

Treatment of Human Gingival Recession by Coronally Positioned Flap Procedure with or without GTR: A Clinical study

Santhi Priya Potharaju^{1*} Santha Kumari Prathypaty² Ravi Kanth Chintala³ D Sunil Kumar⁴ Y. Durga Bai⁵ Jai Krishna Srikanth Kolliboina⁶

¹Assistant Professor, Department of Periodontology and Oral Implantology, Government Dental College and Hospital, Hyderabad, India.

²Professor and Head, Department of Periodontology and Oral Implantology, Government Dental College and Hospital, Hyderabad, India.

³Graded Specialist, AD Corps. Pune, Maharashtra, India.

⁴Reader, Department of Periodontology and Oral Implantology, Government Dental College and Hospital, Hyderabad, India.

⁵Associate Professor, Department of Periodontology and Oral Implantology, Government Dental College and Hospital, Hyderabad, India.

⁶MHA, Central Michigan University. Michigan, United States.

ABSTRACT

Background: The purpose of this study was to clinically evaluate and compare the outcome of Coronally positioned flap (CPF) procedures in the treatment of Millers Class I and Class II gingival recession with or without the supportive effect of a type I collagen bioabsorbable membrane, BIOMEND REGULAR. (Sulzerdental, USA)

Methods: A total of 30 sites from 15 patients were selected and divided in to Experimental Site A (Coronally Positioned Flap alone) and Experimental Site B (Coronally Positioned flap + Biomend Regular). The clinical parameters such as Recession Depth, Recession Width, Width of Keratinized Gingiva Clinical Attachment Level and root coverage percentage were recorded at baseline, 3months and 6 months postoperatively.

Results: Both treatments resulted in a significant gain in root coverage with a mean of 73.13% and 71.60% respectively (Experimental site A and Experimental Site B). There was no significant difference between the two groups with significant increase within the group.

Conclusion: Combination of CPF with bio resorbable membrane doesn't seem to improve the results when compared. However, both the treatments resulted in achieving the root coverage.

Keywords: Coronally Positioned Flap, Gingival Recession, Guided Tissue Regeneration, Collagen Membrane.

INTRODUCTION

One of the toughest challenges faced by the Periodontist's is the achievement of predictable root coverage of denuded root surfaces. The origin of these procedures began in 1980s¹. Gingival recession is defined as the displacement of the marginal tissue apical to the cemento-enamel junction⁴. Root coverage procedures aim at achieving soft tissue gain, reduction in sensitivity and improvement of aesthetics.² The treatment of buccal recession is focused on reshaping the

gingival architecture with or without efforts to increase the amount of keratinized tissue. The rationale for treating buccal recessions is mainly to address esthetic concerns³.

Gingival recession type defects have been treated by a number of procedures including coronally or laterally positioned pedicle grafts, rotational flaps, epithelialised free tissue grafts, connective tissue grafts and by applying principles for guided tissue regeneration (GTR). The rationale behind usage of GTR in the present study is to

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*Correspondence Dr. Santhi Priya Potharaju.

Department of Periodontology and Oral Implantology, Government Dental College and Hospital, Hyderabad, India.

Email: drpriyatweety@gmail.com



Fig 1: Armamentarium.

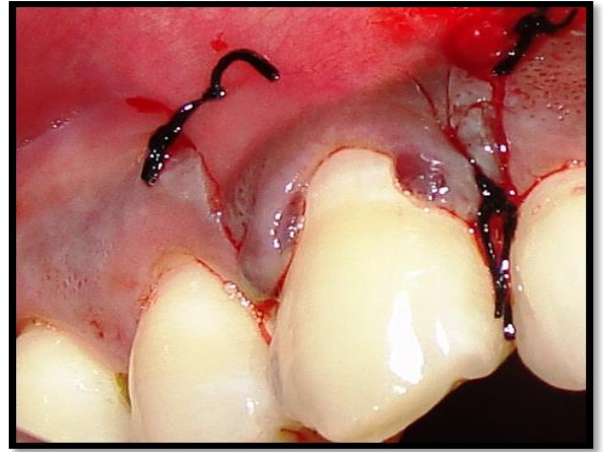


Fig 4: Experimenta site A: coronally positioned flap.



Fig 2: Experimental site A Recession of canine.

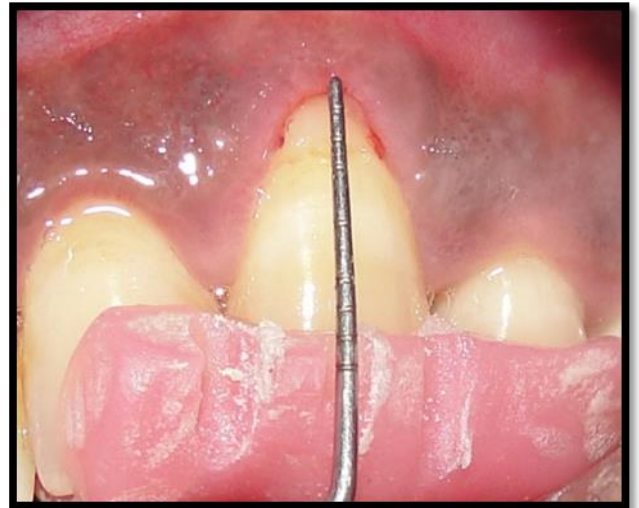


Fig 5: Experimenta site B. Gingival Recession.

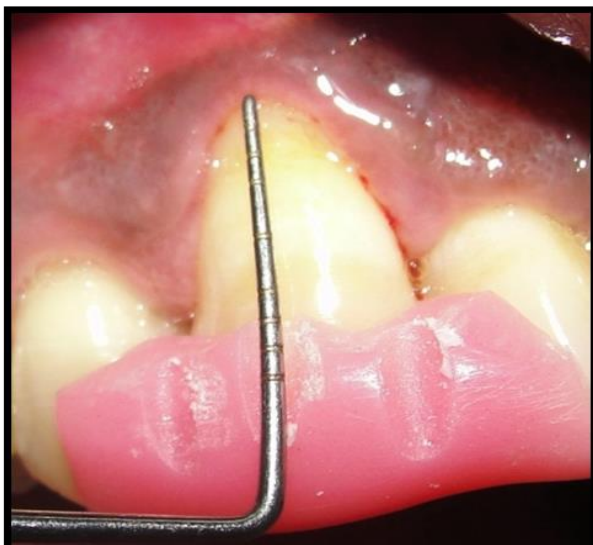


Fig 3: Experimenta site A: Clinical attachment loss with William's periodontal probe and stent.



Fig 6: Experimenta site B. GTR membrane Biomend placed.

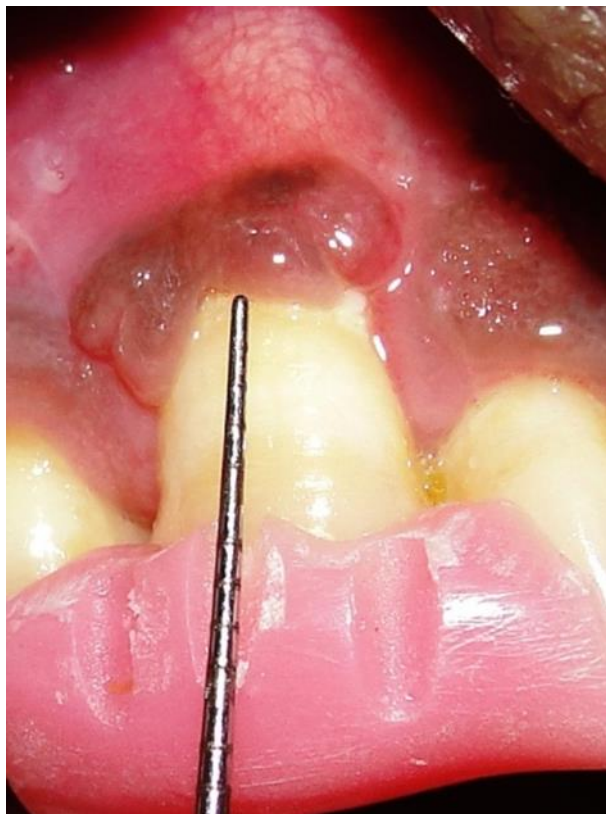


Fig 7: Experimental site A after 6 months.



Fig 8: Experimental site B after 6 months.

achieving periodontal regeneration rather than connective tissue repair⁴.

The aim of the present study is to examine the outcome of Coronally repositioned flap procedures in the treatment of Miller's class I and class II

gingival recessions with or without the supportive effect of a bioabsorbable periodontal membrane i.e., Biomend has been done.

MATERIALS AND METHODOLOGY

The patients for this study were selected from the outpatient section Department of Periodontia, Govt. Dental College and Hospital, Hyderabad. Inclusion criteria include patients with the age group of 20-55 years of both genders, good systemic health and gingival recession defects with Miller's Class I or Class II measuring ≥ 3 mm either on cuspids or 1st & 2nd premolars one in each quadrant or on Contralateral sides of same arch. (upper or lower jaw). Patients with orthodontic appliances, bone loss, history of drug allergy, smoking and unable to perform routine oral hygiene procedures were excluded from the study. A total of 30 sites from 15 patients were selected and divided into Experimental Site A and Experimental Site B according to the type of treatment rendered by using split mouth design (Fig.2). Clinical parameters were recorded pre-operatively, at baseline, and post-operatively. Clinical attachment level and Gingival Recession depth and Gingival Recession width were recorded at 3 months and 6 months post-operatively. Root Coverage Percentage was recorded at baseline and 6 months

Clinical measurements: All the measurements were standardized using customized acrylic stents with vertical grooves at the defect sites to aid in probe penetration in the same plane every time. The recordings were made by William's graduate probe. The apical limit of the groove was used as the fixed reference point for clinical attachment level and gingival recession measurement. The Williams graduated probe was inserted through the groove and markings were made at fixed reference point of the stent. The Clinical attachment level was measured from a fixed reference point to the base of the pocket with the help of William's probe using the acrylic stent (Fig. 3&5). The Gingival recession depth was measured from a fixed reference point to the most apical margin of the gingiva and width, between the ends of gingival margin with the help of William's graduated periodontal probe. BIOMEND REGULAR (Type I collagen) is a bioabsorbable membrane,

Table 1: Comparison of group A and group B with respect to Recession Depth scores at baseline, 3 months and 6 months by Mann-Whitney U test.

Time	Group	Mean	SD	Median	U-value	Z-value	P-value
Baseline	Group A	3.27	0.46	3.0			
	Group B	3.33	0.49	3.0	105.00	-0.3111	0.7557
3 months	Group A	1.07	1.03	1.0			
	Group B	1.07	0.96	1.0	112.00	-0.0207	0.9835
6 months	Group A	1.27	1.03	1.0			
	Group B	1.33	1.05	1.0	108.00	-0.1867	0.8519

Table 2: Comparison of group A and group B with respect to Recession Width scores at baseline, 3 months and 6 months by Mann-Whitney U test.

Time	Group	Mean	SD	Median	U-value	Z-value	P-value
Baseline	Group A	3.80	0.77	4.0			
	Group B	3.73	0.70	4.0	108.00	-0.1867	0.8519
3 months	Group A	1.20	1.08	1.0			
	Group B	1.20	1.01	1.0	112.00	-0.0207	0.9835
6 months	Group A	1.33	1.11	1.0			
	Group B	1.27	1.03	1.0	109.50	-0.1244	0.9010

Table 3: Comparison of group A and group B with respect to width of keratinized gingival scores at baseline, 3 months and 6 months by Mann-Whitney U test.

Time	Group	Mean	SD	Median	U-value	Z-value	P-value
Baseline	Group A	3.00	0.00	3.0			
	Group B	3.00	0.00	3.0	112.50	0.0000	1.0000
3 months	Group A	3.67	0.62	4.0			
	Group B	3.60	0.63	4.0	105.50	-0.2903	0.7716
6 months	Group A	3.27	0.59	3.0			
	Group B	3.13	0.64	3.0	99.50	-0.5392	0.5897

Table 4: Comparison of group A and group B with respect to clinical attachment loss scores at baseline, 3 months and 6 months by Mann-Whitney U test.

Time	Group	Mean	SD	Median	U-value	Z-value	P-value
Baseline	Group A	5.07	0.70	5.0			
	Group B	5.13	0.83	5.0	110.50	-0.0830	0.9339
3 months	Group A	2.93	1.22	3.0			
	Group B	2.87	1.30	3.0	109.00	-0.1452	0.8846
6 months	Group A	3.13	1.25	3.0			
	Group B	3.13	1.41	3.0	112.50	0.0000	1.0000

Table 5: Comparison of group A and group B with respect to root coverage percentage scores by Mann-Whitney U test.

Group	Mean	SD	Median	U-value	Z-value	P-value
Group A	73.13	25.58	77.00			
Group B	71.60	25.89	72.00	108.50	-0.1659	0.8682

made up from bovine deep flexor (Achilles) tendon which that serves as a matrix for proliferation of slower growing osteogenic cells to the site. It has an effective pore size of 0.004 microns, which will effectively retard epithelial down growth during early phases of healing. Being semi occlusive, it allows essential nutrients to pass through the membrane. Biomend Regular incorporates into the surrounding tissue and is completely absorbed within 18 weeks.

Surgical procedure: Two weeks after phase I therapy, oral hygiene and tissue response were evaluated and informed consent was taken from each patient. On completion of baseline examination and through initial therapy, recession defects (Fig. 2) were randomly assigned as either experimental site A or experimental site B. Required armamentarium is shown in Fig. 1.

The patients were asked to rinse with 10ml of 0.2% Chlorhexidine digluconate solution. The operative site was anaesthetized with 2% xylocaine HCL with adrenaline (1:80,000), using block and infiltration techniques. Horizontal incisions were given on the facial side on either sides of the tooth involved at CEJ, followed by the crevicular incisions and vertical releasing incisions using Bard Parker handle no: 3 with blades #15 and # 12. The interdental papillary tissue was retained as much as possible. A full thickness mucoperiosteal flap was reflected upto mucogingival junction followed by a partial thickness flap, using the periosteal elevators. After reflection of the flap root planing was done using scalers and curettes. The surgical site was thoroughly irrigated with normal saline.

At site A the elevated mucoperiosteal flap was positioned coronally to cover the root surface. At site B the elevated mucoperiosteal flap was held with a tissue holding forceps. Type I collagen GTR membrane (Biomend Regular) was placed over the recession defect and covered by a coronally

advanced flap (Fig. 4). Exact size of Biomend Regular GTR membrane was cut with the help of a trimmed sterile template. Later membrane was placed directly over the recession defect in such a way that is completely covered the defect and extended a minimum of 2-3mm beyond the recession defect apically, mesially and distally (Fig. 6).

The mucoperiosteal flaps were repositioned and secured in place using the black braided (5-0) Mersilk Ethicon non resorbable sutures. A "double-loop sling suture" was applied by passing the thread twice around the contact point and then pulling it back and finally tying the knot buccally. Interrupted sutures were placed on the vertical incision. Periodontal coe-pack was placed over the surgical site and postoperative instructions were given. The patients were recalled after 24 hours of surgery, 1month, 3months and 6 months(Fig. 7&8).

RESULTS

A total of 30 sites from 15 patients (12 males and 3 females) were selected for the study in the age group of 20-55 years. All the clinical parameters recorded at baseline, 3 months and 6 months (except root coverage which was measured at baseline and 6 months) were subjected to the following statistical analysis. For intragroup variations, paired t-test and for comparison between the two groups / inter-group variations an analysis of variance all the parameters. There was significant difference statistically within the group, but no difference statistically in between the two groups from base line to 6 months with respect to all parameters and explained according to their Tables (I to V) and Graphs (I to V).

DISCUSSION

Complete coverage of the denuded root surface in an esthetic and naturally appearing

manner is the ultimate goal of periodontal plastic surgical procedure. Coronally advanced flap technique is reported to be most successful technique in predictability and clinical effectiveness of root coverage.⁵ Coronally advanced flap mainly heals by a long junctional epithelium with a limited amount of bone and cementum formation. GTR based root coverage has emerged as an alternative treatment because it also demonstrate histologically new attachment formation.⁶

Tinti and Vincenzi (1992) initially proposed guided tissue regeneration- based root coverage.⁷ In the mid-1970s, Melcher presented the basic postulates which formed the biologic basis for GTR and suggested that the periodontal tissue groups in the periodontium (the gingival epithelium, the gingival connective tissue, the alveolar bone and the periodontal ligament) had the potential to express a unique cell phenotype, and that the type of healing which resulted following periodontal therapy was dependent upon the phenotype of the cells which first repopulated the root surface⁸. A significant disadvantage of non-resorbable membranes is the necessity of a second surgical procedure to remove the barrier. Therefore more recent studies have focused on the use of bioabsorbable barriers which compose of porcine or bovine collagen, polyglactic acid, polylactic acid, or copolymers of these components.⁹

The rationale of using collagen membrane for root coverage include: Proven barrier function, bioabsorbable, chemotactic function for periodontal ligament fibroblasts and gingival fibroblasts, haemostatic properties¹⁰ weak immunogenicity, easy manipulation, ability to augment tissue thickness by providing a collagenous scaffold, promoting wound healing through clot stabilization, wound stability and hemostasis.¹¹ Hence collagen material appears to be an ideal choice for an absorbable GTR barrier. This observation is in agreement with Blumenthal.¹²

The overall treatment plan was discussed in detail with all the patients participating in the study, and a written consent was taken from the selected patients. This was done to avoid misconception and misunderstanding about the treatment. It also helped the clinician to get the patients for the regular recall visits. On inter group

comparison, the difference in mean of all the parameters were statistically not significant both from baseline to 3 months and from 3 months to 6 months. Both recession depth and recession width are in accordance with the study done by Evandro S. Amarante, Knut N. Leknes, Johanne Skavland and Tryggve Lie.³ In the present study, the post operative mean gain in the width of keratinized gingiva findings were in accordance with the studies done by Evandro S. Amarante, Knut N. Leknes, Johanne Skavland and Tryggve Lie.³ Clinical attachment level (CAL) is an important clinical parameter which is in accordance with the studies done by Huang H.L, E.F. Neiva R, and Wang H.L in 2005^{13, 14}.

In the present randomized clinical study, the mean root coverage observed for the experimental site A and Experimental site B at 6 months was 71.5 ± 23.2 and 69.2 ± 24.4 . There was no statistical significance obtained between both the experimental groups regarding mean root coverage. These findings were in accordance with the studies done by Evandro S. Amarante, Knut N. Leknes, Johanne Skavland and Tryggve Lie in 2000¹³.

BioMend Regular is an FDA approved resorbable barrier product, prepared from purified bovine Achilles tendon by a company Sulzer Calcitek, Carlsbad, CA. BioMend is 100% type I collagen. Resorption rate is 6-8 weeks, which is sufficient for preventing apical migration of epithelium during early periodontal wound healing, since the critical time for epithelial proliferation occurs within first 14 days. The main advantages of Biomend Regular are a) biocompatibility b) no inflammatory reaction, c) totally resorbed, degraded and eliminated d) easy to handle, cut, contour and adapt e) maintains desired shape and configuration f) easily secured in place. This particular collagen membrane is semi permeable allowing nutrient and fluid passage to cells on either aspects of the barrier. No post-operative complications were noticed. Hence the use of this membrane in combination with coronally advanced flap represents a novel approach in the mucogingival therapy. The limitation of the present study is the histological evaluation which was not done due to ethical considerations.

CONCLUSION

Both the treatment modalities (CPF and CPF+ BioMend Regular) are useful surgical modalities for the treatment of gingival recession with proper case selection. There is no significant statistical difference between both the groups.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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