



## Original Research Article

## A comparative assessment of root coverage of gingival recession using modified coronally advanced flap using microsurgical and macro surgical techniques

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## ABSTRACT

**Background:** Gingival anatomic factors, chronic trauma, periodontitis, and tooth alignment are the main conditions leading to gingival recession. The present study was conducted to compare the root coverage of localized GR using modified coronally advanced flap (CAF) and root conditioning with 24% EDTA when performed under magnification and without magnification.

**Materials and Methods:** This study was conducted on 30 patients with Miller's Class I and II GR. Patients were divided into 2 groups i.e 15 in each group. Group I (Coronally advanced flap with microsurgery) was test group and group II (Coronally advanced flap with macrosurgical approach) was control. Plaque index (PI), gingival index (GI), pocket probing depth (PD), and clinical attachment level (CAL) width of keratinized gingival, recession width and recession depth was recorded in both groups at baseline 1 and 3 months for the test and control group. Visual analog scale (VAS) was used to record pain postoperatively on 3rd and 7th day of the surgery. CAF and root conditioning were done with 24% EDTA. Surgical procedure at test site was carried under magnification 3.5 and at control site was done without magnification.

**Results:** The mean gingival index at baseline in group I was 0.45 and in group II was 0.66, PI was 0.86 in group I and 0.86 in group II, clinical attachment level was 3.02 in group I and 3.34 in group II, PD was 0.76 in group I and 0.74 in group II, width of keratinized tissue 4.20 in group I and 3.26 in group II, recession depth was 2.54 in group I and 2.68 in group II and recession width was 3.60 in group I and 3.68 in group II. There was alteration in mean GI, PI, CAL, PD, width of keratinized tissue, recession depth and recession width between both groups recorded at 1 month. Significant reduction was found in GI, CAL, width of keratinized tissue, recession depth and recession width in both groups ( $P < 0.05$ ). We found that mean VAS at 3<sup>rd</sup> day in group I was 4.12 and in group II was 1.84 and at 7<sup>th</sup> day 0.68 in group I and 0.34 in group II.

**Conclusion:** Authors found that microsurgery had less postoperative pain and discomfort when compared to macrosurgical approach. The use of the microscope augments the results, but obtaining an expertise in using needs a lot of practice.

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### 1. Introduction

Gingival recession (GR) is a term that designates the oral exposure of the root surface because of a displacement

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of the gingival margin apical to the cemento-enamel junction (CEJ).<sup>1</sup> Gingival anatomic factors, chronic trauma, periodontitis, and tooth alignment are the main conditions leading to these defects. GR may be of concern to the patient for a variety of reasons. In addition to root hypersensitivity, erosion, root caries, and aesthetic considerations may also come into play.<sup>2</sup> The progression of recession defects warrants both the investigation of the etiologic factors and the consideration of therapeutic actions directed at minimizing the apical movement of the gingival margins.<sup>3</sup>

The ultimate goal of a root coverage procedure is the complete coverage of the recession defect with good appearance related to adjacent soft tissues and minimal probing depth (PD). Previous systematic reviews showed that several surgical procedures such as pedicle flaps, free soft tissue grafts, combinations of pedicle flaps and grafts or barrier membranes (BM) may be indicated to improve the coronal level of the gingival margin on the root surface, even if very limited data for epithelialized free gingival graft and laterally positioned flap are available.<sup>4,5</sup>

Recently, the coronally advanced flap has been demonstrated to be very effective in the treatment of multiple recession defects affecting adjacent teeth with obvious advantages for the patient in terms of aesthetics and morbidity. The coronally advanced flap was first introduced by Norberg as an aesthetic surgical procedure for root coverage.<sup>6</sup> The present study was conducted to compare the root coverage of localized GR using modified coronally advanced flap (CAF) and root conditioning with 24% EDTA when performed under magnification and without magnification.

## 2. Materials and Methods

This study was conducted in the department of Periodontics. It comprised of 30 patients. Patients were divided into 2 groups i.e. 15 in each group. Group I (Coronally advanced flap with microsurgery) was test group and group II (Coronally advanced flap with macrosurgical approach) was control with Miller's Class I and II GR. All patients signed the informed consent and study was approved from institutional ethical committee.

Data such as name, age, gender etc. was recorded. In all subjects oral hygiene instructions, full mouth scaling and root planning was done. Patients were divided into 2 groups. Group I was test group and group II was control. Plaque index (PI), gingival index (GI), pocket probing depth (PD), and clinical attachment level (CAL) width of keratinized gingiva, recession width and recession depth were recorded in both groups at baseline 1 and 3 months for the test and control group. Visual analog scale (VAS) was used to record pain postoperatively on 3rd and 7th day of the surgery. CAF and root conditioning were done with 24% EDTA. Surgical procedure at test site was carried under magnification  $\times 3.5$  and at control site was done without magnification.

## 3. Results

**Table 1:** Assessment of parameters at baseline

Parameters	Group I	Group II	P value
Gingival index (GI)	0.45	0.66	0.72
Plaque index (PI)	0.86	0.86	1
CAL	3.02	3.34	0.12
Probing depth (PD)	0.76	0.74	0.91
Width of keratinized tissue	4.20	3.26	0.15
Recession depth	2.54	2.68	0.81
Recession width	3.60	3.68	0.74

Table 1 shows that mean gingival index at baseline in group I was 0.45 and in group II was 0.66, PI was 0.86 in group I and 0.86 in group II, clinical attachment level was 3.02 in group I and 3.34 in group II, PD was 0.76 in group I and 0.74 in group II, width of keratinized tissue 4.20 in group I and 3.26 in group II, recession depth was 2.54 in group I and 2.68 in group II and recession width was 3.60 in group I and 3.68 in group II. The difference was non-significant.

**Table 2:** Assessment of parameters at 1 month

Parameters	Group I	Group II	P value
Gingival index (GI)	0.79	1.02	0.76
Plaque index (PI)	0.76	0.76	1
CAL	1.76	1.34	0.16
Probing depth (PD)	1.24	0.86	0.02
Width of keratinized tissue	4.76	3.42	0.17
Recession depth	1.40	0.82	0.84
Recession width	2.61	1.68	0.76

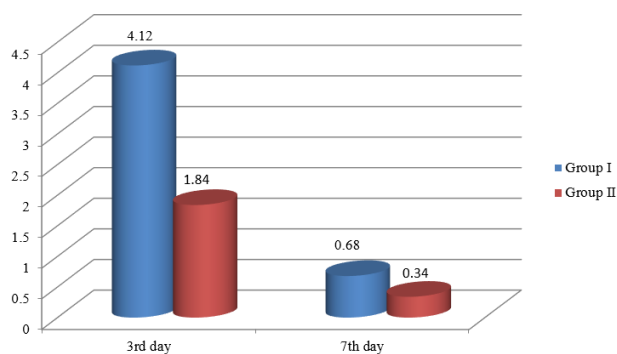
Table 2 shows that mean gingival index at 1 month in group I was 0.79 and in group II was 1.02, PI was 0.76 in group I and 0.76 in group II, clinical attachment level was 1.76 in group I and 1.34 in group II, PD was 1.24 in group I and 0.86 in group II, width of keratinized tissue 4.76 in group I and 3.42 in group II, recession depth was 1.40 in group I and 0.82 in group II and recession width was 2.61 in group I and 1.68 in group II. The difference was non-significant.

Table 3 shows that mean gingival index at 3 months in group I was 0.46 and in group II was 0.24, PI was 0.89 in group I and 0.58 in group II, clinical attachment level was 2.16 in group I and 1.38 in group II, PD was 0.64 in group I and 0.42 in group II, width of keratinized tissue 4.60 in group I and 4.52 in group II, recession depth was 1.84 in group I and 1.26 in group II and recession width was 3.10 in group I and 1.74 in group II. The difference was non-significant.

Figure 1 shows that mean VAS at 3<sup>rd</sup> day in group I was 4.12 and in group II was 1.84 and at 7<sup>th</sup> day was 0.68 in

**Table 3:** Assessment of parameters at 3 month

Parameters	Group I	Group II	P value
Gingival index (GI)	0.46	0.24	0.08
Probing index (PI)	0.89	0.58	0.92
CAL	2.16	1.38	0.12
Probing depth (PD)	0.64	0.42	0.17
Width of keratinized tissue	4.60	4.52	0.19
Recession depth	1.84	1.26	0.81
Recession width	3.10	1.74	0.80

**Fig. 1:** VAS in both groups

group I and 0.34 in group II. The difference was significant at 3<sup>rd</sup> day ( $P < 0.05$ ).

#### 4. Discussion

The CAF is a root coverage surgery that does not involve a palatal donor site, and it was demonstrated to be a safe and predictable approach. In patients with high esthetic expectations, the CAF is the first choice when there is adequate keratinized tissue apical to the root exposure. With this approach, the soft tissue used to cover the root exposure is similar in color, texture, and thickness to that originally present at the buccal aspect of the tooth with the recession defect; thus, the esthetic result is more satisfactory.<sup>6</sup> The present study was conducted to compare the root coverage of localized GR using modified coronally advanced flap (CAF) and root conditioning with 24% EDTA when performed under magnification and without magnification.

We found that mean gingival index at baseline in group I was 0.45 and in group II was 0.66, PI was 0.86 in group I and 0.86 in group II, clinical attachment level was 3.02 in group I and 3.34 in group II, PD was 0.76 in group I and 0.74 in group II, width of keratinized tissue 4.20 in group I and 3.26 in group II, recession depth was 2.54 in group I and 2.68 in group II and recession width was 3.60 in group I and 3.68 in group II. Santis et al<sup>7</sup> conducted a study in which forty isolated gingival recessions with at

least 1 mm of keratinized tissue apical to the defects were treated with a modified approach to the coronally advanced flap. The main change in the surgical procedure consisted in the modification of flap thickness and dimension of surgical papillae during flap elevation. All recessions fall into Miller class I or II. The clinical re-evaluation was performed 1 year and 3 years after the surgery. At the 1-year examination, the average root coverage was 3.72 $\pm$ 1.0 mm (98.6% of the pre-operative recession depth) and 3.64 $\pm$ 1.1 mm (96.7%) at 3 years. The gain in probing attachment amounted to 3.65 $\pm$ 1.10 mm at 1 year and to 3.70 $\pm$ 1.09 mm at 3 years. The average increase of keratinized tissue between the baseline and the 3-year follow-up amounted to 1.78 $\pm$ 0.90 mm. All changes of keratinized tissue (difference between baseline and 1 year, baseline and 3 years, and between 1 and 3 years) were statistically significant.

We found that there was alteration in mean GI, PI, CAL, PD, width of keratinized tissue, recession depth and recession width between both groups recorded at 1 month. When both groups were compared there was no significant difference between both the groups but a significant improvement was seen in the clinical parameters in both the groups from baseline to 3 months after surgical procedure. Cairo et al<sup>8</sup> conducted a study in which the primary outcome variable was complete root coverage (CRC). The secondary outcome variables were recession reduction, clinical attachment gain, keratinized tissue gain, aesthetic satisfaction, root sensitivity, post-operative patient pain and complications. A total of 794 Miller Class I and II gingival recessions in 530 patients from 25 RCTs were evaluated in this systematic review. CAF was associated with mean recession reduction and CRC. The addition of connective tissue graft (CTG) or EMD enhanced the clinical outcomes of CAF in terms of CRC, while BM did not. The results with respect to the adjunctive use of acellular dermal matrix were controversial.

We found that at 3 months there was alteration in mean GI, PI, CAL, PD, width of keratinized tissue, recession depth and recession width between both groups. There was significantly reduction in GI, CAL, width of keratinized tissue, recession depth and recession width in both groups ( $P < 0.05$ ). We found that VAS at 3<sup>rd</sup> day in group I was 4.12 and in group II was 1.84 and at 7<sup>th</sup> day was 0.68 in group I and 0.34 in group II.

Singh et al<sup>9</sup> included a total of 20 sites with Miller's Class I GR (10 in test and 10 in control). Mean WKT at baseline in control and test group was 4.22  $\pm$  2.05 and 3.22  $\pm$  1.09 which increased to 4.56  $\pm$  1.59 and 4.50  $\pm$  0.94, respectively, at 3 months. RD at baseline in control and test groups was 2.56  $\pm$  0.53 and 2.67  $\pm$  0.87 which reduced to 1.83  $\pm$  0.71 and 1.22  $\pm$  1.20, respectively. RW at baseline in control and test group was 3.56  $\pm$  1.13 and 3.67  $\pm$  0.50 which decreased to 3.06  $\pm$  1.01 and 1.72  $\pm$  1.39, respectively. All the clinical parameters were statistically

not significant between control and test groups. Mean visual analog scale (VAS) at 7 days postoperatively in control and test groups was  $1.78 \pm 0.97$  and  $0.22 \pm 0.44$ , respectively. The VAS scores were found to be significantly lower in the test group at both 3rd and 7th day postoperatively showing less pain in test group.

Microsurgery represents an amplification of universally recognized surgical principles, in which gentle handling of soft and hard tissues and extremely accurate wound closure are made possible through magnification, allowing for well planned and precisely executed surgical procedures. Loupes are less expensive and easy to use.<sup>10</sup>

Even though there are numerous advantages of microsurgical techniques, restricted adoption of microsurgery in periodontal surgical practice may be indebted to its innate disadvantages. These may include constrained areas of vision, loss of depth of field and visual reference point, steep learning curve, and a relatively higher initial cost of microsurgical setup.

## 5. Conclusion

Both groups showed a substantial improvement of clinical parameters in Miller's Class I and Class II gingival recession defects postoperatively. Authors found that microsurgery had less postoperative pain and discomfort when compared to macrosurgical approach. The use of the microscope augments the results, but obtaining an expertise in using needs a lot of practice. The histological evaluation of the periodontal healing by microsurgical and macrosurgical technique should be undertaken to understand the flap to root attachment.

## 6. Conflicts of Interest

All contributing authors declare no conflicts of interest.

## 7. Source of Funding

None.

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