Case Study

Guided tissue regeneration (GTR): Creating space for regeneration in infra-bony defects.

Jyotsana Tanwar 1*, Kiran Dodani 2

1 183, Tagore Nagar, Sector-4, Hiran Magri, Udaipur-324002, Rajasthan, India.
2 Flat no. 2, Jawaharlal Nehru cancer hospital campus, Iddgah Hills, Bhopal, India.

*Corresponding Author: Jyotsana Tanwar;
E-mail address: drjyotsana12@gmail.com; Tel., 9414137800.

Running Title: Guided Tissue Regeneration (GTR)

Received: 02 November, 2015; Revised: 12 December, 2015 Accepted: 22 December, 2015
Available online at http://www.thescientificpub.com http://dx.doi.org/10.19046/abp.v02i06.02

Abstract

Periodontal regeneration is the major focus for treatment of periodontitis. The goal of periodontal therapy is to regenerate the periodontal tissues destroyed by the disease process. Present study was carried out to investigate the efficacy of guided tissue regeneration (GTR) membrane in the treatment of deep infrabony defects. A patient with pain and pus discharge in maxillary second molar was presented with pocket probing depth of 8mm and was treated with DFDB allograft covered with GTR membrane and was sutured. It was found that after 6 months of surgical procedure of GTR membrane placement with decalcified freeze dried bone allograft, a reduction of 5mm in pocket probing depth took place, which indicates that the resorbable GTR membrane can be effectively used for the treatment of deep infrabony angular defects.

Keywords: Bone loss, bone regeneration, guided tissue regeneration, membranes/resorbable, membranes/non-resorbable.

Introduction

Periodontal regeneration is the foremost purpose of treating periodontitis [1]. The goal of periodontal therapy is to regenerate the periodontal tissues destroyed by the disease process. However, conventional periodontal therapies have resulted in incomplete repair due to the rapid proliferation of gingival epithelium. Nyman et al have reported new attachments including bone and connective tissue by using a barrier to exclude epithelium from the defect sites; GTR therapy has been widely used [2]. Guided Tissue Regeneration (GTR) has been introduced into clinical dental practice over 30 years ago. The mechanisms of GBR followed the same principles i.e. under favourable conditions, cells that originate from tissues adjacent to provided space are able to form their parent tissue. In order to allow repopulation of cells from desired tissues into that space, preference must be given by preventing access of cells from neighboring undesired tissues using tissue barriers, commonly referred to as Membranes [3]. Guided tissue regeneration (GTR) can be considered as an effective and predictable surgical approach for the treatment of periodontal infra-bony defects, which involves placement of either resorbable or non-resorbable barrier membranes which allows cells from periodontal ligament and alveolar bone to repopulate the defects. The main indication of GTR membrane is to guide the healing in periodontal defects. Numerous problems, have been reported with the use of non-resorbable barrier membranes including the possibility of membrane contamination, infection and need for a second surgical procedure for membrane removal. Several investigations have indicated that the outcome of GTR procedures can be affected by bacterial contamination of the non-resorbable devices. Furthermore, the removal of the membrane is associated with increased morbidity for the patient, time
Advances in Biomedicine and Pharmacy Vol. 2 (6) 2015

Tanwar and Dodani

consuming, and can interfere with the maturation of the regenerated tissues during an early and delicate stage of healing. In addition, the optimal timing of resorbable membrane removal has not been unequivocally determined as the healing time and maturation time of hard tissues varies from individual to individual [4].

Factors influencing successful regeneration

Each patient has a different healing potential that can directly influence the response to treatment. The patient-related factors that have a negative influence on the regeneration of these lesions include smoking, stress, diabetes mellitus, acquired immunodeficiency syndrome and other acute and debilitating diseases, and the presence of multiple deep periodontal pockets. Age, gender and type of periodontal disease do not seem to play a major role in regenerative therapy.

✓ Smoking.
✓ Stress
✓ Diabetismellitius
✓ Presence of multiple deep periodontal pockets

Intra-oral factors influencing successful regeneration

✓ Furcal Anatomy
✓ Cervical enamel projections and enamel pearls
✓ Root concavity
✓ Root trunk concavities
✓ Bifurcation ridge
✓ Accessory canal
✓ Entrance of the furcation
✓ Length of root trunks
✓ Type of tooth
✓ Defect Morphology
✓ Probing pocket depth
✓ Horizontal probing attachment level
✓ Distance of bone crest to base of defect
✓ Distance of furcation roof to base of defect
✓ Distance of furcation roof to crest of bone
✓ Interproximal bone height
✓ Root divergence
✓ Horizontal defect depth
✓ Thickness of Gingival Tissue
✓ Tooth Mobility [5]

Materials and Methods

A 28 year old patient was presented in the Department of Periodontics with pain in the upper left back tooth region associated with pus discharge since 1 month. The patient’s medical status was noncontributory. The tooth was characterized by gingival reddening and swelling at the palatal side. The patient complained of periodic discharge of pus from the periodontal pocket, and intermittent pain (figure 1) and tooth was vital and gave quick response to electric pulp testing. The radiograph showed infra-bony defect on mesial aspect of maxillary second molar (figure 2).

Figure 1: Pre-operative- abscess in left maxillary

Figure 2: Pre-operative radiograph showing second molar vertical bone loss

A written and well-versed consent was taken from the patient before the procedure. Immediate abscess drainage was done without flap reflection with curette and patient was kept on anti-inflammatory and antibiotics for 5 days. After healing of abscess, taking care of asepsis and sterilization the surgery was planned (figure 3). The area selected for surgery was anesthetized using xylocaine with adrenaline 1:200,000. A full thickness flap was raised at the palatal aspect (figure 4). After reflection thorough degranulation and debridement was done at the defect area using Gracey’s curette # 13 and 14. In addition a thorough scaling and root planning was carried out on the exposed root surface area of the defect (figure 5). Decalcified
freeze dried bone allograft with osteoconductive and osteostimulative properties was placed and stabilized with guided tissue regeneration barrier membrane and was sutured (figure 6). Periodontal pack was placed to provide better healing and to reduce patient discomfort.

Figure 3: periodontal probe showing pocket of 8mm

Figure 4: Sulcular incision on palatal aspect with #15 blade

Figure 5: Infrabony defect after flap reflection

Figure 6: GTR placement after DFDB allograft
Discussion

Six months after operating the patient with GTR placement surgery, the clinical examination revealed that, the tissues at selected sites were clinically healthy and resisted penetration of the probe. In addition the radiological analysis showed bone gain with the reduction of 5 mm in periodontal pocket depth (figure 7, 8). However, several studies have reported with the satisfactory results of GTR in different patterns of bone loss. Thomas von Arx and David L. Cochran have demonstrated that this technique can also be successfully applied in endodontic surgery. However, only a few controlled clinical and experimental studies have evaluated the membrane technique in endodontic surgery. Vouros I, Aristodimou E, Konstantinidis A reported the comparison of two bio-absorbable barriers (collagen and polylactic acid (PLA) membranes) combined with a bovine bone mineral (BBM) graft, with an access flap procedure (AFP) alone for treating intra-bony defects and showed greater PD reduction and CAL gain compared with AFP treatment [6-9].

Conclusion

The present study demonstrates periodontal regeneration with the application of guided tissue regeneration in the treatment of deep infrabony defects with successful healing and adequate bone gain and reduction in pocket depth after 6 months. Further research standardization of the numerous factors that influence the regenerative status (patient selection, standardized defect, analysis of defect and furcation characteristics, large sample size, and standardized evaluation methods) could lead us to better comparison of studies and will help to indicate the true impact of each factor on the final therapeutic result.

Financial Support/Assistance

None declared

Conflict of interest

The authors declare that there is no conflict of interest to reveal.
References


