Clinical Evaluation of a Modified Coronally Advanced Flap Alone or in Combination With a Platelet-Rich Fibrin Membrane for the Treatment of Adjacent Multiple Gingival Recessions: A 6-Month Study

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Background: The aim of this study was to determine whether the addition of an autologous platelet-rich fibrin clot (PRF) to a modified coronally advanced flap (MCAF) (test group) would improve the clinical outcome compared to an MCAF alone (control group) for the treatment of multiple gingival recessions.

Methods: Twenty subjects, presenting three adjacent Miller Class I or II multiple gingival recessions of similar extent on both sides of the mouth, were enrolled in the study. The mean recession value at baseline was 2.9 ± 1.1 mm for test sites and 2.5 ± 0.9 mm for control sites. Each patient was treated on both sides by an MCAF technique; the combination treatment (with a PRF membrane) was applied on the test side. Probing depth (PD), recession width, clinical attachment level (CAL), keratinized gingival width, and gingival/mucosal thickness (GTH) were measured at baseline and at 6 months post-surgery. Gingival recession was measured at baseline and at 1, 3, and 6 months post-surgery.

Results: Mean root coverage after 1, 3, and 6 months was 81.0% ± 16.6%, 76.1% ± 17.7%, and 80.7% ± 14.7%, respectively, at the test sites and 86.7% ± 16.6%, 88.2% ± 16.9%, and 91.5% ± 11.4%, respectively, at the control sites. Differences between the two groups were statistically significant at 3 and 6 months. At 6 months, complete root coverage was obtained at 74.6% of the sites treated with the control procedure but at only 52.2% of the experimental sites. At 6 months, the increase in GTH was statistically significant when comparing the test sites (from 1.1 ± 0.3 mm at baseline to 1.4 ± 0.5 mm at 6 months) to the control sites (from 1.1 ± 0.3 mm at baseline to 1.1 ± 0.3 mm at 6 months). In the case of PD, there was no significant difference between the two groups at 6 months, but a significant CAL gain in favor of the control group was observed at that time.

Conclusions: MCAF is a predictable treatment for multiple adjacent Miller Class I or II recession-type defects. The addition of a PRF membrane positioned under the MCAF provided inferior root coverage but an additional gain in GTH at 6 months compared to conventional therapy. *J Periodontol 2009;80:244-252.*

KEY WORDS

Fibrin; gingival recession; plastic surgery.

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Isolated gingival recessions have been treated by several techniques.[1] The main goal of these plastic periodontal surgical procedures is to obtain root coverage and an optimal esthetic appearance together with complete root coverage and the blending of mucosa and/or gingiva. These root-coverage procedures are usually based on the coronally advanced flap (CAF), and the outcome, when combined with a connective tissue graft (CTG) (bilaminar technique), is considered the gold standard. In a systematic review[1] of treatments of single recession defects, a mean root coverage of 83% was found with CAF.

Multiple adjacent recession-type defects present a further challenge because several recessions must be treated at a single surgical session to minimize patient discomfort. The most reported techniques are the

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CAF or its modified approach (MCAF),[2] the supraperiosteal envelope technique,[3] and its evolution, the so-called ''tunnel technique.''[4,5]

Many materials have been proposed to improve clinical outcomes. Fibrin glue (FG) has been tested in conjunction with tetracycline root conditioning, but the addition of FG may not enhance the outcome of the CAF procedure.[6]

Platelet-rich plasma (PRP) is a fraction of plasma that provides a rich source of growth factors[7] and may enhance the initial stabilization and revascularization of the flap and grafts.[8] PRP is prepared with an anticoagulant to avoid platelet activation and degranulation. Thereafter, it must undergo two centrifugation processes. Then PRP is mixed with bovine thrombin and calcium chloride at the time of application.[9] In a pilot study on the treatment of Miller Class I recessions,[10] the application of PRP with a CAF root-coverage procedure provided no clinically measurable enhancement. However, positive benefits from the use of PRP included better gingival index and wound-healing index values, as well as increased gingival thickness.[11]

The autologous platelet-rich fibrin clot (PRF) was used initially in implant surgery to improve bone healing.[12] Despite a lack of scientifically proven clinical benefit, the homogeneous fibrin network that is obtained is considered by the promoters of the technique to be a healing biomaterial and is commonly used in implant and plastic periodontal surgery procedures[13] to enhance bone regeneration and soft tissue wound healing. Compared to PRP, there are few references in the literature about the biologic properties of PRF. However, it contains platelets, growth factors, and cytokines that may enhance the healing potential of bone as well as soft tissues.[14]

PRP and PRF differ in their preparation protocols. PRF is used without the addition of anticoagulant and is centrifuged only once. The aim of our study was to determine whether the addition of an autologous fibrin clot to CAF improved root coverage of multiple Miller Class I or II gingival recessions compared to CAF alone.

MATERIALS AND METHODS

The study protocol was approved by the Review Board of the Department of Periodontology, Semmelweis University, and was conducted between September 2005 and May 2007. Twenty patients were recruited from the department based on the following inclusion criteria: at least three multiple Miller Class I and II recession defects, together with similar contralateral lesions; systemic health; age ≥18 years; full-mouth plaque index <20%; and a signed informed consent form. Smokers (≤20 cigarettes/day) were included.

Exclusion criteria were inflammatory periodontal disease; previous surgical attempt to correct gingival recession; systemic disease or severe immune deficiency; coagulation defect or current anticoagulation treatment; addiction to drugs; inability or unwillingness to complete the trial; lack of linguistic skills; psychiatric disorders; refusal to sign the informed consent form; pregnancy; and molar or premolar teeth with furcation involvement.

Sixty-seven recession-type defects were treated. Twenty subjects, 15 females and five males aged 22 to 47 years (mean age, 31.7 years), were enrolled. Fifteen patients had maxillary recessions, and four had mandibular recessions. One patient had maxillary and mandibular recessions, thus allowing test and control procedures to be undertaken in the upper and lower arches. Therefore, 21 pairs of treatment (test and control) were performed. Full-mouth scaling and prophylaxis were scheduled 1 month before surgery. CAFs were performed on both sides of the mouth, either in conjunction with a PRF membrane (test side) or without (contralateral control side).

At baseline and at 1, 3, and 6 months postoperatively, gingival recession (GR) was measured from the cemento-enamel junction (CEJ) to the gingival margin at the mid-buccal point of the teeth involved, using a periodontal probe.‖ At baseline and 6 months after surgery, the following clinical measurements were recorded: keratinized gingival width (KGW) was measured from the mucogingival junction to the gingival margin, recession width (RW) was measured at the CEJ, probing depth (PD), clinical attachment level (CAL), and gingival/mucosal thickness (GTH).

GTH was measured 3 mm below the gingival margin at the attached gingiva or the alveolar mucosa using a #15 endodontic reamer with a silicone disk stop. The mucosal surface was pierced at a 90° angle with slight pressure until hard tissue was reached. The silicone stop¶ on the reamer was slid until it was in close contact with the gingiva. After removal of the reamer, the distance between the tip of the reamer and the inner border of the silicone stop was measured to the nearest 0.1 mm with calipers.#[15]

All clinical measurements were performed by the same two investigators (SA and TK). They had been calibrated previously by assessing 30 recession defects in five patients, with 72 hours between assessments. Calibration was accepted when 90% of measurements of recession were within 0.5 mm using the periodontal probe[16] and within 0.2 mm for measurements of gingival thickness using the endodontic file.

‖ PCP-UNC 15 periodontal probe, Hu-Friedy, Chicago, IL.
¶ Mani.Reamers length 25 mm, size 15, Utsonomiya-shi, Japan.
# Mitutoyo, Model CD-6''B, Andover, U.K.

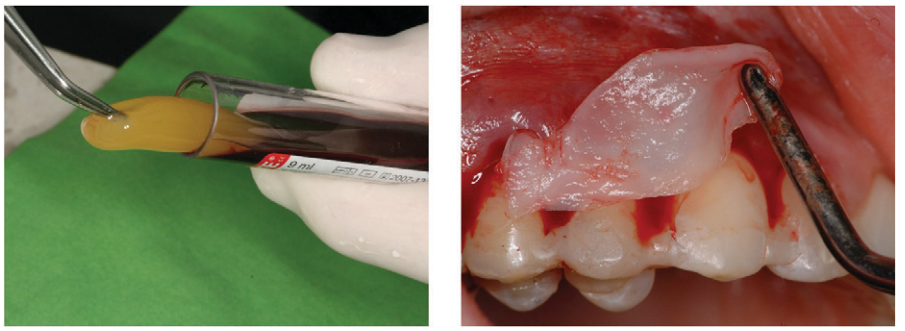

Figure 1.
Plasma-rich fibrin clot being applied after centrifugation.

Adverse effects with regard to patient comfort, tooth sensitivity, and esthetics were evaluated by interviewing the patients 1 and 6 months after surgery.

Surgical Procedure

Before surgery, all patients were given a single dosage of betamethasone, 4 mg,** and one tablet of alprazolam, 0.25 mg,†† to minimize postoperative edema and anxiety. After local anesthesia, both surgical operations (test and control) were performed during a single surgical session by the same practitioner (SA). Test and control sides were determined by tossing a coin.

Just prior to surgery, intravenous blood was collected in four 10-ml vials without anticoagulant and immediately centrifuged‡‡ at 3,000 revolutions per minute for 10 minutes. The fibrin clot formed in the middle part of the tube. The upper part contained an acellular plasma, and the bottom part contained the red corpuscles (Fig. 1).[9] The fibrin clot was easily separated from the lower part of the centrifuged blood and spread on a sterile gauze. Dry gauze was folded over the PRF, which was stored in a refrigerator at 4°C until used. To minimize the delay before using the fibrin clot, test surgery was performed first.

Recession defects were thoroughly scaled using Gracey curets.§§ No root conditioning was used. An MCAF technique was undertaken[2] using a modified suturing technique. The flap design was as follows: submarginal incisions were made in the interdental areas, and intrasulcular incisions were made around those teeth with recession defects. Split-full-split flap incisions were performed in a coronal–apical direction. Gingival tissue adjacent to the root defect and the interproximal bone was raised full thickness, whereas the most apical portion of the flap was split thickness to allow coronal repositioning of the flap without tension. All papillae were deepithelialized to create a connective tissue bed. At the test sites, the previously prepared fibrin clot was positioned over the recession defects, just below the CEJ (Fig. 2). The gingival flap was repositioned, with its margin located on the enamel, on the test and control sides. It was held in that position with horizontal suspensory sutures‖‖ around the contact points[5] (Fig. 2). Stabilization of the blood clot was achieved by the application of gentle pressure for 3 minutes.

Post-Surgical Protocol

All patients were given analgesics (niflumic acid, 3 × 250 mg¶¶) for 3 to 4 days and antibiotics (Clindamycin-C, 3 × 300 mg##) for 5 days. Patients were advised not to brush their teeth in the operated areas until after suture removal 2 weeks later. They were instructed to rinse their mouth with a 0.12% chlorhexidine solution, three times a day for 1 minute, for 3 weeks. Fifteen days after surgical treatment, all patients were reviewed and instructed in mechanical tooth cleaning in the operated areas using a soft toothbrush and a roll technique. All patients were recalled for prophylaxis 1 month after suture removal and at 3 and 6 months.

Statistical Analysis

The statistical analysis was performed using commercially available software.*** A subject-level analysis was performed for each parameter. Mean ± SD for the clinical variables were calculated for each treatment. The method of Kolmogorov and Smirnov was used to confirm that the data were sampled from a Gaussian distribution. The significance of the difference within and between groups before and after treatment was evaluated with the paired-samples *t* test. Differences were considered statistically significant at $P<0.05$.

RESULTS

There were no statistically significant differences between the recession-type defects in the two groups at baseline. Figure 3 shows the clinical improvements achieved by both procedures.

All patients completed the study and expressed improvement as far as root sensitivity was concerned. Sloughing of a flap, without infection, occurred in one patient, resulting in a recession defect, although the patient made no complaint about the esthetic

** Célestène, Schering-Plough, Levallois-Perret, France.
†† Frontin, Egis, Budapest, Hungary.
‡‡ EBA 20 Centrifuge, Andreas Hettich, Tuttlingen, Germany.
§§ Gracey curet, Hu-Friedy.
‖‖ 5-0 polyglactin 910 Vicryl, Ethicon, Johnson & Johnson International, St-Stevens-Woluwe, Belgium.
¶¶ Donalgin, Richter, Budapest, Hungary.
Dalacin-C, Pfizer KFT, Budapest, Hungary.
*** Instat 2000, version 3.05, GraphPad Software, San Diego, CA.

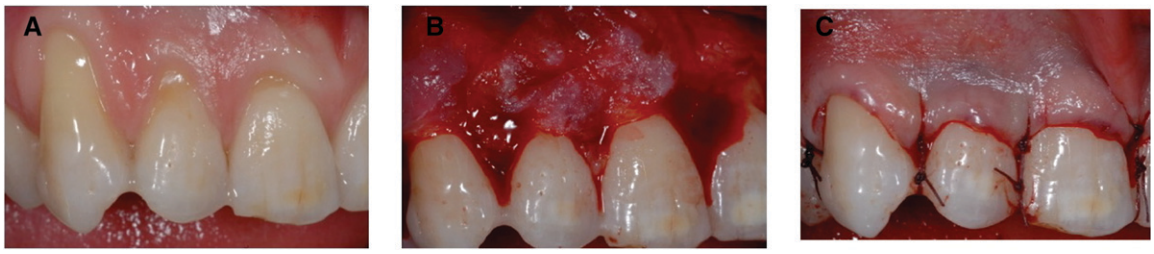

Figure 2.
Test procedure. ***A)*** *Preoperative view of maxillary right anterior teeth (test side).* ***B)*** *PRF membrane over the recession defects.* ***C)*** *CAF maintained in a coronal position with suspensory sutures around the contact points.*

outcome. Two patients were moderate smokers (<10 cigarettes/day); they did not show any altered wound healing.

At 1 month, both treatments resulted in significant improvements in the percentage of root coverage: 81.0% ± 16.6% and 86.7% ± 16.6%, respectively, for test and control groups (Table 1). The difference between the two groups was not statistically significant. At 3 months, there was a slight decrease in root coverage in the test group, and the difference between the two groups became statistically significant (76.1% ± 17.7% in the test group and 88.2% ± 16.9% in the control group). At 6 months, there was a statistically significant increase in root coverage in the control group (up to 91.5% ± 11.4%) compared to the 3-month data. No statistically significant differences were observed at the test sites over the same time period. Therefore, at 6 months, the difference in root coverage between the two groups was statistically significant: 80.7% ± 14.7% and 91.5% ± 11.4% for test and control sites, respectively (Table 1).

Full root coverage was achieved at 74.62% of the control sites compared to only 52.23% of the test sites (Table 2).

A threshold of 0.5 mm remaining recession defect may be considered a clinically satisfactory esthetic outcome. This value represents a 17% (test sites) and a 20% (control sites) lack of coverage when applied to the mean baseline values. In the present study, this value was obtained at 64.17% and 88.05% of the test and control sites, respectively.

At the patient level at 6 months, the test procedure resulted in a lower percentage of root coverage than the control procedure for 15 patients. For these patients, the mean root coverage was 74.1% ± 12.1% for the test side versus 92.4% ± 11.8% for the control side. Only two patients had worse results with the control procedure. One hundred percent root coverage was obtained with the control and test procedures in four patients. Eleven patients showed 100% root coverage in the control group, whereas only four patients obtained this optimal result with the test procedure.

The best results were found at anterior maxillary sites, where the control procedure resulted in 100% root coverage, and the test procedure resulted in 91.1% ± 18.8% root coverage (Table 1). The worst results were obtained for maxillary molars, with only 86.3% ± 17.6% root coverage for the control procedure and 70.9% ± 19.9% root coverage for the test procedure. These differences were statistically significant (Table 1).

A greater and significant reduction in RW was achieved at 6 months with the control treatment (66.2% ± 37.5% reduction for the test sites versus 82.4% ± 33% for the control sites; Table 1).

Both procedures resulted in a significant CAL gain at 6 months (from 4.23 ± 1.56 mm to 1.76 ± 0.97 mm and from 3.93 ± 1.43 mm to 1.37 ± 0.62 mm for the test and control groups, respectively; Table 3). Although there were no significant differences in CAL between the two groups at baseline, a statistically significant difference was found at 6 months.

We also observed a statistically significant decrease in PD in the two groups from baseline to 6 months. However, the difference between the two groups at 6 months was not statistically significant (Table 3). Both groups showed a significant decrease in KGW from baseline to 6 months; however, there was no statistically significant difference between the two groups at baseline or at 6 months. A significant increase in GTH between baseline and 6 months was observed only in the test group (from 1.1 ± 0.4 mm to 1.4 ± 0.5 mm). Finally, no significant difference in terms of root coverage was observed with a threshold GTH of ≤0.5 and ≤1 mm within the test and control groups.

DISCUSSION

Multiple gingival recessions may be a concern for patients with a high lip smile line. Studies on this surgical challenge mostly concern the treatment of multiple Miller Class I and II recession defects. Suspensory sutures around the contact point were used in our study to allow stabilization of the flap margin at or above the

Figure 3.
*Results of treatment of multiple recession-type defects on the same patient (test and control). Test side. View at baseline **(A)** and at 1 **(B)**, 3 **(C)**, and 6 months **(D)**. Control side. View at baseline **(E)** and at 1 **(F)**, 3 **(G)**, and 6 months **(H)**.*

CEJ during the first 2 weeks of wound healing. In the present study, only two patients were smokers (<10 cigarettes/day), and because they showed uneventful wound healing we did not consider the impact of cigarette smoking on the stability of the root coverage.[17]

A 6-month postoperative measurement period is sufficient to evaluate the stability of the gingival margin after a CAF.[18] In the present study, a mean root coverage of 91.5% was obtained at control sites. This may be comparable to a study[2] that showed a mean root coverage of 97.1% with a CAF and sling sutures after 1 year. Complete root coverage up to the CEJ was obtained in 88% of recessions after 1 year in the reference study,[2] compared to 74.6% for the control group in our study at 6 months. In the study referred to above, the treated recession defects were exclusively in the maxilla from teeth #4 to #13. However, our study involved maxillary recessions from teeth #3 to #14 and included 27 upper molars. We also included mandibular recessions from teeth #18 to #31, which included eight lower molars. Also, our mean number of treated teeth per recession was 3.19 (range, 3 to 5), with only 38% of recessions ≥3 mm in our control group against 3.4 (range, 2 to 5) and 91% of recessions ≥3 mm in the other study.[2]

If mandibular recessions and maxillary first molars are excluded in the control group, the remaining six patients showed a mean root coverage of 100% on 20 recession defects. The five patients with recession defects on mandibular teeth showed a mean root coverage of 91.4% on 17 recessions. The mean root coverage for maxillary molars was 86.3% on 27 recessions. Reduced root coverage has been reported following CAF-CTG combination treatment of molars and for mandibular teeth with multiple recession defects.[19] The study design did not allow a direct comparison between sling sutures and suspensory sutures. These are intended to promote full coverage, but satisfactory results for root coverage of 70.9% ± 19.9% (test group) and 86.3% ± 17.6% (control group) for maxillary molar teeth may be due to a more coronal stabilization of the flap margin with suspensory sutures during initial wound healing.

The aim of the present study was to evaluate a plastic periodontal surgical procedure, with or without the addition of a PRF membrane, by a randomized split-mouth controlled study. Considering the claimed benefits for soft tissue wound healing induced by the PRF

Table 1.

Clinical Parameters (mean ± SD) at Different Time Points

	Test (mean ± SD)	Control (mean ± SD)	*P* Value
Root coverage at 28 days (%)	81.0 ± 16.6	86.7 ± 16.6	0.1189
Root coverage at 90 days (%)	76.1 ± 17.7	88.2 ± 16.9	0.0173*
Root coverage at 180 days (%)	80.7 ± 14.7	91.5 ± 11.4	0.0039*
Root coverage at 180 days for maxillary anterior teeth (%)	91.1 ± 18.8	100	0.0474*
Root coverage at 180 days for maxillary posterior teeth (%)	70.9 ± 19.9	86.3 ± 17.6	0.0030*
Recession width reduction at 180 days (%)	66.2 ± 37.5	82.4 ± 33	0.0091*

* Statistically significant difference ($P < 0.05$).

membranes, our results failed to show any beneficial effect of using a 0.5-mm-thick PRF membrane located at the flap margin. At 28 days, results were similar between the two groups, but at 6 months there was a statistically significant difference in the percentage of root coverage in favor of the control group. A creeping attachment occurred between 3 and 6 months (mean root coverage of 88.2% and 91.5%, respectively). Other studies did not show similar detrimental effects from the addition of a platelet derivative in a CAF-PRP combination after 6 months compared to CAF alone[11] or with a CAF-CTG-PRP combination compared to CAF-CTG alone.[20] In the present study, reduced root coverage in the test group might have been due to differences in biologic properties between PRP and PRF. Also, because the clinical measurements were performed by two investigators who were not masked to the surgical procedure undertaken, there is the possibility that bias affected the results.

The initial thickness of the flap and the type of dissection have a greater or lesser effect on connective tissue microcirculation. Also, the interposition of PRF may restrict the collateral circulation, which is essential for a thin flap to revascularize and heal.[21] If sites having an initial GTH threshold ≤0.5 mm are compared to those >0.5 mm, the mean root coverage is 76.5% ± 33.4% and 81.6% ± 22.6% for the test group versus 97.1% ± 7.5% and 92.0% ± 16.8% for the control group. By increasing the thresholds to ≤1 and >1 mm,[22,23] we obtain a root coverage of 81.8% ± 26.5% and 78.1% ± 19.9% for the test group versus 92.8% ± 16.1% and 92.0% ± 14.7% for the control group. The importance of soft tissue thickness for root coverage with CAF was stressed in systematic reviews[18,21] on single recessions, but limited information is available for multiple recessions.[15] In the present study, the different thresholds of gingival thickness were not associated with any significant difference in root coverage within each group. This is in contradiction to other investigators[24] who found (using a CAF and two releasing incisions) a mean root coverage of 64.3% for seven recessions with a flap thickness of ≤0.5 mm and full coverage only with a flap thickness >0.8 mm.

There was a clear trend toward an increased thickness of the gingival margin at the test sites. This difference was statistically significant after 6 months. The clinical benefit of such an enlargement is still controversial.[25] However, even if thick tissue seems to improve clinical results, a systematic review[21] failed to establish conclusively a requirement for a minimum thickness. The absolute mean gain in GTH for the test group in the present study was limited (0.3 mm) and could not be positively compared to a mean GTH gain ≥1.22 mm after a CAF-CTG combination,[15] but the protocol for measurement differed. In the present study, we measured GTH at a constant distance of 3 mm apical to the gingival margin, at which location the measurements are apical to the base of the pocket. However, this means that for 40.3% of the sites in both groups, at baseline, our measurements were within alveolar mucosa. The compared studies made measurements at the middle of the apico-coronal width of keratinized tissue. This represents a mean distance of ~2 mm from the gingival margin (at 6 months) and, on occasion, could represent the thickness of the free gingiva. Future studies are needed to evaluate if the GTH gain of 37% (0.3 mm) that we found in our test group after 6 months is of clinical value and/or is associated with an improved esthetic outcome. This increase in soft tissue thickness may be the result of a proliferation of gingival and periodontal ligament fibroblasts which, in turn, may be due to the influence of growth factors from PRF or to a spacing effect of the PRF membrane.

We did not observe any gain of keratinized gingiva in the test or control group. This is contrary to studies with CAF alone,[17] CAF-PRP combination,[11] or CAF–platelet concentrate grafts.[26] However, the 6-month time frame adopted in our study may not be appropriate to observe a significant creeping attachment when a PRF membrane is interposed under the flap, because the length of time for this observation may vary among mucogingival techniques.[27,28] Both treatments resulted in a statistically significant gain of

Table 2.

Individual Recession and Root-Coverage Results

Treatment Pair	Recessions/ Patient (n)	Recession (mm)								Root Coverage at 180 Days (%)		Complete Root Coverage	
		Baseline		28 Days		90 Days		180 Days					
	T/C	T	C	T	C	T	C	T	C	T	C	T	C
1	3/3	2.3	2.0	0.2	0.1	0.2	0.2	0.3	0.2	87	90	1/3	2/3
2	3/3	4.3	2.8	1.3	0.7	2	0.8	1.5	0.8	68.1	71.4	0/3	1/3
3	3/3	4.3	2.7	1.8	0.2	1.8	0	1.8	0.2	58.1	92.6	0/3	2/3
4	3/3	3.3	2.5	1	0	1.3	0	0.8	0	75.8	100	0/3	3/3
5	3/3	3.7	3.7	1	0.5	1.2	0.5	1	0.3	73	91.9	2/3	2/3
6	3/3	3.7	3.5	1.7	1.8	1.3	1.8	1.5	1.2	60.5	63.6	0/3	0/3
7	3/3	2.0	2.2	0.7	0.2	1.2	0	0.7	0.5	68.2	77.3	1/3	1/3
8	3/3	3.5	3.0	1.7	0.3	2	0.7	1.5	0	57.1	100	0/3	3/3
9	3/3	2.8	2.0	0	0	0	0	0	0	100	100	3/3	3/3
10	3/3	4.0	3.0	0.8	1	0.7	1.7	0.5	0.8	87.5	71.4	2/3	2/3
11	3/3	3.0	3.3	0.5	0.3	0.8	0.7	1	0	66.7	100	1/3	3/3
12	3/3	2.2	1.2	0	0	0.3	0	0	0	100	100	3/3	3/3
13	3/3	3.0	2.7	0.3	0	0.2	0	0	0	100	100	3/3	3/3
14	3/3	1.8	1.5	0	0	0.2	0	0	0	100	100	3/3	3/3
15	3/3	1.7	1.3	0.7	0.7	0.3	0.3	0.2	0.2	88.2	84.6	2/3	1/3
16	3/3	5.0	4.0	0.5	1.2	0.7	0.3	0.3	0.2	94	95	2/3	2/3
17	3/3	2.0	1.7	0.2	0.2	0.2	0	0.3	0	85	100	2/3	3/3
18	3/3	2.5	3.8	0.2	0.8	0.8	0.1	0.3	0.8	88.9	78.9	1/3	0/3
19	4/4	1.5	2.0	0	0	0	0	0.4	0	75	100	2/4	4/4
20	5/5	2.7	2.8	0.4	0	0.6	0.3	0.5	0	81.5	100	4/5	5/5
21	4/4	1.0	1.0	0	0	0.1	0	0.1	0	90	100	3/4	4/4
Mean		2.9	2.5	0.6	0.4	0.8	0.4	0.6	0.2	80.7	91.5		
SD		1.1	0.9	0.6	0.5	0.6	0.5	0.6	0.4	14.7	11.4		
Recessions with 100% root coverage at 180 days (%)												52.23%	74.62%

T = test sites; C = control sites.

Table 3.

Mean ± SD of PD, CAL, Height of Keratinized Gingiva, and Tissue Thickness (mm) of the Operated Sites at Baseline and 6 Months Postoperatively

	Test (mean ± SD)	Control (mean ± SD)	*P* Value
PD			
Baseline	1.41 ± 0.65	1.44 ± 0.6	0.6725*
6 months	1.17 ± 0.41 ($P = 0.0103^{\dagger}$)	1.14 ± 0.34 ($P = 0.0003^{\dagger}$)	0.5593*
CAL			
Baseline	4.23 ± 1.56	3.93 ± 1.43	0.0628*
6 months	1.76 ± 0.97 ($P < 0.0001^{\dagger}$)	1.37 ± 0.62 ($P < 0.0001^{\dagger}$)	$0.0004^{\dagger}$
KGW			
Baseline	2.78 ± 1.08	2.85 ± 1.23	0.5760*
6 months	2.54 ± 0.85 ($P = 0.0299^{\dagger}$)	2.37 ± 0.89 ($P = 0.0013^{\dagger}$)	0.1446*
GTH			
Baseline	1.1 ± 0.4	1.1 ± 0.3	0.7653*
6 months	1.4 ± 0.5 ($P = 0.0122^{\dagger}$)	1.1 ± 0.3 ($P = 0.5774$*)	$0.0036^{\dagger}$

* No statistically significant difference.
† Statistically significant difference ($P < 0.05$).

attachment and a decrease in PDs. However, the only statistically significant difference between the two groups was the change in CAL at 6 months (Table 3).

Positioning the PRF at the CEJ may also favor initial root exposure. This was reported in 53% of single recessions treated with a bilaminar surgical technique.[29] The design of the present study allowed an evaluation of results with a patient-centered outcome. In the present study, only 52.3% of patients in the control group showed 100% root coverage at 6 months compared to 19% in the test group. At the patient level, it may be more relevant to evaluate the surgical outcome by the percentage of patients with recessions ≤0.5 mm and not by the percentage of patients with 100% root coverage. This distance is the discriminating value in our probing measurements and can be considered the minimal error of observation. With this approach, the percentage of patients with satisfactory surgical outcomes was 38% and 71.4% for the test and control groups, respectively. The absolute percentages of root coverage may not reflect patient satisfaction. Our oral questionnaire at 6 months was not able to discriminate patient satisfaction with respect to the esthetic outcome.

Within the limits of this study, the lack of benefit of the combined technique did not justify the use of PRF for the treatment of multiple adjacent recession-type defects. However, some factors, such as PRF consistency, positioning in relationship to the CEJ, and platelet concentration,[30] were not tested and may have affected the final clinical result.

CONCLUSIONS

This controlled, randomized trial for the treatment of multiple gingival recessions indicated that CAF surgery alone or in combination with PRF are effective procedures to cover denuded roots. Our 6-month data comparing a combined CAF-PRF technique to CAF alone showed no additional benefit in terms of mean root coverage or short-term wound healing for the treatment of multiple gingival recessions. A longer period of evaluation may be necessary to appreciate the clinical effects of this autogenous biologic material. Within the limits of this study, the only benefit of the addition of PRF was a statistically significant increase in the thickness of the keratinized marginal gingiva.

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