



## **Bracket Assisted Treatment of Multiple Gingival Recession Using Placental Membrane- A One Year Follow up Case Series**

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### **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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**Case Study**

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### **ABSTRACT**

Gingival recession is the apical migration of the junctional epithelium with exposure of the root surface. The treatment of buccal gingival recession is a common requirement due to esthetic concern or root sensitivity. Several surgical techniques have been proposed to treat gingival recession. The literature has documented that gingival recession can be successfully treated by means of several mucogingival surgical approaches irrespective of the technique utilized, provided that the biologic conditions for accomplishing root coverage are satisfied with no loss of soft and

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hard tissue height interdentally. The treatment of multiple adjacent recession type defect (MARTD) show some differences when compared with a single type of recession. The following is a case series of three patients for evaluating the efficacy of modified approach of the coronally advanced flap with guided tissue regeneration membrane (GTR) (Amnion, Tata Memorial, Mumbai) for treating multiple adjacent gingival recession type defect assisted by orthodontic brackets.

*Keywords: Coronally advanced flap; MARTD; suspensory sutures; orthodontic bracket; root coverage.*

## 1. INTRODUCTION

Gingival recession is a common and undesirable condition [1,2], affecting almost all middle and older aged individuals to some extent [3], characterized by root exposure due to the displacement of gingival margin apically from the cemento-enamel junction (CEJ) [4,5] or from the former location of the cemento-enamel junction where restoration have distorted the location or appearance of the cemento-enamel junction [6]. The etiopathogenesis of gingival recession is multifactorial. Several factors may play a role in recession development, such as injudicious tooth brushing, destructive periodontal disease, tooth malpositioning, alveolar bone dehiscence, thin marginal tissue covering a non-vascularized root surface, aberrant muscle attachment, frenal pull and occlusal trauma. Other causative factors that have been reported are iatrogenic factors related to reconstructive, conservative, orthodontic, prosthetic and periodontal treatment [7]. It results in root exposure which leads to clinical problems such as root surface hypersensitivity, root caries, cervical root abrasions, difficult plaque control and diminished aesthetic/cosmetic appeal [8]. Clinicians are challenged to achieve outcomes that meet these exacting standards, and therefore need a sound, clinically oriented and scientifically supported decision-making process to plan the therapeutic approach, to predict the outcome and, finally, to achieve it [9].

Different surgical techniques have been introduced to treat gingival recession, including free gingival graft (Lindhe et al. 2008; Sullivan and Atkins 1968), the coronally advanced flap (Allen and Miller, 1989), the coronally advanced flap with connected tissue graft (Langer and Langer 1985), CAF and without vertical releasing incisions (Zucchelli et al. 2009) and various regenerative techniques, including the use of non resorbable membrane (Prato et al. 1992), absorbable membrane (Roccuzzo et al. 1996), enamel matrix derivative (Rasperini et al. 2000), and a platelet-containing gel with a coronally displaced flap [10].

The literature has documented that gingival recession can be successfully treated by means of several mucogingival surgical approaches irrespective of the technique utilized, provided that the biologic conditions for accomplishing root coverage are satisfied with no loss of soft and hard tissue height interdentally [11,12]. Also another important thing to be taken into consideration is that functional aspects of root coverage may be controversial, but the cosmetic aspect and satisfaction is not debatable.

The treatment of multiple adjacent recession type defect (MARTD) show some differences when compared with a single type of recession. In MARTD, as the area of surgical operation is multiple, it is important that the technique to be used must be practical, not take long time and second operation area allow all gingival defects to be corrected simultaneously with the soft tissue close to the defects themselves [13]. It is important to protect and to achieve the most possible coronal position of the gingival margin during early healing period with routine periodontal plastic surgical techniques.

The aim of this three patient observational case series was to evaluate the efficacy of modified approach of the coronally advanced flap with guided tissue regeneration membrane (GTR) (Amnion, Tata Memorial, Mumbai) for treating multiple adjacent gingival recession type defect (MARTD) assisted by orthodontic brackets. This modification is combination of three techniques of recession coverage proposed by Norberg [12] (conventional coronally advanced flap), Prato P et al. [14] (GTR membrane) and Zucchelli and De Santis [15].

## 2. MATERIALS AND METHODS

Three systemically healthy male patients reported to the Department of Periodontology, with chief complaint of receding gums. On clinical examination multiple adjacent Miller's Class I and II gingival recession having adequate width of attached gingiva with Modified Norland and Tarnow Class I papillary recession [16] was observed. Patients were made aware of the

papillary recession defect. However the patients were not willing for the treatment of papillary recession and were more concerned for the treatment of gingival recession. Thus the root coverage procedure was thereby planned. Ethical clearance was granted by the committee. Patients were explained about the procedure and were included in the study with their consent.

## 2.1 Presurgical Treatment

Patients were educated and motivated, with an emphasis on proper oral hygiene maintenance and underwent initial phase of treatment, which consisted of scaling and root planing.

## 2.2 Measurements

All measurements were performed by one examiner. The participants were evaluated for the following clinical parameters; gingival recession depth (RD), probing depth and clinical

attachment level (CAL), at baseline, 3 month, 6 month and 12 months. A customized acrylic occlusal stent was fabricated with cold cure acrylic resin. Vertical groove was made on the midbuccal aspect. The graduated periodontal probe (UNC-15) was placed in the stent groove to record clinical parameter. This ensured accuracy and reproducibility of reading. Gingival recession depth measured as the distance between the most apical point of the CEJ and the gingival margin. Probing depth was measured as the distance between gingival margin to the bottom of the sulcus and clinical attachment level was measured as the distance from CEJ to base of the sulcus.

## 2.3 Surgical Procedure

Measurements at baseline were recorded, and the surgical area was prepared with adequate anesthesia using 2% lignocaine hydrochloride containing 1:2,00,000 adrenaline (Xylocaine)®.



**Fig. 1A and B. Preoperative measurement of gingival recession depth w.r.t #21 and #23. C: Intracrevicular incision and vertical incision on distal aspect of canone. D. Partial thickness flap elevated with Ward's mucoperiosteal elevator. E. Orthodontic brackets and trimmed amnion membrane placement. F. mucoperiosteal membrane advanced coronally and secure with suspensory sutures with Orthodontic brackets and interdental papilla secured with interrupted sutures**



**Fig. 1G. 1 year post operative**



**Fig. 2. Preoperative measurement of gingival recession defect wr.t 23. B. Intracrevicular incision. C. Partial full partial thickness flap raised with mucoperiosteal elevator. D. Orthodontic brackets and trimmed amnion membrane placement. E. Suturing. F. 1 year postoperative**



**Fig. 3A. Gingival recession w.r.t. #11, #12, #13. B. Preoperative measurement of gingival recession with UNC-15 Probe. C. Intracrevicular incision. D. Mucoperiosteal flap elevated. E. Orthodontic bracket placed and there after am-nion membrane will be placed. F. One year postoperative**

Modified coronally positioned flap procedure was performed in all patients. An intrasulcular incision was made using 15 no. blade on the buccal aspects of the involved teeth (teeth with multiple adjacent recession). This incision extended horizontally mesiodistally to involve the buccal aspect of the involved tooth. Vertical incision was given at line angle upto mucogingival junction in the distal aspect only, not on the mesial aspect. This vertical incision involved the adjacent papilla. A triangular partial full partial thickness (split full split) flap was raised beyond mucogingival junction with Ward's mucoperiosteal elevator. On mesial aspect, no vertical incision was given but the gingiva was undermined so that the gingival tissue passively covered the recession defect and should be positioned coronal to gingival margin.

After partial full partial thickness flap was raised, root planning was done with Gracey curettes. Immediately after root planning root biomodification was done with tetracycline HCl solution (50-150 mg/ml, Isik et al. 2000), it was burnished over root for 3-5 minutes. The area was rinsed thoroughly. Before placing the GTR membrane (Amnion) and suturing the flap, orthodontic brackets (Begg's 0.002") were applied on each of the respective teeth with flowable composite (Esthet-X Flow, Dentsply) on the middle third of the facial aspect of the tooth after etching and bonding. Thereafter, Amnion membrane was trimmed and positioned over the root and 2-3 mm beyond the bony margin. Upon placement, the freeze-dried, irradiated amnion membrane get dehydrated and become self adherent to the exposed root and proximal bone,

**Table 1. Clinical parameter at baseline, 3 months, 6 months and 12 months for patient 1**

Patient 1. Tooth No.	Baseline			3 months			6 months			12 months		
	21	22	23	21	22	23	21	22	23	21	22	23
Recession depth (mm)	1	2	3	0.5	0	0	0.5	0	0.5	0.5	0	0.5
Probing depth	1	1	1	1	1	1	1	1	1	1	1	1
Clinical attachment level	2	3	4	1.5	1	1	1.5	1	1.5	1.5	1	1.5

**Table 2. Clinical parameter at baseline, 3 months, 6 months and 12 months for patient 2**

Patient 2 Tooth No (FDI system)	Baseline				3 months				6 months				12 months			
	21	22	23	24	21	22	23	24	21	22	23	24	21	22	23	24
Recession depth (mm)	3	2	3	3	0.5	0	0	0	0.5	0	0	0.5	0	0	0	0.5
Probing depth	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Clinical attachment level	4	3	4	4	1.5	1	1	1	1.5	1	1	1.5	1	1	1.5	1.5

**Table 3. Clinical parameter at baseline, 3 months, 6 months and 12 months for patient 3**

Patient 3 Tooth No. (FDI System)	Baseline			3 months			6 months			12 months		
	21	22	23	21	22	23	21	22	23	21	22	23
Recession depth (mm)	1	2	2	0.5	0	0	0.5	0	0	0.5	0	0
Probing depth	1	1	1	1	1	1	1	1	1	1	1	1
Clinical attachment level	1	3	3	1.5	1	1	1.5	1	1	1.5	1	1

thus eliminating the need for suturing the membrane. The flap was then coronally positioned to cover the membrane. The surgical papillae were stabilized using 5-0 interrupted black braided silk suture (Trusilk). The central area of the coronally advanced flap was stabilized via suspensory sling sutures on the buttons. The final position of the flap margins was positioned to be at least 3-4 mm coronal to the cemento-enamel junction of all teeth at the end of the surgery. Periodontal dressing was applied to avoid any mechanical trauma or any discomfort by orthodontic bracket.

Post operative instructions were given. Cap. Doxycycline hydrochloride 100 mg B.D. on 1<sup>st</sup> day followed by 100 mg O.D. dose for 10 days, tab Ibuprofen 400 mg T.D.S. for 3 days and chlorhexidine gluconate rinse 0.2% twice daily for 15 days. The sutures, brackets and periodontal dressing were removed 14 days after surgery. The patients were re-evaluated at 3, 6 and 12 months. The parameters recorded at different intervals, ascertained clinically, are presented in Tables 1, 2, and 3 above.

### 3. RESULTS

The present case series resulted out 80-90% root coverage and few sites showed 100% root coverage.

### 4. DISCUSSION

Multiple adjacent recession defects are a therapeutic challenge considering that several

defects must be treated in a single surgical session to minimize patient discomfort. Treatment of gingival recession with free gingival graft is a painful procedure for patients because of denudation of the palate, and unpredictable results have been seen with respect to harmony with the adjacent tissue. Subepithelial connective tissue graft has an excellent prognosis, with good esthetic results. It is considered standard approach compared to other root coverage techniques, however it has some disadvantage. It is traumatic and time consuming for the patient. In addition, patient prone gingival recession usually have thin palatal musosa and are unable to provide connective tissue of adequate thickness [10]. Cortellini et al. [17] in a systematic review reported that cases where root coverage and keratinised tissue expected, use of connective tissue graft is advised. Sub-epithelial connective graft superior to achieve full root coverage than coronally advanced flap (CAF) alone. Latest systematic review by Cairo et al. [18] which included 25 randomized controlled trials, 500 patients and revealed that CAF is a safe and predictable approach for root coverage but connective tissue graft and enamel matrix derivative enhances clinical outcomes of CAF in terms of complete root coverage. In multiple recessions— different variations of techniques, such as Zucchelli's technique. In the single recessions, the CAF is the most used technique. Multiple – number and location of recession defects guide the surgical design. Bharwani et al in a recent study compared Zucchelli's technique or tunnel technique with subepithelial connective tissue graft for treatment of multiple gingival

recessions and concluded that Zucchelli's technique is effective for the treatment of multiple adjacent recessions in terms of both root coverage and keratinized tissue gain, irrespective of the number of defects. Moreover, this technique does not require an additional surgical site as required in the gold standard SECTG [19]. In another study Ghahroudi et al. [10] compared amnion membrane allograft with connective tissue graft for root coverage procedure and resulted out that amnion allograft can be used as an alternative to connective tissue graft.

Evidences also shows that coronally advanced flap offers several advantages compared to other traditional root coverage procedures, which includes a better color, contour match and the procedure doesnot require any donar site. Healing seen with coronally advanced flap is by formation of long junctional epithelium with a limited amount of bone and cementum formation. Guided Tissue Regeneration (GTR) based root coverage has emerged as an alternative treatment because it may not achieve similar clinical results to those of traditional root coverage procedures but also demonstrate histological new attachment formation [5]. Amnion membrane (third generation GTR membrane), recently introduced was used in this case series.

Amnion lines the inner most portion of the amniotic sac, is 100-200  $\mu$  in thickness and consist of single layer of epithelium, basement membrane, thick compact layer, fibroblastic layer and a spongy layer. The basement membrane contains collagen type III, IV and V and cell-adhesion bioactive factors including fibronectin and laminins (mainly laminin-5) [20]. The ability of this membrane to repair tissues occurs through the presence of growth factors and cytokines, such as transforming growth factor  $\beta$  (TGF- $\beta$ ), vascular endothelial growth factor, epidermal growth factor, platelet derieved growth factor. It has been reported to be nonimmunogenic, to reduce inflammation, reduce scar tissue, has antibacterial properties, reduces pain at the site of application and act as a natural biological barrier [21].

Gris et al. 2002 in a histological finding after amnion membrane transplant reported resorbtion time of amnion more than 3 months and less than 7 months [22]. The biological action of the amnion membrane is via its growth factors present in the membrane and various adhesive

molecules (Laminin-5). The presence of amnion membrane for long time at the surgical site helps to achieve regeneration of the attachment apparatus at the site of gingival recession. The membrane also provides one mechanical advantage as it prevents the apical migration of the junctional epithelium.

Patient perception of the immediate post operative pain was less. VAS analysis showed satisfied aesthetics. Healing seen at 14 days was uneventful. Another factor that contributed for good healing was Amnion membrane used has immunomodulatory properties.

There are several factors which are increasing the predictability of good results with the present modified technique: 1. Guide Tissue Regeneration using barrier membrane which has shown to result in regeneration of the supporting structure of periodontium and stability of the results. 2. Advancing the flap more coronally which delay apical proliferation of gingival epithelium and connective tissue and allow time for coronal migration of periodontal ligament and bone cells. 3. Suspensory sutures with orthodontic bracket used provide the maximum coronal positioning of the flap and in addition stabilized the flap in the coronally displaced position during two weeks of wound healing. 4. Vertical incision was avoided in the anterior region so as not to severe the lateral blood supply to the flap and to avoid appearance of unesthetic white scars which result post-surgically at the incision site in esthetic area. At the same time vertical incision was given in the distal aspect to prevent tension in the flap. 5. The flap raised here is full partial thickness flap, the full thickness portion, by including the periosteum, confers more thickness, and thus better opportunity to achieve root coverage, to that portion of the flap residing over the previously exposed avascular root surface; the more apical split thickness flap elevation facilitates the coronal displacement of the flap. Therefore, optimum root coverage results, good color blending of the treated area with respect to adjacent soft tissue and complete recovery of the original soft tissue marginal morphology can be predictably accomplished by mean of this new approach.

## 5. CONCLUSION

The case series has shown 100% root coverage predictibility. The results illustrated that the usage of the orthodontic bracket and suspended

sutures with coronally advanced flap was effective in treatment of Miller's Class I and II gingival recession. The one year operative results appear promising in terms of both clinical (root coverage) and patient response (immediate post operative pain, esthetic) parameters. Since there is lack of a control group, the added benefit of the membrane is not clear and thus further researches are warranted to explore the findings.

### COMPETING INTERESTS

Authors have declared that no competing interests exist.

### REFERENCES

1. Anarthe R, Mani A, Marawar PP. Study to evaluate the prevalence, severity and extent of gingival recession in the adult population of Ahmednagar district of Maharashtra state in India. 2013;6(1):32-37.
2. Grover HS, Aggarwal N. Observational study on the association between gingival recession and other clinical variables in an adult population in India. Indian Journal of Dental Sciences. 2012;4(1):1-7.
3. Pradeep K, Rajababu P, Satyanarayana D, Sagar V. Gingival recession: Review and strategies in the treatment of recession. Case Reports in Dentistry. 2012;1-6
4. Lee EJ, Meraw SJ, Oh TJ, Giannobile WV, Wang HL. Healing of gingival recessions using a collagen membrane with a demineralized xenograft: A randomized control clinical trial. The International Journal of Periodontics and Restorative Dentistry. 2009;29:59-67.
5. Mahajan R, Khinda PK, Gill AS, Sahewale A, Saravanan SP. Guided tissue regeneration based treatment of root coverage using placental membrane allograft: A case report. IJSS. 2015;2(7):1-5.
6. Kassab MM, Badawi H, Dentino AR. Treatment of gingival recession. Dent Clin N Am. 2010;54:129-140.
7. Chrysanthakopoulos NA. Occurrence, extent and severity of the gingival recession in a Greek Adult population sample. J Periodontal Implant Dent. 2010;2(1):37-2.
8. Trabulsi M, Oh TJ, Eber R, Weber D and Wang HL. Effect of enamel matrix derivative on collagen guided tissue regeneration-based root coverage procedure. J Periodontol 2004; 75(11):1446-57.
9. Pitale U, Shekhawat S. Treatment of gingival recession with coronally advanced flap procedure: A case report. NJDSR. 2014;2:28-30.
10. Gharoudi AAR, Khorsand A, Rokn AR, Sabounchi SS, Shayesteh YS, Soolari A. Comparison of amnion allograft with connective tissue graft for root coverage procedure: A double blind, randomized, controlled clinical trial. Journal of the International Academy of Periodontology. 2013;15(4):101-112.
11. Vijayaraghavan A, Vijayalaxshmi R, Bhavna J, Ramakrishnan T, Kumar A, Bali V. Double laterally rotated bilayer flap operation for treatment of gingival recession: A report of two cases. Journal of Indian Society of Periodontology. 2008; 12(2):51-54.
12. Zucchelli G, Mounssif I. Periodontal plastic surgery. Periodontology. 2000; 2015;68:333-368.
13. Chambrone L, Lima LA, Pustiglioni FE, Chambrone LA. Systematic review of periodontal plastic surgery in the treatment of multiple recession-type defect. JCDA. 2009;75(3):203a-g.
14. Prato GP, Tinti C, Vincenzi G and Magnani C. Guided tissue regeneration versus mucogingival surgery in the treatment of human buccal gingival recession. J Periodontol. 1992;61(11):919-928.
15. Zucchelli G. Treatment of multiple recession-type defects in patients with esthetic demands. J Periodontol. 2000;71(9):1506-14.
16. Kotsakis GA, Theodora M, Andreas LL, Georgios RE, James HE. Prevalence of maxillary midline papillae recession and association with interdental smile line: A cross sectional study. Int J Periodontics Restorative Dent. 2014;34(3):81-87.
17. Cortellini P, Tonetti M, Baldi C, Francetti L, Rasperini G. Does placement of a connective tissue graft improve the outcomes of coronally advanced flap for coverage of single gingival recessions in upper anterior teeth? A multi-centre, randomized, double-blind, clinical trial. J Clin Periodontol. 2009;36:68-79.
18. Cairo F, Nieri M, Pagliaro U. Efficacy of periodontal plastic surgery procedures in the treatment of localized gingival

- recessions. A systematic review. J Clin Periodontol. 2014;41(15):44-62.
19. Bherwani C, Kulloli A, Shetty S, Agrawal P, Gujar D, Desai A. Zucchelli's technique or tunnel technique with subepithelial connective tissue graft for treatment of multiple gingival recessions. J Int Acad Periodontol. 2014;16(2):34-42.
  20. Brain G. A novel dehydrated amnion allograft for use in the treatment of gingival recession: An observational case series. J Imp Adv Cli Dent. 2009;1(1):11-6.
  21. Francisco JC, Cunha RC, Simeoni RB, Guarita-Souza LC, Ferreira RJ, Irioda AC. Amniotic membrane as a potent source of stem cells and a matrix for engineering heart tissue. J. Biomedical Sciences and Engineering. 2013;8:1178-1185.
  22. Gris O, Wolley-Doy C, Guell JL, Tresserra F, Lerma E. Histologic findings after amniotic membrane graft in the human cornea. Ophthalmology. 2002;109:508–512.

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