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ORIGINAL ARTICLE

Comparative evaluation of platelet-rich fibrin membrane and connective tissue graft in the treatment of multiple adjacent recession defects: A clinical study

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Abstract *Background/purpose:* The expanded mesh connective tissue graft (e-MCTG) is an effective method for the treatment of multiple adjacent recession-type defects (MARD). Platelet-rich fibrin (PRF) is a second-generation platelet concentrate. The aim of the present study was to assess the effectiveness and the predictability of the PRF membrane (PRF-M) for the treatment of MARD, and also to compare it with e-MCTG.
Materials and methods: A total of 106 buccal gingival recessions were treated with coronally advanced flap (CAF) + (e-MCTG) or with (CAF) + (PRF-M). Clinical measurements recorded at baseline and 6 months after surgery included plaque index and gingival index, probing depth, recession depth, recession width, apicocoronal width of keratinized tissue, and clinical attachment level.
Results: Six months after the surgery, statistically significant gain in root coverage, recession width, clinical attachment level, and keratinized tissue were assessed in both groups. No statistically significant difference was found between the two groups for all of these parameters.
Conclusion: The results of this study indicate that the use of PRF allowed the treatment of MARD with adequate wound healing and highly predictable root coverage. More expanded clinical studies are needed to confirm these findings.

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Introduction

Gingival recession (GR) is defined as the partial denudation of the root surface due to the apical migration of the soft tissue to the cemento–enamel junction (CEJ).[1,2] There are varied etiologic and predisposing factors related to GR, including trauma from tooth brushing, malposition of teeth, frenilia, and muscle attachments.[3] GR is a typically common clinical condition[4–6] and may result in esthetic problems, inadequate plaque control, root caries, and dentin hypersensitivity.[4,7]

The treatment of multiple adjacent recession-type defects (MARD) with different surgical procedures depends on many factors, such as defect size, presence or absence of keratinized tissue adjacent to the defect, and thickness of the gingiva, which are related to the defect and/or the patient. Numerous surgical procedures have been described to achieve root coverage (RC) based on coronally positioned flaps, pedicle grafts, free gingival grafts; subepithelial connective tissue grafts (CTG); and guided tissue regeneration.[8–10]

MARD presents a further challenge because several recessions must be treated at a single surgical session to minimize patient discomfort.[11] For these reasons, recent studies have aimed to develop new techniques for RC of multiple adjacent recessions.

The CTG technique is currently one of the most predictable and reproducible techniques to achieve RC and a high degree of esthetics. Although excellent esthetic results have been reported and RC has ranged from 69% to 97% in many studies, this technique requires a suitable donor site. Inherent problems with RC grafting are a limited quantity of available graft, the need for two surgical sites, compromised patient esthetics, postoperative discomfort, and complications.

The quality of healing after RC has been examined in a few histological studies.[12–15] Although the formation of long junctional epithelium is generally expected after conventional mucogingival surgery,[14,15] a limited amount of regeneration can be achieved with conventional techniques.[12,13] Therefore, various adjunctive agents have been used to accelerate healing and further enhance clinical outcomes. These include root conditioners,[16] enamel matrix proteins,[17] recombinant human growth factors, and platelet-rich plasma (PRP).[18] PRP has become a focus of current studies because of its potential to accelerate wound healing.[19,20]

Platelet-rich fibrin (PRF), which was introduced by Choukroun et al in 2001, can be considered a second-generation platelet concentrate. Using PRF requires very simple techniques because, unlike other platelet concentrates, it does not require anticoagulants or bovine thrombin. Blood is collected in dry glass tubes or glass-coated plastic tubes and centrifuged immediately, and the fibrin clot is formed in the middle of the tube.[21] Unlike the other platelet concentrates, PRF was defined as an autologous leukocyte and PRF biomaterial, because in this method, platelets and leukocytes are collected with high efficiency such that the growth factors will able to release gradually during at least 1 week.[22–24] It has been shown in different studies that PRF has a proliferative effect on different types of cells such as dental pulp cells,[25] human osteoblasts,[26] human gingival and periodontal ligament fibroblasts,[27] dermal prekeratinocytes, and preadipcytes.[26,28,29] This homogeneous fibrin network is considered a healing biomaterial and is used to enhance bone regeneration and soft tissue healing in implant and periodontal plastic surgery procedures,[30] healing of extraction sockets,[31] and treatment of intrabony defects[32] and radicular cysts.[33]

The aims of the present study were to assess the effectiveness and the predictability of PRF membrane (PRF-M) with coronally advanced flap [(CAF) + (PRF-M)] for the treatment of MARD, and also to compare it with (CAF) + expanded mesh connective tissue graft (e-MCTG).

Materials and methods

Patient selection

This study is a split-mouth, randomized, controlled clinical trial designed to compare the outcomes of two surgical procedures for RC. The study protocol was reviewed and approved by the Ethical Board of Gazi University (2010/78). The 20 patients were consecutively referred to the Department of Periodontology, University of Gazi. The study was conducted in accordance with the Helsinki Declaration of 1975, as revised in 2000. Written informed consent was obtained from all patients after a thorough explanation of the nature, risks, and benefits of the clinical investigation and associated procedures. The individuals who reported between November 2010 and June 2011 were included in the study.

The patient selection was based on the following criteria: at least three adjacent maxillary or mandibular Miller Class I and/or Class II GR defects $\geq$2 mm in depth; systemic health; presence of identifiable CEJ; good plaque control [full-mouth plaque index (PI) $<$20%]; vital teeth; no caries or restoration on the selected teeth; absence of bleeding on probing at the surgical sites; and probing depth (PD) of $\leq$2 mm. All participants were in good health and were not aware of any systemic conditions.

Exclusion criteria were as follows: previous surgical attempt to correct gingival recession; fixed orthodontic or removable appliance; current smoking or chewing of tobacco; endodontically treated sites or root surface restorations on sites; systemic disease; coagulation defect or current anticoagulation treatment; and pregnancy.

All participants met the aforementioned inclusion criteria before enrollment in this study.

Twenty patients aged 23–48 [33.7 $\pm$ 7.12 (mean $\pm$ SD)] years complaining of esthetic problems or dentinal hypersensitivity were enrolled in the study. Five female patients were excluded because they did not comply with the study protocol. A total of 106 buccal gingival recessions were treated in 15 individuals (9 men, 6 women). Patients had recession defects, thus allowing test (CAF) + (PRF-M) and control (CAF) + (e-MCTG) procedures to be undertaken in the upper and lower arches. Test and control sides were determined by tossing a coin.

The test group included 54 buccal gingival recessions (21 teeth on maxilla, 33 teeth on mandibula) (Table 1). Test