the usage of CAF procedure along with PRF membrane to correct the recession defects. Primarily, full mouth scaling and root planing was done and followed by oral hygiene instructions. After re-evaluation the surgical procedure was carried out. Whole surgical procedure was explained to the patient and written informed consent was obtained.

Before proceeding with the surgical procedure, the PRF was prepared. Required quantity of blood was drown in test tubes without anticoagulant and immediately centrifuged at 1300 revolutions/ minutes for 8 minutes [9]. At the end of centrifugation, three layers were seen and the fibrin clot needs to be separated from the red blood clot base using sterile tweezers. Before use, this fibrin clot was slightly squeeze with the gauze piece to remove its serum content.

Figure 2 Aseptic (left) and anesthesia procedure (topical – middle, and local infiltration – right)

Aseptic procedure was done in extraoral and intraoral area using povidone iodine. Anesthesia was achieved via topical anesthesia using xylocaine, continued with local infiltration, using septocaine. Primary incision was made vertically beyond the mucogingival junction and horizontally with sulcular incision technique, using 15c blade, only on the buccal aspects of the involved teeth.

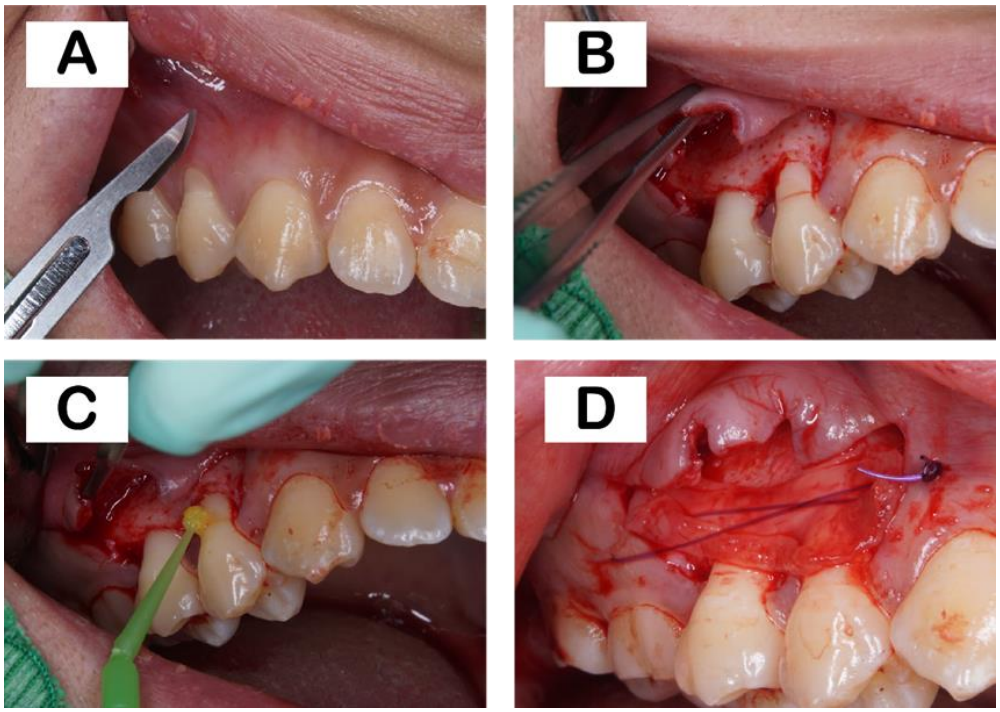

Figure 3 A. making the vertical and horizontal incision. B. the opened flap made needs to be in a free-tension condition. C. Biomodification of the root surface. D. securing the PRF membrane on site with resorbable sutures

The full thickness flap was elevated using a raspatorium on the buccal aspect of the teeth treated, followed by partial thickness apically beyond mucogingival junction. The perfectly opened flap should be having a free-tension condition. The exposed root then conditioned with tetracycline (100g/ml) for 3 minutes10 as a biomodification products, promoting attachment of fibroblasts to dentin surfaces. Rinse thoroughly after that using normal saline (PZ), then place the PRF membrane on the treated site. 5.0 monofit resorbable sutures were used for suturing the PRF membrane to the exposed roots.

Figure 4 A. Placement of the button. B. Suturing. C. Application of Amnion membrane

The buttons were placed on the buccal teeth surface using the Xenoortho, and the de-epithelialization of the gingiva was made on the proximal area from the canine to first premolar. The buccal flap was coronally positioned to cover the PRF membrane using 5.0 nylon sutures to the button, continued by suturing the interdental site. Amniotic membrane (AM) was placed on the top of the treated area, especially the vertical incision area.

Post-surgery prescription included a course of Amoxiclav 625mg thrice daily for five days, Cataflam 50mg twice daily for five days if needed, and Mefinal 500mg if needed. Patient were given the post-operative instructions to discontinue tooth brushing around the surgical site, advised to use 0.12% chlorhexidine gluconate mouthrinse, visit clinic post one weeks for follow up and a month after that for sutures and button removal.

On both follow up, patient doesn't have any complaints, and on the second follow up, a complete root coverage was obtained. The patient also satisfied because she doesn't feel any pain or discomfort on her upper right teeth while taking cold beverages anymore.

Figure 4 Clinical appearance before (left) and after (right) the procedure

3. Results and Discussion

The present case aims to describe the effectiveness of coronally advanced flap (CAF) in combined with PRF in root coverage of Miller's class 1 gingival recession. To obtain safe and effective outcomes for root coverage, there were made various approach to improve CAF procedures. The CAF combined with sub epithelial connective tissue graft is considered as a gold standard approach. However, pain and discomfort from the donor site is always being a great concern [4]. That is why, now researchers are using regeneration materials to decrease postoperative discomfort.

The aim of the given therapy is to restore the lost gingiva as a part of the periodontium and also converse the exposed root surface as a great recipient site for epithelial and connective tissue adherence. The treatment preceded by scaling and root planing then continued with a root conditioning or biomodification agent. There are number of agents for conditioning of root surfaces that have been proposed for demineralization purposes, and one of them that widely known are tetracyclines [10]. Tetracyclines are well known broad spectrum antimicrobial in controlling periodontal pathogens. Dentin root surface demineralization by low pH tetracycline increases fibronectin, thus enhances fibroblast attachment and growth while suppressing epithelial cell attachment and growth [11].

The usage of biomodification before applying the PRF membrane could be seen as an acts of initial wound healing, that is always better to do over a viable root surface to devoid any smear layer or biofilm. Topical application of acid solutions conditioning the root surfaces will dissolve the smear layer, exposing the dentin collagen dan cementum proteins. These exposed root surfaces have an enlarged dentin tubules, removing toxins from the root surface and preparing a better tissue bed for the healing connective tissue. The demineralization by these agents will cause an increase in total surface area available for the possible binding of extra cellular matrix proteins which play an important role in new attachment and regenerative therapies [11].

The use of platelet-rich fibrin (PRF) is one of the modification of gingival recession treatment. PRF is autologous, simple, cost effective, and aggregate large number of white blood cells which have anti-inflammatory and antibacterial effects. Even if the additional use of PRF membrane did not provide additional benefits in terms of root coverage outcomes compared with CAF alone, the use of PRF membranes stated increasing tissue thickness significantly [8] and preferred for the treatment of Classes I and II gingival recessions [7]. And furthermore, for patient acceptance in terms of healing, AM was observed to be better as compared to PRF and CAF alone. The amniotic membrane is a bioresorbable membrane used in periodontal field to reduce scarring and inflammation, as well as enhances wound healing on the surgical site. This membrane have the ability to accelerate epithelialization and reduce pain when applied to burnt or ulcerated areas, antiangiogenic, bacteriostatic, and low immunogenic characteristics [12].

4. Conclusion

In this present case report, combination of CAF with the added benefits of PRF as a healing regenerative material is successfully used for the root coverage procedure. Further clinical studies are needed to evaluate the efficacy of this technique in comparison with other techniques or with currently available biomaterials alternatives. More research and clinical studies are required to help in defining further applications of techniques and materials or membranes in the field of Periodontics.

Compliance with ethical standards

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Disclosure of conflict of interest

No conflict of interest.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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