

Modified Coronally Advanced Flap With Prf Membrane Using Orthodontic Buttons – An Innovative Way Of Treating Multiple Adjacent Gingival Recession In Anterior Esthetic Region: A Case Report

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Abstract:

Introduction: This case report proposes the effectiveness of modified coronally advanced flap (M-CAF) technique using orthodontic buttons and PRF membrane in the management of multiple adjacent gingival recession defects in relation to maxillary anteriors.

Case presentation: A 36-year-old male patient is concerned about the appearance of his maxillary teeth due to gingival recession. Class I Miller gingival recession was confirmed by clinical examination, and it was treated with a PRF membrane and a modified coronally advanced flap (M-CAF) using orthodontic buttons. Complete root coverage was seen, and the outcomes were true even six months later. The current case report demonstrates how the modified coronally advanced flap (M-CAF) technique with the use of PRF membrane can contribute beneficial effects in order to achieve better results in terms of the reduction of gingival recession depth (GRD), pocket depth (PD), increased keratinized tissue width (KTW), and clinical attachment level (CAL).

Conclusion: According to the current case study, the combination of a modified coronally advanced flap with orthodontic buttons (MCAF-B) with a PRF membrane can help patients achieve improved outcomes in terms of GRD reduction, PD, increased KTW, and CAL. These parameters ultimately improve gingival aesthetics, a crucial component of root covering techniques.

Keywords: Multiple adjacent gingival recession, modified coronally advanced flap, platelet rich fibrin membrane, orthodontic buttons, periodontal plastic surgery, esthetics.

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I. Introduction

Gingival recession is the migration of the gingival margin apical to the cemento-enamel junction, which exposes the root surface, or anaesthetic expansion of the crown section of the tooth, which exposes the root surfaces to the oral cavity.¹ In most populations, it is a common consequence of periodontal disease,²⁻⁴ leading to issues for the patients with function and esthetic. It might just affect one tooth or it might affect several adjacent teeth.⁵ In addition to treating the patient's aesthetic issues, cosmetic gingival recession correction is required to avoid root caries, plaque calculus accumulation, abrasion, and hypersensitivity and to improve the patient's overall oral health. The reliable and popular periodontal plastic surgery technique known as the Coronally Advanced Flap (CAF) enables for root coverage.⁶

Zucchelli and De Sanctis suggested a modified CAF approach for MARTDs (multiple adjacent recession-type defects) in 2000.⁷ A greater chance of obtaining whole root coverage and a better postoperative result existed with no vertical incisions and coronal progress of the modified CAF devouring the flap in order to prevent unsightly keloid formation along the vertical releasing incisions in CAF.⁸ Additionally, one of the most crucial elements affecting the surgical outcome is preserving the gingival margin in its most coronal position

throughout the initial healing phase. In 2011, Ozcelik⁹ used orthodontic buttons to further secure the flap in the most coronal position. In the CAF with button application (CAF+B) group, he reported total root coverage in 84 percent of the defects compared to 61 percent in the CAF group.⁹

Platelet-rich fibrin (PRF), a second-generation platelet concentrate that is referred to as an autologous biomaterial, was found by Choukroun¹⁰ (2001). Autologous PRF is made up of a 3-D polymerized fibrin matrix with platelets, leukocytes, growth factors, and circulating stem cells. With studies showing its use in conjunction with bone graft materials for periodontal regeneration, ridge augmentation, and sinus lift procedures for implant placement as well as for covering recession defects in the form of a membrane,¹¹ considered to be a healing biomaterial that was initially used in oral implantology by its promoters.^{12,13} By reducing the donor site, the PRF membrane approach is less invasive and causes less postoperative discomfort. Compared to other treatments, PRF encourages faster soft tissue repair and little postoperative oedema. Here, based on the Consensus-based Clinical Case Reporting (CARE) guideline, we present a case report with multiple adjacent Miller's class I gingival recession treated by modified CAF with orthodontic buttons and PRF membrane.

Clinical presentation:

The main concern of a 36-year-old male patient was that his upper front teeth's exposed roots could be seen when he smiled. The patient's oral and overall health were evaluated. An intraoral examination of the patient identified multiple recession problems, but his primary concern was the manner the gingival recession appeared in relation to the maxillary anteriors. The diagnosis was multiple adjacent Miller's class I gingival recession seen on the labial aspect of the area 13-23 (maxillary right and left canine, right and left lateral incisor, and right and left central incisor), however the periodontal parameters and orthopantomogram showed healthy periodontium in this area. The patient explained improper brushing habits led to gingival recession in the past.

Case Management:

Presurgical therapy:

Scaling and root planing were performed as part of the patient's preparation, and oral hygiene instructions and education were given to the patient. The surgical procedure was explained to the patient and the informed consent was obtained before starting the surgical procedure.

Acrylic stent was manufactured before surgery for the standardisation of the presurgical & postsurgical measurement, i.e. after initial treatment at baseline and six months following surgery. Using William's graduated periodontal probe, the height and width of the recession were measured [Figure 1]. The subsequent clinical variables were noted: (1) Gingival recession depth was measured as the distance from the most apical point of the cemento-enamel junction (CEJ) and the gingival margin; (2) gingival recession width was measured as the distance between the mesial and the distal gingival margin of the tooth at an imaginary horizontal line tangential at the CEJ; (3) Probing depth measured as the distance from the gingival margin to the bottom of the gingival sulcus at distofacial, facial, mesiofacial, distolingual, lingual, and mesiolingual sites using University of North Carolina 15 probe; (4) Clinical attachment level measured as the distance from the CEJ to the bottom of the sulcus.

Surgical procedure:

Orthodontic buttons (Zhejiang Protect Medical Equipment Co., Ltd., Zhejiang Province, China) were applied to the maxillary anterior teeth in the midface prior to surgery using dental composite (Heraeus Kulzer CHARISMA) that was light-cured (Woodpecker Light cure LED). 2 percent lignocaine (LOX 2% adrenaline [1:200000]) was used to anaesthetize the surgical site. The flap design featured two oblique, bevelled divergent incisions placed at the mesial and distal line angles of the two peripheral teeth with gingival recession, an intrasulcular incision, and mesial and distal horizontal incisions using No. 15c bard parker blade. Starting at the CEJ of the central tooth of the adjacent multiple defects, the oblique interdental incisions moved toward the gingival margin's (GM) most apical position at adjacent teeth. The gingival tissue apical to the root recessions was raised in a full thickness manner to expose approximately 3.0 mm of bone, and a split-thickness flap was elevated at the most apical portion of the flap to allow flap coronal movement without tension. This procedure raised the flap using a split-full-split approach in the coronal-apical direction. Using Gracey curettes 1/2 and 3/4, root surfaces that had previously been exposed in the oral cavity were mechanically decontaminated. Root conditioning was done using 24% Ethylenediaminetetraacetic acid (EDTA gel) on the root surface for 2 min and then thoroughly rinsed with normal saline. The remaining tissue of the anatomic interdental papilla was then deepithelialized, creating a new surgical papilla for flap coronal advancement. Until the PRF membrane was constructed using a stainless steel PRF box, the recipient site was covered with damp gauze. Immediately below the CEJ, the prepared PRF membrane was then applied to the recession defects [Figure 2]. The flap was then smoothly moved beyond the CEJ and toward the buttons, where it was subsequently fastened with sutures utilising the buttons as anchors [Figure 3]. In order to further fix and stabilise the flap, interdental interrupted sutures (4-0

VBV; ETHICON) were also used. To protect the flap and the buttons, a Coe pack dressing was applied. After receiving a prescription for medicine, the patient was released with postoperative instructions along with proper brushing technique (modified Bass) demonstration.

Clinical Outcomes:

The Coe-pack was removed, the sutures were removed, and the buttons were debonded at the follow-up appointment two weeks later [Figures 4]. The patient was ecstatic with the outcome and the region 13–23 displayed exceptional, full root coverage.

A consistent result was seen even after 3 months and 6 months of follow-up, which supported a positive long-term outcome of the M-CAF+B procedure. Oral hygiene recommendations were reaffirmed. [Figures 5 and 6]

The Mean±SD gingival recession depth, probing depth, clinical attachment level and keratinized tissue width were 0.62±0.71 mm, 1.42±0.49 mm, 2.08±0.74 mm, and 3.34±0.60 mm at 3 months follow up respectively. At the 6 months, the Mean±SD gingival recession depth, probing depth, clinical attachment level and keratinized tissue width were 0.17±0.38 mm, 1.37±0.48 mm, 1.53±0.52 mm, and 3.62±0.61 mm respectively; Which showed overall improvement in clinical outcomes from baseline to 6 months' interval. [Table 1]

II. Discussion:

Several methods, including free gingival grafting, connective tissue grafting, and tunnel procedure, have been developed to address several contiguous gingival recession defects.¹⁴ Soft tissue autografts from the donor site, such as the palate, are needed for these surgeries. Therefore, the number and quality of the grafts harvested from the donor site are essential to the procedure's effectiveness, which is particularly challenging in situations with repeated recession. These procedures have further limitations like technique sensitivity and unpredictable aesthetics in addition to the problems of second site morbidity and inadequate grafts.

The modified CAF technique + PRF membrane was used in the current case report and further secured with orthodontic buttons as it was more convenient to anchor a suture rather than orthodontic brackets to produce predictable results. To achieve CRC, the postoperative location of the marginal gingiva with relation to the CEJ is crucial.⁴ The considerable reduction in recession depth and higher percent root coverage at six months from baseline may be attributable to the suspending sutures that are placed around the bonded orthodontic buttons during the first two weeks of the key wound healing phase. The split-full-split thickness flap design in this instance allows for increased flap mobilisation, improved probability for root coverage, preservation of the most keratinized tissue, and decreased risk of flap perforation. More aesthetically acceptable surgical papillae are produced using the M-CAF.

From baseline to six months following surgery, Ozcelik⁹ found that complete root coverage was 84.6 percent in the CAF+B group and 61.1 percent in the CAF group, respectively. Using the CAF+B method, together with membrane and bone graft, Fatima¹⁵ was able to cover the recession and even gain bone between the maxillary central incisors. Maroo¹⁶ reported complete root coverage on the maxillary canine tooth three months after the CAF+B procedure.

Similar to our findings, Aroca¹ found that at 6 months, measurements of the MRC and CRC were significantly higher in the CAF alone group than in the CAF + PRF membrane group. Choukroun¹⁰ suggested PRF administration at the surgical site as soon as feasible for the treatment that is at concerns in our instance to be as successful as possible.

Remarkably, using the M-CAF+B method, all maxillary anterior teeth in the current case study had 100% root coverage. We found that areas 13 and 23, which increased by 3 mm and 2.5 mm, respectively, from baseline to the 6-month period, showed the greatest gains among all of the maxillary anterior teeth. Regarding both clinical and patient-centred characteristics, the M-CAF+B method has been verified as a promising technique.^{16,17}

Labial proclination of the central and lateral incisors of the teeth served as the primary limiting factor in the current situation. Therefore, thorough evaluations of patient- and defect-related characteristics are vital factors to take into account before choosing a viable surgical strategy.^{18,19} For class I and II recession defects with adequate attached gingiva, M-CAF+B performs well.

III. Conclusion:

Based on our results, it can be concluded that M-CAF+B with PRF membrane helps achieve better results in terms of maximum recession covering with outstanding gingival contour and texture with regard to reduced GRD, PD, increased KTW, and CAL. These standards lead to an enhanced gingival appearance, a significant benefit of root covering procedures. Longer monitoring periods in further clinical trials are preferred, nevertheless. To demonstrate its short- and long-term effectiveness, more histological and clinical study is required.

Clinical Relevance:

The scientific rationale for our study: To the best of our knowledge, this is the first case in which multiple adjacent Miller's class I gingival recession defects in the maxillary anterior region have been treated using modified CAF, PRF membrane, and orthodontic buttons to improve esthetic outcome.

The principal findings from our case are listed below:

- By using a modified coronally advanced flap with an orthodontic button and PRF membrane, clinical outcomes have improved overall in terms of increased keratinized tissue width (KTW), pocket depth (PD), reduction of gingival recession depth (GRD), and clinical attachment level (CAL).
- The patient was ecstatic with the outcome and the region 13–23 displayed exceptional, full root coverage after the M-CAF+B procedure

The case study we described has practical implications for the operator, who should select a procedure based on the latest scientific findings and strive for good root coverage and patient satisfaction. The suturing approach, which is thought to have been a successful course of therapy in this case, is another important link in the stabilisation and anchoring of the periodontal flap.

Table 1: Periodontal parameters at baseline and 6 months for region 13-23

Values in (mm)	Mean±SD (mm)		
	Baseline	3 months	6 months
GRD	2.98±0.76	0.62±0.71	0.17±0.38
PD	1.69±0.46	1.42±0.49	1.37±0.48
CAL	4.66±0.77	2.08±0.74	1.53±0.52
KTW	2.48±0.52	3.34±0.60	3.62±0.61



Fig 1: Recession height was measured using William’s graduated periodontal probe at baseline showing multiple gingival recession. (Before Procedure)



Fig 2: Placement of platelet-rich fibrin membrane



Fig 3: Coronal advancement of the flap by suspended sutures around the orthodontic button at teeth.



Fig 4: complete root coverage and reduction in gingival recession parameters after 14 days follow up.



Fig 5: 3 MONTH follow up

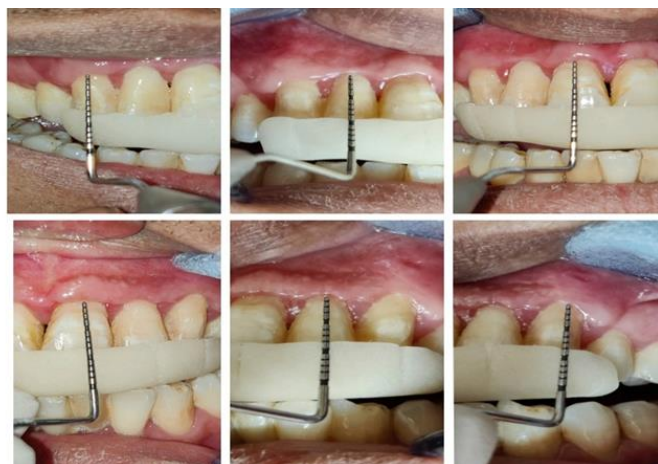


Fig 6: Complete root coverage and reduction in gingival recession parameters after 6 months follow up.

Conflicts of interest:

There are no conflicts of interest.

Reference:

- [1] Aroca S, Keglevich T, Barbieri, B, Gera I, And Etienne D. Clinical Evaluation Of A Modified Coronally Advanced Flap Alone Or In Combination With A Platelet-Rich Fibrin Membrane Forthe Treatment Of Adjacent Multiple Gingival Recessions: A 6-Month Study. *J Periodontol* 2009; 80: 244-52.
- [2] Chambrone L, Tatakis Dn. Long-Term Outcomes Of Untreated Buccal Gingival Recessions: A Systematic Review And Meta-Analysis. *J Periodontol* 2016; 87(7): 796-808.
- [3] Richmond S, Chestnutt I, Shennan J, Brown R. The Relationship Of Medical And Dental Factors To Perceived General And Dental Health. *Community Dent Oral Epidemiol* 2007; 35:89-97.
- [4] Susin C, Haas An, Oppermann Rv, Haugejorden O, Albandar Jm. Gingival Recession: Epidemiology And Risk Indicators In A Representative Urban Brazilian Population. *J Periodontol* 2004; 75:1377-1386.
- [5] Rocuzzo M, Bunino M, Needleman I, Sanz M. Periodontal Plastic Surgery For Treatment Of Localized Gingival Recessions: A Systematic Review. *J Clin Periodontol* 2002;29(3):178-194.
- [6] Pini Prato Gp, Baldi C, Nieri M, Franseschi D, Cortellini P, Clauser C, Et Al. Coronally Advanced Flap: The Post-Surgical Position Of The Gingival Margin Is An Important Factor For Achieving Complete Root Coverage. *J Periodontol* 2005; 76:713-22.
- [7] Zucchelli G, De Sanctis M. Treatment Of Multiple Recession-Type Defects In Patients With Esthetic Demands. *J Periodontol* 2000; 71:1506-14.
- [8] Zucchelli G, Mele M, Mazzotti C, Marzadori M, Montebugnoli L, De Sanctis M. Coronally Advanced Flap With And Without Vertical Releasing Incisions For The Treatment Of Multiple Gingival Recessions: A Comparative Controlled Randomized Clinical Trial. *J Periodontol* 2009; 80:1083-94.
- [9] Ozelcik O, Haytac Mc, Seydaoglu G. Treatment Of Multiple Gingival Recessions Using A Coronally Advanced Flap Procedure Combined With Button Application. *J Clin Periodontol* 2011; 38: 572-80.
- [10] Choukrounj, Adda F, Schoeffler C, Vervellea. Prf: An Opportunity In Perio-Implantology (In French). *Implantodontie* 2000; 42:55-62.
- [11] Dohan Dm, Choukroun J, Diss A, Dohan Sl, Dohan Aj, Mouhyi J, Gogly B. Platelet-Rich Fibrin (Prf): A Secondgeneration Platelet Concentrate. Part I: Technological Concepts And Evolution. *Oralsurg Oral Med Oral Pathol Oral Radiol Endod* 2006;101: E37-44.
- [12] Shetty Ss, Chatterjee A, Bose S. Bilateral Multiple Recession Coverage With Platelet-Rich Fibrin In Comparison With Amniotic Membrane. *J Indian Soc Periodontol* 2014; 18:102-6.
- [13] Kumar Ap, Fernandes B, Surya C. Platelet Rich Fibrin: A Promising Approach For Root Coverage. *J Interdiscip Dentistry* 2011; 1:115-8.
- [14] Alghamdi H, Babay N, Sukumaran A. Surgical Management Of Gingival Recession: A Clinical Update. *Saudi Dent J* 2009; 21:83-94.
- [15] Fatima Z, Bey A, Mian F, Zia A. Management Of Gingival Recession Using Coronally Advanced Flap Combined With Bracket Application: A Case Report. *J Adv Med Clin Dent Sci* 2014; 2:171-5.
- [16] Maroo S, Grover Hs, Luthra S. Button-Assisted Coronally Advanced Flap: An Innovative Ortho-Perio Amalgamation. *J Indian Orthod Soc* 2014; 48:133-7.
- [17] Kaur S, Vandana, Kaur H, Gill Es. Treatment Of Gingival Recession By Coronally Positioned Flap – A Case Report. *Indian J Compr Dent Care* 2013; 3:349-52.
- [18] Pin Prato Gp, Tinti C, Vincenz G, Magnani C, Cortellini P, Clauser C. Guided Tissue Regeneration Versus Mucogingival Surgery In The Treatment Of Human Buccal Gingival Recession. *J Periodontol* 1992; 63:919-28.
- [19] Rasperini G, Acunzo R, Limiroli E. Decision Making In Gingival Recession Treatment: Scientific Evidence And Clinical Experience. *Clin Adv Periodontics* 2011; 1:41-52.