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## ORIGINAL ARTICLE

# A Preliminary Study Of The Guided Tissue Regeneration Procedures For Adjacent Buccal Root Coverage Using Single Gtam-Tr6t Membrane

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### ABSTRACT

The purpose of this study was to assess the reliability of the GTR procedure in terms of root coverage, using material (GTAM-TR6T) in single and adjacent buccal recessions. One of the major therapeutic goals of periodontal treatment is to obtain root coverage in areas of localized or generalized gingival recession associated with aesthetic problems, dentinal hypersensitivity and root caries lesions. This study showed enhanced root coverage and attachment gain with a Titanium reinforced GTR (GTAM-TR6T) membrane in both single and adjacent buccal recessions. Therefore, a preliminary attempt to cover adjacent buccal recessions with single GTAM-TR6T (Augmentation material) has proved clinically successful.

**Key Words:** Titanium reinforced augmentation material, adjacent gingival recessions, single membrane, root coverage

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### Introduction

One of the major therapeutic goals of periodontal treatment is to obtain root coverage in areas of localized or generalized gingival recession associated with aesthetic problems, dentinal hypersensitivity and root caries lesions.

Root coverage can be accomplished by using flaps, which can be free gingival grafts, connective tissue grafts, pedicle grafts or free mucosal autograft, followed by coronally displaced flap. The presence or the creation of significant amounts of keratinized tissue was the prerequisite for the success of any of these procedures.

Guided tissue regeneration (GTR) procedures provide a predictable reconstruction of periodontal tissues. In a study, 12 human recessions were treated using a membrane procedure, which consistently resulted in the reduction of the recession associated with corresponding attachment gain[1]. At present, guided tissue regeneration (GTR) procedures using barrier membranes of expanded polytetrafluoroethylene (e-PTFE) have been introduced into the treatment of human isolated facial gingival recession. Koichi Ito et al [5] used titanium reinforced e-PTFE material for treating adjacent facial gingival recession. A Medline search revealed no data related to the treatment benefits of using single GTR membrane for root coverage of adjacent gingival recessions. The guided tissue augmentation material (GTAM) is the membrane of choice in ridge augmentation and implant therapy. Since the titanium reinforcement provides a good tent effect to facilitate periodontal regeneration, a first attempt was made for root coverage, uniquely for adjacent recessions using a single membrane. The aim of this preliminary study was to assess the clinical efficacy of titanium

reinforced e-PTFE membrane (GTAM-TR6T) in the treatment of single and adjacent gingival recessions for a post operative period of 2 years.

## Method and Materials

### Patient and site selection

The buccal recessions were selected in seven systemically healthy patients who presented at the Department of Periodontics, College of Dental Sciences, Davangere. All the 7 patients were males, whose age ranged from 26 to 32 years. The informed consent was obtained from the selected patients. A total of 11 sites included 3 single buccal recessions and 4 pairs of adjacent gingival recessions.



(Table/Fig 1) Baseline Presentation of Case A and Case B

There was no loss of interdental bone or soft tissue, and patients were non smokers. The initial preparation before the surgical procedure consisted of scaling and root planing, and elimination of traumatic occlusion if required. The patients exhibited acceptable plaque control during recall visits.

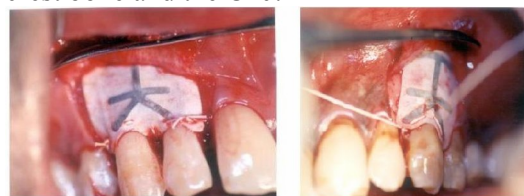
### Surgical procedures

The sites were treated with the technique described by Ito and Murai[6]. A full thickness flap, including an intrasulcular incision and two releasing incisions, were elevated on the facial aspect of the alveolar process. A partial thickness dissection was carried out apical to the mucogingival junction. The exposed root surface was thoroughly planed by means of cures.



(Table/Fig 2) Facial Defect During Surgery of Case A and Case B

A microporous membrane Titanium reinforced guided tissue regenerative (GTAM-TR6T) membrane was trimmed and bent enough to cover the entire defect with one membrane in both single and adjacent recessions, and at least 2 mm of the buccal crest bone and the CEJ.



(Table/Fig 3) GTAM Membrane Covering In Case A and Case B

The membrane was secured coronally by using a Teflon suture by means of a sling ligation. The flap was displaced coronally to cover the membrane and was ligated interdentally by means of Teflon sutures. Special care was taken not to displace or compress the membranes. No periodontal dressing was applied.

### Post operative care

The patients were prescribed systemic Doxycycline Hydrochloride 100 mg twice on the first day and 100 mg/day for the next four days, along with 100 mg of Nimesulide given twice daily for 3 days. The patients were instructed to rinse 2 times daily with a 0.2% chlorhexidine digluconate for 4 weeks to prevent post surgical infection. Sutures were removed 10 days following the surgery.



A 4 Before reentry, at 6 weeks

(Table/Fig 4) Clinical Picture Of Case A Before Re entry At 6 Weeks

The re-entry procedure was carried out 4 weeks following the initial surgery. The membrane was exposed with a minimal flap reflection. The membrane was then dissected out carefully with gentle traction on its coronal margin.



A 5 After membrane removal, new granulation tissue shown with arrow

(Table/Fig 5) Case A After Membrane Removal

The newly formed tissue was exposed. The flap was repositioned to cover this tissue completely and was fixed with 4-0 silk sutures.

The patients were recalled for professional tooth cleaning once in 3 months, for 24 months.

### Measurements

Probing depth, gingival recession, attachment level and the width of gingival recession were recorded with a PCP UNC-15 probe at the time of surgery (baseline) and 9 months and 24 months after surgery. All measurements were standardized using custom acrylic stents and were rounded off to the nearest millimeter.



A 6 At 9 months

B 6 At 9 months

(Table/Fig 6) Follow up at 9 Months of Case A and Case B



A 7 At 24 months



B 7 At 24 months

(Table/Fig 7) Follow up at 24 Months of Case A and Case B

### Statistical Analysis

Means and standard deviations for both groups were calculated for each clinical parameter at the baseline and at 9 month and 24 month post operative examinations. Paired 't' test was used to analyze mean difference between pre and post treatment values of each parameter. Differences at  $P < 0.05$  were considered statistically significant. A linear regression analysis was also done.

### Results

A total of 11 sites were treated with the guided tissue regeneration procedure.

The baseline and follow-up data are summarized in [Table/Fig 8] and the difference between the baseline and follow up values, along with the results of the significance test for differences between the means, are reported in [Table/Fig 9]. (Fig.A1 to A7 ; B1 to B7)

(Table/Fig 8) Periodontal parameters measured in millimeters (Pre operative)

	Recession	Pocket depth	Attachment level	Width of recession
<b>Baseline</b>				
Mean $\pm$ SD	3.6 $\pm$ 1.6	2.0 $\pm$ 0.9	5.0 $\pm$ 1.8	4.5 $\pm$ 0.8
Range	2-7	1-4	3-9	3-6
<b>Follow up</b>				
Mean $\pm$ SD	0.7 $\pm$ 1.0	1.4 $\pm$ 0.5	2.7 $\pm$ 1.3	3.5 $\pm$ 0.8
Range	0-2	1-2	1-5	1-3

(Table Fig 9) Differences between baseline and follow-up (24 months post operative)

	Recession reduction	Pocket reduction	Attachment gain	Width of recession
Mean $\pm$ SD	2.9 $\pm$ 1.8	0.6 $\pm$ 0.9	2.3 $\pm$ 2.0	0.9 $\pm$ 0.8
t	5.32	2.28	3.76	3.63
p	< 0.001	< 0.05	< 0.01	< 0.01

A significant difference was noted in each case, both clinically and statistically in the amount of recession ( $P < 0.001$ ) and probing attachment level ( $P < 0.01$ ), and pocket depth reduction was noted ( $P < 0.05$ ). The average width of the gingival recession was also significantly reduced ( $P < 0.01$ ).

## Discussion

Although most previous reports have indicated that isolated human facial gingival recession can be treated successfully through the use of GTR procedures with an e-PTFE membrane [1],[2],[3],[4] clinical reports of root coverage in the adjacent facial gingival recession, particularly long term observations, have been rare. A previous case report indicated that the GTR procedure with e-PTFE membranes is reliable for the treatment of adjacent facial gingival recession, consistently improving the soft tissue condition of the defect in terms of root coverage and attachment gain[6].

PiniPrato et al [2] have shown that the GTR procedure is of greater efficacy in situations where the recessions are very severe (more than 5 mm). In patients treated with the GTR procedure using e-PTFE membranes, follow-up is more complex because of the need for a second surgical procedure and more frequent visits.

The width of keratinized tissue was not taken into consideration in designing the surgical technique and no attempts were made to increase it in this study. The root surface was moderately planed to create an adequate space between the planed root surface and the titanium reinforced membrane, which was maintained during healing to provide enough room for the formation of adequate blood clot

and the subsequent growth of newly formed tissue. The flap was gently positioned and sutured and no dressing was applied in order to prevent compression upon the membrane. The flap was positioned more coronally beyond the CEJ, to cover the membrane and the underlying tissues.

In the present study, the calculated average percentage of root coverage is 76.88%, whereas Koichi Ito et al [5] obtained an average root coverage of 74%. The differences between baseline and follow up in the recession reduction ( $2.9 \pm 1.8$ ) and attachment gain ( $2.3 \pm 2.0$ ) were statistically significant, which was similar to the findings of PiniPrato et al.[2] The width of the gingival recession measured at the level of CEJ was significantly reduced during the follow up period ( $0.9 \pm 0.8$ ). The root coverage achieved after 6 months was stabilized throughout the study period. Therefore, it appears that the root coverage achieved using GT augmentation material (GTAM-TR6T) is successful clinically, in the treatment of both single as well adjacent recessions.

A new acellular dermal matrix (ADMA-Alloderm) has been recently introduced for use in dentistry, although it has been used for full-thickness burns, the revision of depressed scar and nasal reconstruction, facial defect repair, lip augmentation, and septal perforation repair. In dentistry, its uses include substitution for palatal donor tissue in soft tissue surgeries around natural teeth and implants to increase the zone of keratinized tissue, for tissue augmentation, and for root coverage. The intent of these procedures is principally to create a tissue barrier that is more resistant to further recession due to trauma. Other indications include soft tissue flap extension over bone graft, amalgam tattoo correction, and soft tissue defect repair. ADMA is used as a barrier membrane in reconstructing non-spacemaking buccal dehiscences [7] and in ridge expansion procedures[8].

In this study, the aesthetic result obtained with the use of GTR was good. Therefore, it appears that GTR using GTAM-TR6T membrane is the preferable technique when adjacent facial gingival recession is present and the resolution of the aesthetic problem is necessary.

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