Comparative evaluation of multiple recession coverage procedures with mucogingival area as a prognostic factor: A randomized controlled clinical trial

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INTRODUCTION

Soft tissue recession, defined as exposure of the root surface caused by apical shift of the gingival margin, results in an unesthetic appearance, root hypersensitivity, and root caries. The treatment of choice for recession coverage should address the biological as well as the patients’ esthetic demands. More recent studies pointed out the importance of flap tension and flap thickness on clinical outcome of the coronally advanced flap. Other factors could be involved in the final outcome of the various surgical procedure; for example, the area and/or height of the interdental papilla might influence the final clinical outcome. Hence, the aim of the study was to compare and evaluate the multiple recession coverage procedures with mucogingival area as a prognostic factor.

Abstract

Background: Denuded root surface may give rise to dentin hypersensitivity, deterioration in the esthetic appearance, and inability to perform proper oral hygiene procedure. Hence, various surgical procedures have been proposed to overcome the problem of gingival recession. Hence, the aim of the study was to perform recession coverage procedures and thereafter to compare the height, width, and thickness of the interdental papilla postoperatively.

Materials and Methods: Thirty patients were selected with Miller’s Class I/Class II localized gingival recession in the maxillary or mandibular anterior region (age 20–50 years) with the presence of buccal gingival recession (≥2 mm). The baseline measurements of height, width, and thickness of the interdental papilla were measured with a standardized vernier caliper, and width of keratinized gingiva, probing pocket depth, and clinical attachment level were measured with a UNC 15 probe. Mucogingival surgical procedures were performed and evaluated postoperatively up to 6 months.

Results: The amount of root coverage was significantly correlated with the interdental papilla.

Conclusion: This study indicates that the various recession coverage procedures did not affect the papilla dimension however, recession coverage was seen with lower height of the interdental papilla.

Keywords: Gingival recession, gingival height, recession coverage, vernier caliper, width and thickness of the interdental papilla
MATERIALS AND METHODS

The study performed was a randomized double-blinded clinical trial, in which 30 patients aged between 20 and 50 years of age, with Miller’s Class I and Class II gingival recession defects, were selected from the department of periodontology. The inclusion criteria for this study were (1) systemically healthy patients, (2) presence of maxillary and mandibular buccal recession in the anterior region up to canine, (3) tooth vitality, and (4) absence of grooves, restoration, and caries in the area to be treated [Flowchart 1].

Oral hygiene instruction was given to eliminate the cause of recession. Scaling and root planing was performed followed by oral hygiene instructions. Only patients with full-mouth and local plaque scores <20% and full-mouth and local bleeding scores of <15% in the index proposed by O’Leary et al. throughout the study period were included in the study.

Clinical measurements

The following clinical measurements were taken at the facial aspect of the selected teeth 1 week before surgery (baseline) and repeated after 3 and 6 months postoperatively:

- Gingival recession depth (RD) measured from the cementoenamel junction (CEJ) to the most apical extension of the gingival margin
- Probing depth (PD) measured from the gingival margin to the bottom of the gingival sulcus
- Gingival RD and PD measured by William’s periodontal probe [Figure 1a]
- Thickness of the papilla measured using an endodontic file at the center of the papilla with an imaginary line connecting the apex of the papilla to a midpoint on the base of the papilla [Figure 1b]
- Papilla height measured as the perpendicular distance from the apex of the papilla to an imaginary line connecting the CEJ of the teeth adjacent to the papilla [Figure 1c]
- Papilla base measured as the distance of the line connecting the CEJ of the involved tooth and the CEJ of the mesial or distal adjacent tooth [Figure 1d]
- Papillary height and base measured by the standardized vernier caliper [Figure 2].

Surgical procedure

All the gingival recession defects were treated by different surgical techniques:

- Free gingival graft technique was performed on nine patients [Figure 3a-c]
- Lateral pedicle flap technique was performed on nine patients [Figure 4a-c]
- Coronally advanced flap technique was performed on nine patients [Figure 5a-c].
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**Postsurgical follow-up**
Antibiotic therapy (amoxicillin 500 mg, TDS) and suitable analgesic were prescribed for 5 days. Chlorhexidine mouthwash (0.12%) was prescribed for 14 days. Toothbrushing was discontinued for the first 2 weeks in the surgical site. After the 1st week, the area was gently debrided with a cotton swab. After the 2nd week, the patient was instructed to use a soft toothbrush with a roll technique followed by a 60 s rinse with chlorhexidine digluconate.

**Statistical analysis**
The difference between the preoperative baseline and 6-month postoperative measurements within each group was examined by the one-way ANOVA test. The clinical measurements analyzed were RD, PD, papilla height, papilla width, and thickness of the papilla.

**RESULTS**
The clinical measurements, in case of free gingival graft, i.e., the pocket depth reduction at baseline is 1.66 ± 0.516 and after 6 months is 0.243 ± 0.453 with $P$ value being not statistically significant, whereas the gingival recession is 1.91 ± 0.20 at the baseline and is 2.45 ± 0.56 after 6 months with $P = 0.0112$.

In coronally advanced flap, the pocket depth reduction at baseline is 1.8 ± 0.421 and after 6 months is 2.3 ± 5.89 with $P$ value being not statistically significant, whereas the gingival recession ranges from 1.45 ± 0.43 to 2.5 ± 0.40 with $P = 0.0094$.

In lateral pedicle flap surgery, at baseline and after 6 months, the pocket depth decrease ranges from 1.6 ± 0.547 to 2.34 ± 0.547 with $P$ value being not statistically significant, and the gingival recession ranges from 1.8 ± 0.273 to 2.5 ± 0.63 with $P = 0.252$ [Table 1].

As the result shows that after these surgeries, there is nonsignificant decrease in pocket depth and increase in recession coverage; however, the height, base, and thickness of the interdental papilla remain unchanged.

**DISCUSSION**
The purpose of this study was to determine the effectiveness of different mucogingival surgical procedures for root coverage procedure for Miller’s Class I recession. The major therapeutic goals of mucogingival surgery are esthetics, treatment of hypersensitivity, and prevention root surface caries. Miller defined complete root coverage

![Figure 4](image)
![Figure 5](image)

Table 1: Comparison between different surgeries

| Clinical parameters | FGG | CAF | LPF |
|---------------------|-----|-----|-----|
|                     | Baseline | After 3 months | After 6 months | $P$ | Baseline | After 3 months | After 6 months | $P$ | Baseline | After 3 months | After 6 months | $P$ |
| PD                  | 1.66±0.516 | 0.26±0.516 | 0.243±0.453 | NS | 1.8±0.421 | 2.8±0.421 | 2.3±0.58 | NS | 1.6±0.547 | 2.6±0.547 | 2.34±0.547 | NS |
| G.R                 | 1.91±0.20 | 2.33±0.25 | 2.45±0.56 | 0.0112 | 1.45±0.43 | 2±0.40 | 2.5±0.40 | 0.0094 | 1.8±0.273 | 2.5±0.50 | 2.6±0.63 | 0.252 |
| Base of I.P         | 2.5±0.54 | 1.25±0.41 | 1.01±0.25 | NS | 2.4±0.214 | 1.6±3.94 | 1.3±3.94 | NS | 2.8±0.4472 | 1.2±0.273 | 1.09±0.273 | NS |
| Height of I.P       | 2.66±0.516 | 1.667±0.516 | 1.55±0.413 | NS | 1.8±0.258 | 1.2±0.258 | 1.2±0.256 | NS | 2±0.2144 | 2±1.944 | 2±1.20 | NS |
| Thickness of I.P    | 2.33±0.516 | 1.25±0.273 | 1.11±0.187 | NS | 2.4±0.516 | 1.5±0.471 | 1.3±0.471 | NS | 2.5±0.5774 | 1.25±0.288 | 1.25±0.274 | NS |

FGG: Free gingival graft, CAF: Coronally advanced flap, LPF: Lateral pedicle flap, PD: Probing depth, GR: Gingival recession, I.P: Interdental papilla, NS: Not significant

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as the location of soft-tissue margin at the CEJ, presence of clinical attachment to the root, sulcus depth of 2 mm or less, and absence of bleeding on probing. This study is part of a series of investigation which evaluates the factors which influence the clinical outcome different surgical procedure for recession coverage and its effect on the interdental papilla.

Nieri M et al. studied that the importance of flap thickness and flap tension was explored. Flap thickness of >0.8 mm was associated with 100% of root coverage and higher flap tensions (4–11 g) before suturing were associated with a lower recession reduction, whereas minimal flap tensions (0–4 g) were often associated with a complete root coverage.

Pini Prato et al. in 2001 studied that the dimensions of the interdental papilla may be the prognostic factor for clinical outcome of the coronally advanced flap in the treatment of gingival recession and concluded that root coverage followed by the coronally advanced flap procedure is not significantly correlated to the interdental papilla.

According to Olsson et al., the base of the papilla is a line connecting the most apical point of the gingival margin (APGM) of a tooth with APGM of the adjacent tooth in healthy individuals. The height of the interdental papilla is measured from the top of the papilla to the base of the papilla. In case of recession, the measurements are different, so in this study, the measurements were done by standardized vernier caliper.

Systemic antibiotics are used as an adjunct to periodontal surgery for the prevention of postsurgical infections. Routine use of systemic antimicrobials following periodontal surgery is not justified as the prevalence of postoperative infections is <1%. The rationale of using antibiotics is to increase the predictability of results by controlling the subgingival microflora to prevent postoperative infection. Matsko and Bissada in 1993 studied 11 patients with recurrent periodontitis and demonstrated subgingival infection with *Aggregatibacter actinomycetemcomitans* and *Porphyromonas gingivalis*. Therapy consists of doxycycline 200 mg on the 1st day and 100 mg 4 days thereafter and then amoxicillin/clavulanate potassium 500 mg three times daily for 5 days. A beneficial and positive effect was evidenced by the gain in probing and attachment level and reduction in PD. Clinical and experimental evidence seems to suggest that chlorhexidine enhances wound healing, reduces complications, and improves clinical parameters following periodontal surgery. The limitation of this study was that as the manual vernier caliper was used, it showed some error in measurements. Endodontic file was used to check the thickness of interdental papilla, and it leads...
to the tearing of flap during surgeries, so further studies are required with larger sample size and on the effect of chlorhexidine on soft tissues.

**CONCLUSION**

In the present study, gingival recession coverage procedure was performed using different mucogingival surgeries, and we found that there is reduction in pocket depth and increase in the root coverage as there is no significant difference seen between the base, height, and thickness of interdental papilla at baseline and after 3- and 6-month follow-up period.

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**Conflicts of interest**

There are no conflicts of interest.

**REFERENCES**

1. Tugnait A, Clerehugh V. Gingival recession-its significance and management. J Dent 2001;29:381-94.
2. Nowzari H. Aesthetic periodontal therapy: Introduction. Periodontol 2000 2001;27:7.
3. Chambrone L, Sukekava F, Araújo MG, Pustiglioni FE, Chambrone LA, Lima LA, et al. Root-coverage procedures for the treatment of localized recession-type defects: A Cochrane systematic review. J Periodontol 2010;81:452-78.
4. Miller PD Jr. A classification of marginal tissue recession. Int J Periodontics Restorative Dent 1985;5:8-13.
5. O’Leary TJ, Drake RB, Naylor JE. The plaque control record. J Periodontol 1972;43:38.
6. Nicri M, Rotundo R, Franceschi D, Cairo F, Cortellini P, Pini Prato G. Factors affecting the outcome of the coronally advanced flap procedure: A Bayesian network analysis. J Periodontol 2009;80:405-10.
7. Pini Prato GP, Baldi C, Nicri M, Franceschi 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.
8. Olsson M, Lindhe J, Marinello CP. On the relationship between crown form and clinical features of the gingiva in adolescents. J Clin Periodontol 1993;20:570-7.
9. Pack PD, Haber J. The incidence of clinical infection after periodontal surgery. A retrospective study. J Periodontol 1983;54:441-3.
10. Matisko MW, Bissada NF. Short-term sequential administration of amoxicillin/clavulanate potassium and doxycycline in the treatment of recurrent/progressive periodontitis. J Periodontol 1993;64:553-8.
11. Lambert PM, Morris HF, Ochi S. The influence of 0.12% chlorhexidine digluconate rinses on the incidence of infectious complications and implant success. J Oral Maxillofac Surg 1997;55:25-30.