

TREATMENT OF A CLASS 2 FURCATION DEFECT USING XENOGRAFT AND RESORBABLE GTR MEMBRANE

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ABSTRACT

Periodontal regeneration in furcation defects is one of the most challenging goals of a periodontist. Here we describe a case report of a successful surgical management of a class 2 furcation defect in a mandibular molar of a 21 year old man. This case report evaluates the efficacy of using xenograft along with resorbable membrane for guided tissue regeneration in furcation defects. The patient reported with a chief complaint of pain and swelling in his right lower back tooth. On clinical and radiographic examination a class II furcation defect (Glickman's classification) was observed. After phase 1 therapy, the flap was reflected and furcation area was debrided. Xenograft was placed into the defect and covered with resorbable collagen membrane and sutured. At the end of 4 months a significant bone fill was seen in the furcation defect thus improving the prognosis of the tooth.

Key words: Furcation defect, xenograft, GTR.

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INTRODUCTION

Regeneration of the tissues lost due to periodontal disease, is the ultimate as well as the most challenging goal of periodontal therapy. Regeneration is defined as the type of healing which completely replicates the original architecture and function of a part. It involves the formation of a new cementum, periodontal ligament, and alveolar bone. Repair, on the other hand, is merely a replacement of loss apparatus with scar tissue which does not completely restore the architecture or the function of the part replaced. The end product of repair is the establishment of long junctional epithelium attachment at the tooth-tissue interface. Traditional therapeutic procedures used in periodontal therapy have often failed to achieve regeneration of the tissues lost due to the disease. In 1976 Melcher stated that the type of cell which repopulates the root surface after periodontal surgery determines the nature of the attachment that will form. Under physiological conditions, only cells from periodontal ligament can synthesise and secrete cementum to attach newly-synthesised collagen fibres of periodontal ligament or lamina propria of gingiva to tooth. Based on this concept there are several techniques used alone or in combination, which are considered to achieve periodontal regeneration, including bone grafts or substitutes, guided tissue regeneration, root surface modification, and biological mediators.¹ One of the most important indications for the guided tissue regeneration (GTR) treatment is the class II furcation defect. In GTR, a barrier is inserted between the root surface and the gingival tissues, to inhibit the apical migration of the epithelium and gingival connective tissue of the flap, allowing the granulation tissue derived from the periodontal ligament and osseous tissues to repopulate the space adjacent to the denuded root surface.² Several clinical studies have shown that GTR can improve the prognosis of class II furcation defects by means of pocket reduction, gain in clinical attachment levels, and bone defect fill. This case report describes the successful use of GTR and bone graft in a class II furcation defect which showed significant bone fill at the follow up period.

CASE REPORT

A 21-year-old male patient reported to the outpatient Department of Periodontics with a chief complaint of pain and swelling with respect to his right lower back tooth region. He did not have any relevant medical history. The patient had a history of RCT done 2 years back on the same tooth. Clinical examination revealed signs of inflammation along with a deep pocket of 9mm on the buccal aspect and class II furcation involvement (Glickman's classification, Subclass B according to Tarnow and Fletcher based on the vertical component) on the buccal aspect of mandibular right first molar (46). On radiographic examination of the region, extensive bone loss was noted with respect to the distal root of 46. A radiolucency of around 7 mm (vertical dimension) was noted. Routine hematological examinations were done before surgical intervention, which were found to be within normal limits. The treatment was divided into Phase I and Phase II therapy. Phase I therapy included scaling and root planing and general oral hygiene instructions were given. After 7 days, the surgical procedure was carried out. After adequate local anesthesia, an intrasulcular incision was made around the involved tooth, extending to the adjacent tooth on both sides for adequate access. A full thickness mucoperiosteal flap was reflected to access the underlying bone morphology in the furcation area. The furcation area was assessed. The assessed defect was 6 mm vertically. The area was properly debrided using Gracey curettes. After debridement, bovine derived bone graft, was placed in the furcation area. Following which resorbable collagen GTR membrane was placed onto the furcation area. Immediately after placing the membrane, the reflected flap was repositioned over the GTR membrane and secured with interrupted direct loop 3-0 nonresorbable silk sutures. The patient was put on Amoxicillin 500 mg and Ibuprofen +Paracetamol combination for 5 days. The patient was given proper oral hygiene and post operative instructions. The patient was advised to use chlorhexidine gluconate mouthwash twice a day to maintain plaque control. After 1 week healing was found to be satisfactory and sutures were removed. At 4 months of follow-up, there was substantial bone fill in the furcation area, representing a significant percentage of bone deposition.

Figure 1
Pre operative radiographic view of 46



Figure 2
Flap reflected and debridement done



Figure 3
Bone graft placed



Figure 4
GTR membrane placed



Figure 5
Sutures placed



Figure 6
3 months post operative radiograph



DISCUSSION

This case report demonstrates the use of Bone graft and GTR membrane for regeneration of bone lost due to periodontal disease in a class II furcation defect. Regeneration of lost periodontal tissues is a challenging goal which most of the traditional periodontal surgical procedures fail to achieve. Newer regenerative techniques like the use of GTR can be used for periodontal tissue regeneration in intrabony defects and furcation-involvement areas caused by periodontal disease. The rationale of GTR is to impede apical migration of the epithelium by placing a membrane between the flap and root surface (preventing contact of the connective tissue with the root surface). Cells derived from the periodontal ligament are induced on the root surface selectively and periodontal tissue regenerated.

Treatment of the first human tooth with GTR was reported by Nyman et al. in 1982. Human Case Series of Clinical Attachment Gain and with Histological evidence was presented by Gottlow and Nyman in 1986.

It must be noted that there are many factors acting collectively that influence the final outcome of GTR in class II furcations. Selecting a defect that is amenable to regeneration is also critical for achieving success.³ Wang and Boyapati⁴ have suggested four factors, the so-called PASS principles, that are critical for predictable bone regeneration: Primary wound closure, angiogenesis as a blood supply and source of undifferentiated mesenchymal cells, space maintenance, and stability of the wound. GTR has offered better results than open-flap debridement or bone replacement grafts alone, in class II furcation.⁵

Jepsen S, 2002 in a systematic review concluded that GTR was consistently more effective than open flap debridement in reducing open horizontal furcation depths, horizontal and vertical attachment levels and pocket depths for mandibular or maxillary class II furcation defects.⁶ Needleman IG, et al, 2006, concluded that GTR has a greater effect on probing measures of periodontal treatment than open flap debridement, including improved attachment gain, reduced pocket depth, less increase in gingival recession and more gain in hard tissue prob-

ing at re-entry surgery than OFD. Lecovic et al had used GTR in 24 cases and reported significant bone fill and attachment gain at reentry.⁷ Lecovic and Scallhorn et al had however reported that the combination of GTR and Various bone substitutes in molar class II Furcations resulted in more pronounced bone fill and attachment gain than GTR alone^{8,9}.

In the present case we have used a resorbable collagen membrane as GTR. Even though the non resorbable membranes made of expanded polytetrafluorethylene (e-PTFE) are considered "Gold standard" for regeneration¹⁰ several clinical studies comparing GTR therapy in class II furcation lesions with non resorbable and resorbable membrane have demonstrated similar results in the bone fill seen^{11,12}. Resorbable membranes have a lesser chance of membrane exposure than non resorbable membranes¹³ and the need for a second surgery is avoided. Thus making it more comfortable and economical for the patient.

We decided to use a xenograft along with GTR membrane for this case. The function of grafting material along with GTR would be to act as a scaffold to ensure clot stabilization and to provide and maintain space whenever the membrane may have the possibility to collapse, therefore reducing the space for regeneration¹⁴. Simonpietri C et al demonstrated in a clinical study that use of bovine derived anorganic bone with GTR improved the bone defect resolution in class 2 mandibular molars¹⁵. The xenograft which we used was demineralized bovine collagen particles and hence it had the additional osteoinductive property along with osteoconduction which would improve the possibility of regeneration. At the end of 4 months we were able to see a significant bone fill thus successfully improving the prognosis of the tooth which was otherwise heading for a hemisection. Radiographic evaluation does not provide as conclusive an evidence as surgical re entry. Nevertheless, the improvement in the radioopacity of the treated furcation site, and improvement in the clinical parameters like gain in clinical attachment level helps us to appreciate the regenerative potential of GTR and xenograft.

CONCLUSION

Treatment and management of furcation involvement is one of the most challenging problems faced by a periodontist because of the inadequate access to these areas thus rendering it impossible to maintain good oral hygiene in that area. GTR is one technique that can deliver periodontal ligament cells and wound stability thereby ensuring a stable clot that allows the activity of signaling molecules and growth factors ensuring periodontal regeneration even in the inaccessible regions.

REFERENCES

1. Santana RB, de Mattos CM, Van Dyke T. Efficacy of combined regenerative treatments in human mandibular class II furcation defects. *J Periodontol* 2009;80:1756-64.
2. Gottlow J, Karring T. Maintenance of new attachment gained through guided tissue regeneration. *J Periodontol* 1992;19:315-7.
3. Zuolo ML, Ferreira MO, Gutmann JL. Prognosis in Periradicular surgery: A clinical prospective study. *Int Endod J* 2000;33:91-8.
4. Wang HL, Boyapati L. "PASS" principles for predictable bone regeneration. *Implant Dent* 2006;15:8-17.
5. Novaes AB Jr, Palioto DB, de Andrade PF, Marchesan JT. Regeneration of class II furcation defects: Determinants of increased success. *Braz Dent J* 2005;16:87-97.
6. Jepsen S, Eberhard J, et al. *J Clin periodontol* 2002;29 Suppl 3:103-16.
7. Lekovic et.al. *J.Periodontol* 1989;60:694-8
8. Lekovic et.al *J.Periodontol* 1990;61:575-8
9. Scallhorn et.al. *Int.J.Periodontics Restorative Dent* 1988;8:9-31
10. Murphy KG, Gunsolly JC. Guided tissue regeneration for the treatment of periodontal intrabony defect and furcation defects. A systematic review. *Ann Periodontol* 2003;8:266-302
11. Eickholz P, Kim TS, Holle R. Regenerative periodontal surgery with non-resorbable and biodegradable barriers: results after 24 months. *J Clin Periodontol* 1998;25:666-76.
12. Eickholz P, Kim TS, Holle R, Hausmann E. Long-term results of guided tissue regeneration therapy with non-resorbable and bioabsorbable barriers. I. Class II furcations. *J Periodontol* 2001;72:35-42.
13. Bouchard P, Giovannoli JL, Mattout C, Davarpanah M, Etienne D. Clinical evaluation of a bioabsorbable regenerative material in mandibular class II furcation therapy. *J Clin Periodontol* 1997;24:511-8.
14. Arthur B, Daniela B. *Braz Dent J.* 2005;16(2).
15. Simonpietri- C JJ, Novaes AB. Guided tissue regeneration associated with bovine derived anorganic bone in mandibular class 2 furcation defects. 6 months result at re-entry. *J periodontol* 2000;71:904-11.