



RESEARCH ARTICLE

SEMILUNAR CORONALLY REPOSITIONING FLAP WITH OR WITHOUT MICROSCOPE

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Abstract

Introduction: Gingival recession, characterized by the displacement of soft tissue margin apical to the cemento-enamel junction (CEJ) and exposure of the root surface, poses functional, therapeutic, and aesthetic challenges. Periodontal plastic surgical procedures like the Semilunar Coronally Repositioning Flap (SCRf) aim to address this issue, enhancing patient aesthetics and minimizing root exposure. The integration of magnification tools such as surgical microscopes has refined these techniques, enabling precise and minimally invasive procedures, thus improving patient outcomes and satisfaction.

Methodology: A randomized clinical trial was conducted, including 20 sites with Miller's class I or class II gingival recession in maxillary anteriors/premolars, divided into two groups: treated with SCRf without magnification (Group 1) and SCRf under a surgical microscope (Group 2). Clinical parameters including Pocket Probing Depth (PPD), Clinical Attachment Level (CAL), Gingival Recession Height (GR), Width of Keratinized Gingiva (WKT), and Wound Healing Index (WHI) were measured at baseline and 3 months post-treatment.

Result: Results showed no significant inter-group differences in PPD, CAL, GR, and WKT scores at both time points. However, within each group, there was a significant reduction in CAL and GR scores and a significant increase in WKT score from baseline to 3 months. Additionally, both groups exhibited a significant increase in WHI, with Group 2 showing a statistically significant improvement compared to Group 1.

Conclusion: Both SCRf with and without surgical microscope demonstrated promising results in improving clinical parameters and root coverage in Miller's Class I and Class II gingival recession defects. The use of a surgical microscope resulted in significantly better Wound Healing Index, indicating enhanced postoperative healing. Larger sample sizes and longer follow-up periods are recommended for further validation of these findings.

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Introduction:-

Gingival recession, characterized by the exposure of root surfaces due to the displacement of the soft tissue margin apical to the cemento-enamel junction (CEJ), is a common condition with multifactorial etiology.¹ Factors such as abnormal tooth

alignment, fenestration, dehiscence, faulty tooth brushing, and periodontal diseases contribute to its development. Beyond functional concerns, gingival recession can also have significant aesthetic implications, leading to the excessive display of tooth structure during smiling or talking, which is often perceived as unaesthetic.^{2,3}

In the realm of periodontal therapy, aesthetics plays a crucial role, prompting the development of various procedures aimed at preserving or enhancing patient aesthetics. One such procedure is the Semilunar Coronally Repositioning Flap, which is designed to treat gingival recession by advancing the gingiva coronally without involving adjacent papillae, thus preserving the aesthetic appearance. This technique is particularly indicated in areas with minimal labial probing depth (PD) and sufficient keratinized gingiva.⁴⁻⁶

To further enhance esthetics and minimize patient morbidity, modern periodontal plastic surgery utilizes magnification tools such as loupes or surgical microscopes. Microsurgery, enabled by surgical microscopes, allows for precise and minimally invasive procedures, improving the visual acuity and dexterity of the operator. This approach promotes gentle tissue handling, accurate wound closure, and overall improved surgical outcomes.⁷⁻⁸ The use of magnification in periodontal surgery has revolutionized both surgical and non-surgical therapies, including periodontal plastic surgeries and implant therapy.⁹

This study aims to evaluate the outcomes and effectiveness of the Semilunar Coronally Repositioning Flap in treating Miller's Class I or Class II gingival recession, with or without the use of a surgical microscope. By assessing the clinical outcomes of this technique, we aim to contribute to the growing body of knowledge in periodontal surgery and further enhance our understanding of optimal treatment modalities for gingival recession.

Methodology:-

Source of data –

The study was carried out on the subjects with Miller's Class I or Class II gingival recession attending the outpatient clinic of the Department of Periodontology and Oral Implantology, I.T.S-Centre for dental studies and research, Muradnagar, Ghaziabad, UP.

Study Design –

A total of 20 sites with Miller's class I or class II gingival recession in Maxillary anteriors/premolars were included in this Randomized clinical trial. The Subjects were allocated into two groups- Group 1 and Group 2 randomly using a coin system.

GROUP 1 - 10 sites with Miller's Class I or II gingival recession were treated with Semilunar Coronally Repositioning Flap without use of magnification.

GROUP 2 - 10 sites with Miller's Class I or II gingival recession were treated with Semilunar Coronally Repositioning Flap under surgical microscope.

Patients included in the study were systemically healthy subjects, subjects with age between 18-60 years, patients having Miller's class I or class II gingival recession (Maxillary anteriors/premolars), no interdental bone loss as seen on IOPA and a detectable CEJ, patients maintaining a good oral hygiene, subjects that were willing to comply with all the study-related procedure and those who were willing to sign the informed consent form.

Patients excluded were either medically compromised, with history of antibiotics or antimicrobial therapy for last 3 months, or on any drug therapy which was known to influence the periodontium, patients who were active tobacco users, pregnant or lactating females, patients not having detectable CEJ / cervical abrasion, patients that were showing pulpal exposures, non-vital tooth, active caries and subjects that were unable to provide informed consent.

Data collection

A detailed dental and medical history of the patients was recorded. A written, informed consent was taken from all the subjects. Patients were advised for blood investigation including complete blood count, hemoglobin %, platelet count, bleeding and clotting time. Occlusal stents were made of cold cure acrylic for positioning the probe and measuring the clinical parameters from a fixed reference point was fabricated for standardization and reproducibility of clinical measurements.

Clinical parameters

Selected sites were assessed for the following clinical parameters at baseline and 3 months. Probing depth¹⁰ (PD) (in mm) was measured at the mid-buccal point on the customized stent (from the free gingival margin to the apical/base of the sulcus). Gingival recession height¹⁰ in mm (from CEJ to gingival margin) at the middle of the buccal surface.

Clinical attachment level¹⁰ in mm (from the fixed reference point to the base of the sulcus). Width of keratinized gingiva¹⁰ in mm (from gingival margin to mucogingival junction). Wound healing index was assessed using a Healing index by Landry et al¹¹.

Clinical procedure

Prior to surgery, all patients received thorough supra-gingival and subgingival scaling and root planing and oral hygiene instructions were given to the patients. Patients were evaluated after a period of 1 week and checked for optimal oral hygiene. Only those patients maintaining optimum oral hygiene were included in the study.

For group 1 (SCRF without use of magnification)

All the periodontal surgical procedures were performed under aseptic condition. The standardized surgical procedure for the selected sites was performed as follows:

Local anesthesia (2% lignocaine with adrenaline 1:80000) was used to anesthetize the surgical area. After obtaining adequate anesthesia, a semilunar incision was made which followed the curvature of the free gingival margin. The incision extended into the alveolar mucosa if there is not enough keratinized tissue to cover the recession. The incision curved apically far enough mid-facially to ensure that the apical part of the flap rests on bone after it is brought down to cover the exposed root. The incision ended into the papilla on each end of the tooth, but not all the way to the tip of the papilla. At least 2 mm was left on either side of the flap, since this is the main area from which the blood supply will come. Using a number 15 blade, a split thickness dissection was made from the initial incision line coronally. This is connected with an intrasulcular incision, made mid-facially. Then, the mid-facial tissue was coronally positioned to the CEJ, or to the height of the adjacent papilla in cases of interproximal recession. The tissue was held in place with moist gauze against the tooth for 5 min. The area was packed with Periodontal dressing.

For Group 2 (SCRF Under Surgical Microscope) –

All the steps were same as discussed above except the procedure was done under magnification using microsurgical instruments.

Post-Operative instructions

All the patients were prescribed Tab. Amoxicillin 500 mg for thrice a day for 5 days and Tab. Ibuprofen 400mg + Paracetamol 325mg thrice daily for 5 days. Patients were advised to avoid brushing in the area of surgery. Avoid eating any hot food for 24 hours post-surgically. Not to touch the surgical area with tongue or finger. Not to brush the teeth in the surgical area for a period of at least 1 week to avoid trauma. In case of any problem regarding the surgery undertaken, report to the clinic as soon as possible.



Figure 1:- Surgical microscope.



Figure 2:- Armamentarium.



Figure 3:- Pre-Operative view of recession.

SITE w.r.t 14&15 (GROUP 1)

Figure 4:- Probing depth measured at baseline using stent.

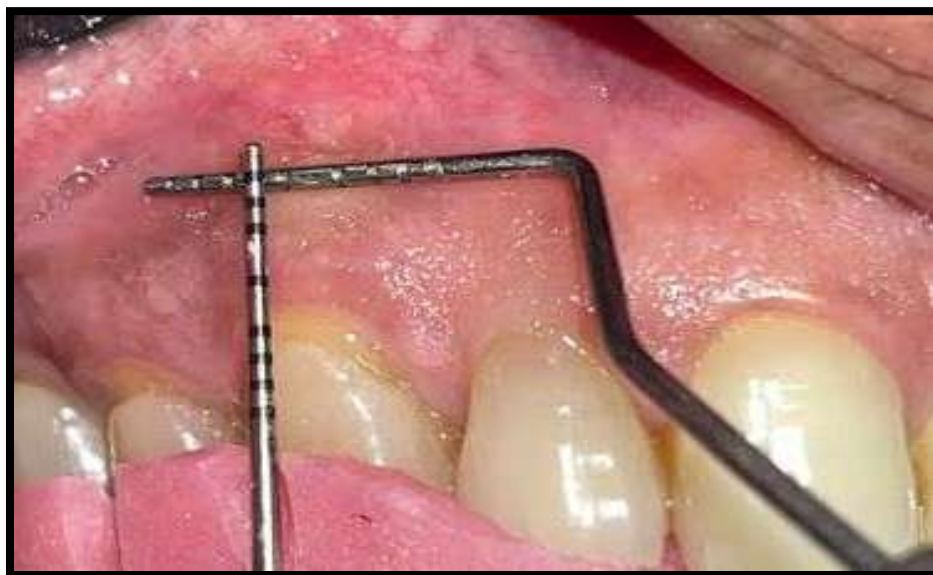


Figure 4:- Width Of Keratinized Gingiva Measured At Baseline using stent.



Figure 5:- Clinical Atachment Level Measured At Baselineusingstent.



Figure 6:- Recessionheightatbaselineusingstent.



Figure 7:- Semilunarincisions.

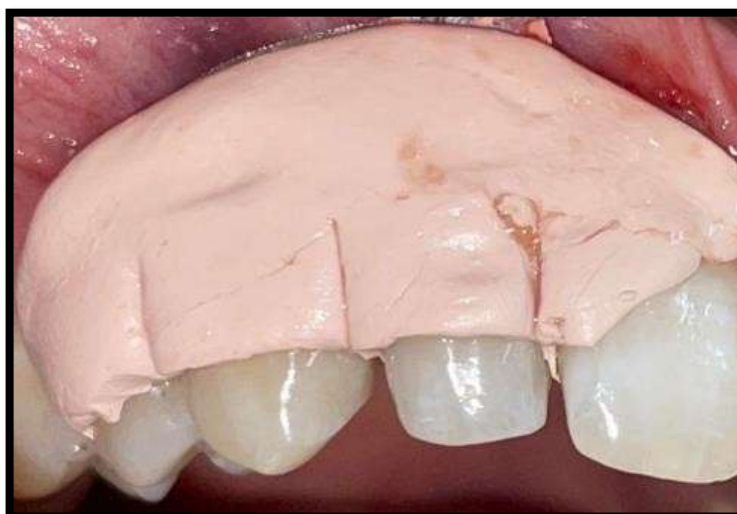


Figure 8:- Periodontaldressing(Coe-Pak®).



Figure 9:- Postoperativeviewafter3months.

(GROUP1)



Figure 10:- Pre-Operativeviewofrecession.

SITEw.r.t11&12(GROUP2)



Figure11:- Probingdepthmeasuredatbaselineusingstent.



Figure 12:- Width of keratinized gingiva measured at baseline using stent.



Figure 13:- Clinical attachment level measured at baseline using stent.



Figure 14:- Recession height at baseline using stent.



Figure 15:- Semilunar incisions under microscope.



Figure 16:- Periodontal dressing (Coepak®).



Figure 17:- Postoperative view after 3 months.

(GROUP2)

Results:-

The purpose of the present clinical trial was to evaluate clinically the efficacy of Semilunar Coronally Repositioning Flap with or without surgical microscope in the treatment of Miller's Class I or Class II gingival recession. In this study, 20 sites fulfilling the inclusion and the exclusion criteria having Miller Class I or Class II maxillary recession were taken. In Group 1, 10 sites were treated with Semilunar Coronally Repositioning Flap (SCRF) without use of magnification and in Group 2, 10 sites were treated with Semilunar Coronally Repositioning Flap (SCRF) under surgical microscope. The clinical parameters for both the groups were assessed and compared statistically to obtain the following results.

The **Mean Pocket Probing Depth (PPD)** at baseline and at 3 months for Group 1 and Group 2 was 1.60 ± 0.70 mm & 1.60 ± 0.70 mm and 1.20 ± 0.42 mm & 1.30 ± 0.48 mm respectively. (Table 1). The **Mean Clinical Attachment Level (CAL)** at baseline and at 3 months for Group 1 and Group 2 was 3.50 ± 1.08 mm & 3.80 ± 0.92 mm and 1.50 ± 1.35 mm & 1.90 ± 0.32 mm respectively. (Table 1) The **Mean Gingival Recession Height (GR)** at baseline and at 3 months for Group 1 and Group 2 was 1.70 ± 0.68 mm & 2.20 ± 0.79 mm and 0.60 ± 0.52 mm & 0.80 ± 0.32 mm respectively. (Table 1) The **Mean Width of Keratinized Gingiva (WKT)** at baseline and at 3 months for Group 1 and Group 2 was 5.20 ± 1.40 mm & 4.60 ± 0.84 mm and 5.90 ± 1.10 mm & 5.20 ± 0.88 mm respectively. (Table 1)

On **Inter-group comparison**, there was no statistical significant difference in PPD, CAL, GR and WKT scores of Group 1 & Group 2 at both time intervals. (Table 1) On **Intra-group comparison** of baseline and 3 months clinical measurements scores in Group 1 & Group 2, there was non-significant change in PPD score. However, there was a significant reduction ($p \leq 0.05$) in CAL & GR score and a significant increase ($p \leq 0.05$) in WKT score from baseline to 3 months (Table 1)

The **Mean Wound Healing Index (WHI)** at 7th day and 3 months for Group 1 and Group 2 was 2.60 ± 0.52 & 3.10 ± 0.57 and 4.20 ± 0.42 & 4.80 ± 0.42 respectively. On the Intra-group comparison of 7th day and 3 months wound healing index scores in Group 1 & Group 2, there was significant increase ($p \leq 0.05$) in wound healing index score from 7 days to 3 months. On Inter-group comparison of 7th Day and 3 months wound healing index scores in Group 1 & Group 2, it was statistically significant ($p \leq 0.05$) at 7th day & 3 months in favor of Group 2. (Table 2)

Table 1:- Comparison of different clinical parameters at baseline and 3 months clinical measurement scores in Group 1 and Group 2

Variable	Baseline		3 months		p value (Inter group)
	Mean	SD	Mean	SD	
Group 1	1.60	0.70	1.30	0.48	0.102

PPD	Group2 pvalue (Inter group)	1.60	0.70	1.20	0.42	0.083
		1.000		0.615		
CAL	Group1	3.50	1.08	1.90	1.35	0.007*
	Group2 pvalue (Inter group)	3.80	0.92	1.50	0.32	0.005*
		0.551		0.764		
GR	Group1	1.70	0.68	0.60	0.52	0.005*
	Group2 p value (Inter group)	2.20	0.79	0.80	0.79	0.004*
		0.144		0.615		
WKT	Group1	5.20	1.40	5.90	1.10	0.008*
	Group2 p value (Inter group)	4.60	0.84	5.20	0.88	0.004*
		0.327		0.872		

Wilcoxon signed rank test; * indicates significant difference at $p \leq 0.01$

Table 2:- Inter & Intragroup comparison of wound healing index for Group 1 & Group 2.

Group	At 7 th day		At 3 months		pvalue (Intra)
	Mean	SD	Mean	SD	
Group1	2.60	0.52	4.20	0.42	<0.001*
Group2	3.10	0.57	4.80	0.42	<0.001*
p value (Inter)	0.006*		0.009*		

Wilcoxon signed rank test; * indicates significant difference at $p \leq 0.01$

Discussion:-

The present clinical study was conducted in the Department of Periodontology and Oral Implantology, ITS-CDSR, Murad Nagar, Ghaziabad. The aim of this randomized control clinical trial was to compare and evaluate clinically the efficacy of Semilunar Coronally Reposition Flap (SCRf) with or without microscope in the treatment of Miller's Class I or Class II gingival recession in Group 1 & Group 2.

In this study, a total of twenty sites, having Miller's Class I or II gingival recession defects were selected and divided into Group 1 (SCRf without magnification) and Group 2 (SCRf under microscope). All the selected sites were subjected to assessment of the clinical parameters like Pocket Probing Depth, Clinical Attachment Level, Width of Keratinized gingiva and Gingival Recession Height at baseline and 3 months. Reproducible alignments of the probe were provided by custom made self-cured acrylic stents grooved in an occluso-apical direction corresponding to the mid-buccal area as a fixed reference point. The theoretical advantage of stent system was demonstrated by the work of **Sivertson and Burgett**¹². Custom made acrylic stents were also used in studies by **Lekovic et al.**¹³ All the patients were successfully treated without any complications and completed the follow-up.

Our study found no significant difference in mean Pocket Probing Depth (PPD) between Group 1 and Group 2, contrasting with **Bittencourt et al.** findings where significant improvements were noted post-treatment. This discrepancy may be due to differing baseline PPD levels between studies.

In our study, both Group A and Group B showed statistically significant improvements in Clinical Attachment Level (CAL) from baseline to 3 months. However, intergroup comparisons revealed no significant differences at the same time intervals. These findings are consistent with **Bittencourt et al.** study, where significant CAL improvements were observed within both treatment groups for Miller Class I gingival recession defects.

Our study showed significant reductions in Gingival Recession (GR) within both Group 1 and Group 2. However, intergroup comparisons did not reveal any statistically significant differences at baseline or at 3 months. These

findings align with **Rana et al.** study, which similarly demonstrated significant improvements in GR scores within both groups (CAF vs SCRF with sutures) for Miller's Class I gingival recession at the 3-month.

In our study, both Group 1 and Group 2 demonstrated statistically significant increases in Width of Keratinized Gingiva (WKT) from baseline to 3 months. However, no significant differences were found between Group 1 and Group 2 in WKT scores at either time point. These findings mirror those of **Govindasamy et al.** who investigated CAF versus SCRF with a surgical microscope for Miller's Class I gingival recession and similarly observed significant improvements in WKT scores within both treatment groups at 3 months.

In our study, both Group 1 and Group 2 showed significant improvement in Wound Healing Index (WHI) scores from 7 days to 3 months within each group. Furthermore, Group 2 exhibited significantly better WHI scores compared to Group 1 at 7th day & 3 months. These findings are consistent with **Santana et al.** research, which similarly demonstrated significant improvements in WHI scores within both groups at the 3-month follow-up.

The results of the present study suggest that the Semilunar Coronally Repositioning Flap with or without microscope can be successfully used in the treatment of Miller's Class I and Class II gingival recession with predictable root coverage as there was significant improvement in both the groups in terms of Clinical Attachment Level, Gingival Recession Height and Keratinized Tissue Height at 3 months follow-up. However, no significant difference was seen in terms of Probing Pocket Depth, Clinical Attachment Level, Gingival Recession Height and Keratinized Tissue Height between Group 1 & Group 2 at baseline and 3 months. Though, significant difference was seen in Wound Healing Index in Group 1 & Group 2 at 7th day & 3 months.

This study's limitations include inability to achieve complete 100% root coverage with the SCRF technique, even with a surgical microscope, and a short 3-month follow-up period. Additionally, it did not compare with other root coverage procedures. SCRF is limited to shallow gingival recessions and is feasible primarily in maxillary teeth with a thick gingival biotype. Future research should involve long-term studies comparing SCRF with other techniques to address these shortcomings comprehensively.

Conclusion:-

This study assessed SCRF's effectiveness with or without a surgical microscope for Miller's Class I and Class II gingival recession. Both groups showed improvements in clinical parameters like PPD, CAL, WKT, and GR, but significant differences were noted in WHI, favoring SCRF with a microscope for better wound healing outcomes. These results indicate both methods are effective for root coverage, with SCRF under a microscope potentially offering superior wound healing benefits. Larger, longer-term studies are needed to confirm these findings definitively.

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