



Case Report

Treatment of angular bone defect using flap with GTR membrane and bone graft substitute with 1 year follow up: A case report

Tanusha Sharma^{1,*}, Charu Agrawal^{1,2}

¹Dept of Periodontics, Ahmedabad, Gujarat, India

²Narsinhbhai Patel Dental College and Hospital, Visnagar, Gujarat, India



ARTICLE INFO

Article history:

Received 13-08-2020

Accepted 12-09-2020

Available online 23-11-2020

Keywords:

Angular defect

Localised Periodontitis

GTR membrane

ABSTRACT

Aim: The aim of this study was to evaluate the efficacy and the role of a resorbable membrane Guided Tissue Regeneration (GTR) with a bone graft substitute in the management of angular bone defect.

Methodology: An angular bone defect of 10 mm was evident between the maxillary second premolar and first molar. After proper debridement, the defect was filled up with a bone graft substitute and covered with a resorbable GTR membrane.

Results: The site showed significant bony fill at the end of 9 months with the reduction in probing depth. The results were well maintained at the time of last follow-up which was 1 year post-operatively.

Conclusion: In this case, where angular defect was associated with localised periodontitis, good results were obtained with bone fill in relation to probing depth reduction. The results were excellent and stable till the last follow up at 1 year.

© This is an open access article distributed under the terms of the Creative Commons Attribution License (<https://creativecommons.org/licenses/by/4.0/>) which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

1. Introduction

Periodontitis is an oral infectious disease. Periodontitis involves gingival inflammation, clinical attachment loss, alveolar bone resorption and, periodontal pocket formation.^{1,2} Hence, periodontal regeneration is the main objectives of any periodontal therapy which also restores the alveolar bone, cementum, and periodontal ligament.^{3,4}

The treatment of periodontitis with bony defect using bone graft substitutes has been widely reported and reviewed. Bone Grafts studies with true periodontal regeneration has not been concluded. This has made researchers constantly discuss newer materials which could give better results and help in regenerating the lost periodontium.

Melcher studied and reported that the infill of periodontal defects was due to four tissues: epithelium, connective tissue, bone and periodontal ligament. As the epithelium had the highest rate of formation, it filled the defect first and was

important landmark study.⁵

From this study and result the concept of periodontal guided tissue regeneration (GTR) came to light. This highlighted on the fact the it would give periodontal ligament time to regenerate and would not interfere with its formation. For this a membrane is placed between the epithelium and connective tissues and the tooth surface to prevent them from forming an attachment and allowing reformation of a periodontal ligament.

Hence based on this concept our case was done using a resorbable GTR membrane and bone graft substitute to combine the advantages of both and give a better result.

2. Case Report

A female patient who was 40 years old, she came with the chief complaint of bleeding and swelling of gums in relation to right upper tooth region since 1 month. On examination there was a periodontal pocket of 10 mm in between 15 and 16 (Figure 1a). There was also grade I mobility in relation to 16. There was no tenderness or pus discharge in relation

* Corresponding author.

E-mail address: drtanushas@gmail.com (T. Sharma).

to the tooth. Radiograph revealed angular bone defects in between 15 and 16. (Figure 1 b) The treatment planning was done so as to carry out a complete debridement in 15 – 16 region and placement of a GTR membrane with the bone graft substitute to fill the defect for regeneration of tissues.

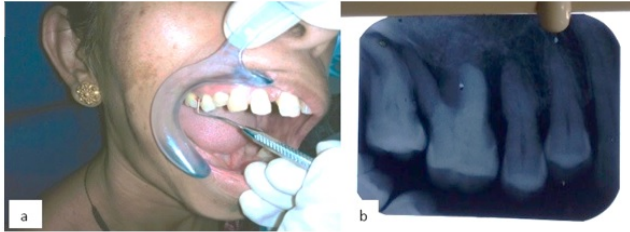


Fig. 1: a) Pre- operative view (Periodontal pocket 10mm); b): IOPA of the preoperative site

2.1. Surgical Technique

All the aseptic measures were taken. Local anesthesia was administered. After which a full thickness flap was raised in the desired region, to ensure maximum coverage of the grafted site. Granulation tissue was removed and complete debridement was performed. The roots were thoroughly scaled and planed by using hands and ultrasonics instruments. The surgical sites were then rinsed with sterile saline. After which an evident angular defect was clearly noticed (Figure 2).

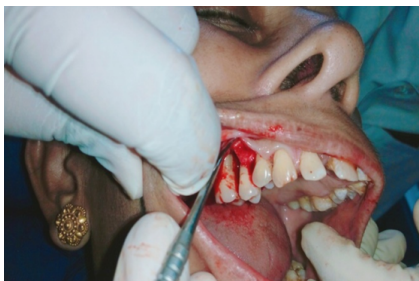


Fig. 2: Full thickness flap with evident angular defect

The bone graft substitute used in this case was of alloplastic material, which was placed in the defect to fill the area completely (Figure 3a) and then it was covered with a resorbable GTR membrane (Healiguide) (Figure 3 b). The flap was then sutured back approximating it on both buccal and palatal aspects so as to completely cover the membrane and lastly periodontal pack was placed

2.2. Post surgical treatment and follow-up

The patient was advised with analgesics. Plaque control instructions were given. She was given 0.12% Chlorhexidine rinse twice daily after 24 hours and also it was instructed to avoid tooth brushing in the operated

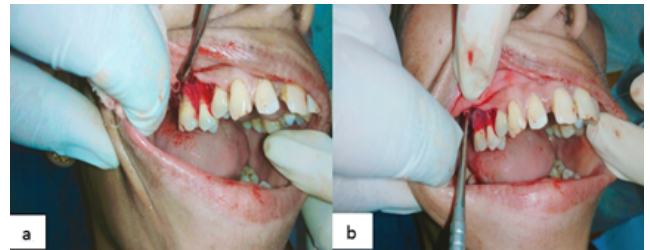


Fig. 3: a) Filling the defect with bone graft substitute; b): Placement of a resorbable GTR membrane (Healiguide)

quadrant. The patient was recalled and the sutures were removed 10 days after surgery. The patient was put on regular recall at 1, 3, 6, & 12 months. The symptoms of bleeding and swelling had disappeared following 1 month. (Figure 4 a, b). There was reduction in probing depth and no mobility could be encountered at the six-month recall and by the 3-month recall the patient was comfortable with no recurrence of symptoms (Figure 5 a, b). At the 9-month recall, radiograph showed significant bony fill, evident as increase in radioopacity and these results were maintained at the time of the last recall at 12 months (Figure 6 a, b).

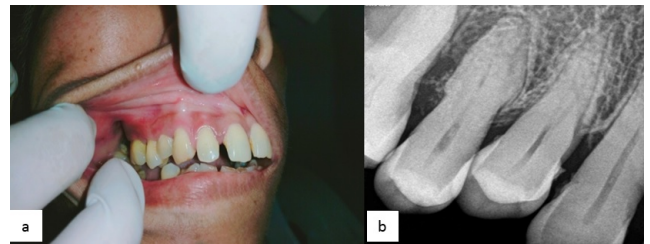


Fig. 4: Post- operative after 1 month

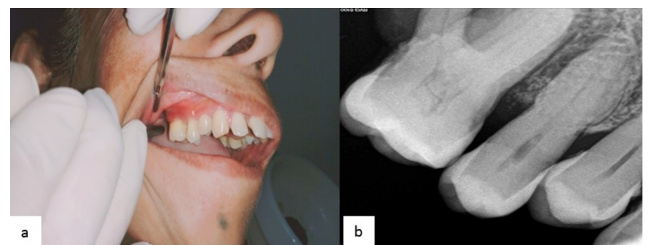


Fig. 5: Post- operative after 3 months

3. Discussion

Periodontal Materials is extensively being studied so that great results can be obtained. From the past 40 years it is being researched and will continue to advance with increasing knowledge in medical field. A lot of studies are undergoing constantly which could show successful clinical results with collagen membranes for GTR therapy.⁶

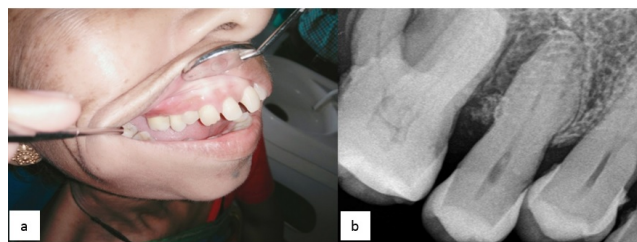


Fig. 6: Post operative after 12 months

The main rationale behind using collagen as a barrier membrane was because of the fact that the main constituent is type-1 collagen. This type of collagen is present in periodontal connective tissue. Collagen materials also have lot of functions such as for fibroblasts it possess chemotactic function, it also has hemostatic property, weak immunogenicity and osteoblast adhesion activity.⁶ However, in case of GTR for complete periodontal regeneration the space underneath the barrier membrane is maintained for long period of time so as to help during healing process. In some of the cases where the membrane is seen collapsing into the defects or to the roots, the results were not good and less amounts of bone were formed. This was because of limited amount of space available for periodontal ligament cells to regenerate and repopulate.^{7,8} Hence, because of the failures of membranes available and to compensate for the lack of space-maintaining effect of membranes bone grafting materials were used as adjuncts to the GTR technique. The would enhance and promote bone formation.

In our case the result was found to be excellent and proven to be good as correction of both pocket depth and mobility was observed. There was reduced pocket depth . Healing was uneventful. Our results are also good compared to other authors who have also performed such studies with GTR membrane and bone replacement grafts.^{9–12} These findings support the hypothesis that the presence of physical support is necessary under the membrane because it maintain the position when the flaps are sutured back. Also, the bone grafts are essential as it contributes to wound stability. Stability of it is a very important factor for obtaining periodontal regeneration.¹³

On the other hand , other researchers have reported that the results obtained with the combined use of GTR and bone grafts were not significant and different from those with GTR alone.^{14–16} These authors have given hypothesis that the biomaterial which is used under the membrane may hinders the coronal migration and proliferation of progenitor cells from the periodontal ligament into the defect site.

4. Conclusion

A combination of a resorbable GTR membrane with alloplastic bone graft substitute in a properly selected defect results in excellent healing with evidence of bone fill. As

a result of the constant innovations through research in the field of biomaterials to improve the predictability of periodontal regeneration it is likely that some combination technique may ultimately prove to provide the ideal regeneration.

5. Source of Funding

None.

6. Conflict of Interest

None.

References

1. Socransky SS, Haffajee AD. The Nature of Periodontal Diseases. *Annal Periodontol.* 1997;2(1):3–10.
2. Flemmig TF. Periodontitis. *Annal Periodontol.* 1999;4(1):32–37.
3. Sculean A, Stavropoulos A, Windisch P, Keglevich T, Karring T, Gera I, et al. Healing of human intrabony defects following regenerative periodontal therapy with a bovine-derived xenograft and guided tissue regeneration. *Clin Oral Investig.* 2004;8(2):70–4.
4. Kim CS, Choi SH, Cho KS, Chai JK, Wikesjö UM, Kim CK, et al. Periodontal healing in one-wall intra-bony defects in dogs following implantation of autogenous bone or a coral-derived biomaterial. *J Clin Periodontol.* 2005;32(6):583–9.
5. Melcher AH. On the Repair Potential of Periodontal Tissues. *J Periodontol.* 1976;47(5):256–60.
6. Bunyaratavej P, Wang HL. Collagen Membranes: A Review. *J Periodontol.* 2001;72(2):215–29.
7. Caton J, Wagoner C, Polson A, Nyman S, Frantz B, Bouwsma O, et al. Guided tissue regeneration in interproximal defects in the monkey. *Int J Periodontics Restor Dent.* 1992;12(4):266–77.
8. Sallum EA, Sallum AW, Nociti FH, Marcantonio RA, Toledo SD. New attachment achieved by guided tissue regeneration using a bioresorbable polylactic acid membrane in dogs. *Int J Periodontics Restor Dent.* 1998;18(5):502–10.
9. Bowers GM, Chadroff B, Carnevale R, Mellonig J, Corio R, Emerson J, et al. Histologic Evaluation of New Attachment Apparatus Formation in Humans. *J Periodontol.* 1989;60(12):675–82.
10. Blumenthal N, Steinberg J. The Use of Collagen Membrane Barriers in Conjunction With Combined Demineralized Bone-Collagen Gel Implants in Human Infrabony Defects. *J Periodontol.* 1990;61(6):319–27.
11. McClain PK, Schallhorn RG. Long-term assessment of combined osseous composite grafting, root conditioning, and guided tissue regeneration. *Int J Periodontics Restor Dent.* 1993;13(1):9–27.
12. Paolantonio M. Combined Periodontal Regenerative Technique in Human Intrabony Defects by Collagen Membranes and Anorganic Bovine Bone. A Controlled Clinical Study. *J Periodontol.* 2002;73(2):158–66.
13. Wikesjö UME, Selvig KA. Periodontal wound healing and regeneration. *Periodontol 2000.* 1999;19:21–39.
14. Kiliç AR, Efeoğlu E, Yilmaz S. Guided tissue regeneration in conjunction with hydroxyapatite collagen grafts for intrabony defects. A clinical and radiological evaluation. *J Clin Periodontol.* 1997;24(6):372–83.
15. Batista EL, Novaes ABJ, Simonpietri JJ, Batista FC. Use of Bovine-Derived Anorganic Bone Associated With Guided Tissue Regeneration in Intrabony Defects. Six-Month Evaluation at Re-Entry. *J Periodontol.* 1999;70(9):1000–7.
16. Trejo PM, Weltman R, Caffesse R. Treatment of Intraosseous Defects with Bioabsorbable Barriers Alone or in Combination With Decalcified Freeze-Dried Bone Allograft: A Randomized Clinical Trial. *J Periodontol.* 2000;71(12):1852–61.

Author biography

Tanusha Sharma, Consultant Periodontist

Charu Agrawal, Professor

Cite this article: Sharma T, Agrawal C. Treatment of angular bone defect using flap with GTR membrane and bone graft substitute with 1 year follow up: A case report. *J Dent Spec* 2020;8(1):26-29.