

Triple System

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Abstract

Introduction: The ultimate goal of periodontal therapy is complete regeneration of the periodontal attachment apparatus. The combination of various regenerative biologic agents has recently attracted in the field of reconstructive periodontal surgery.

Aim: The aim of the case report is to evaluate the effect of combining bone replacement graft, guided tissue regeneration and concentrated growth factor in the surgical treatment of grade II mandibular furcation involvement.

Case report: A 29 years male patient came to the department of periodontics with chief complaint of pain in lower back tooth region. Following the initial examination, scaling and root planing was done. After two week the patient was recalled and surgical treatment was planned for the treatment of furcation defect with bone replacement graft, concentrated growth factor and guided tissue regeneration.

Discussion: The anatomical characteristics of the areas involved, particularly the size of the furcation entrance, the presence of root concavities and the uneven surface of the roof of the furcation, make adequate instrumentation of the inter-radicular area extremely difficult. Regeneration of new bone, cementum, and periodontal ligament is considered one of the primary objectives of periodontal therapy and has been demonstrated by numerous therapeutic grafting modalities for restoring.

Conclusion: The result of this report suggest that combination of these materials are effective in treating the furcation defects.

Keywords: Grade II furcation, CGF, bone replacement graft, GTR.

I. Introduction

The bony defects can be developed by periodontal disease, tooth loss, trauma and infection. The aim of periodontal therapy is to eliminate inflammatory process, prevent the progression of periodontal disease and also to regenerate the lost periodontal tissues¹. Periodontal regeneration can be achieved by surgical debridement with adjunctive root surface, implantation of bone, bone derivatives and substitutes and placement of barrier membranes for Guided tissue regeneration (GTR). It stimulates the effect on angiogenesis and epithelialization, concentrated growth factor (CGF) is an excellent material for enhancing bone healing.² The use of CGF may be a simple and effective method of improving the healing of the bone defects.

Its advantages over platelet-rich plasma include ease of preparation, ease of application, minimal expense, and lack of biochemical modification. The goals of therapy in furcation areas are the same as the goals in all periodontal therapy; arresting the disease process, and ultimately, maintaining the teeth in health and function with appropriate esthetics. Resorbable barriers and bone replacement grafts and more recently, the application of growth factors to the surgical wound are some of commonly employed techniques used to promote periodontal regeneration.²

The improvement in these clinical parameters has potential of creating new attachment leads to the consideration of GTR as the treatment of choice in this type of periodontal defect. GTR has offered better results than open-flap debridement or bone replacement grafts alone in mandibular class II furcation. The aim of the case report is to achieve the hopeless to hopeful teeth.

II. Method and Materials

29 year male patient referred to the Department of Periodontics from the Department of Oral Medicine and Radiology Adhiparasakthi dental college and hospital with chief complaints of pain during mastication and food impaction in lower right back tooth region for past 8 months. History of present illness confirmed dull pain in that region occasionally got worsened during mastication. On clinical examination of lower mandibular first molar deep periodontal pocket with furcation involvement was found on clinical examination of lower mandibular first molar. pulp vitality was done and tooth was found to be vital. [Fig 1]



Fig.1: Probing depth of 12 mm in relation to 46

On radiographic examination, intraoral peri apical radiographs confirmed Class II furcation involvement with the evident vertical bone loss surrounding the roots. Based on the clinical assessment and investigation, treatment planning was done. patient was given instructions in proper plaque control measures. In addition they receive basic periodontal therapy, i.e scaling and root planing. Two weeks later surgical procedure was planned.

Case Presentation

In the present case report, on examination, inflammation of the attached gingiva and presence of plaque, calculus was noted. Periodontal probing revealed a pocket depth of 12mm in relation to 46.

Radiographic examination

Intraoral periapical radiograph was taken which showed the presence of angular defect and furcation involvement. On examination of furcation with naber's probe it was not through and through



Fig 2: pre operative radiograph view in relation to 46

Initial phase of treatment included complete scaling and root planing. After two weeks, the patient was recalled and surgical treatment was planned for the treatment of furcation defect with bone replacement graft, concentrated growth factor and GTR membrane

CGF Preparation:

The use of CGF may be a simple and effective method in improving the healing of the bone defects. It can also serve as a resorbable interpositional membrane . The CGF layer avoids early invagination of the gingival epithelium, thereby serving as a barrier to epithelium migration.



Fig.3: centrifuged blood

The required quantity of blood is drawn in 10 ml test tubes without an anticoagulant and centrifuged immediately[fig.3].



Fig.4: Concentrated Growth Factor (CGF)

Blood is centrifuged using a MEDIFUGE, for 12 mins at 2,700 RPM. The resultant product consists of the 2 layers [fig.4,5]



Fig.5: Concentrated Growth Factor (CGF)

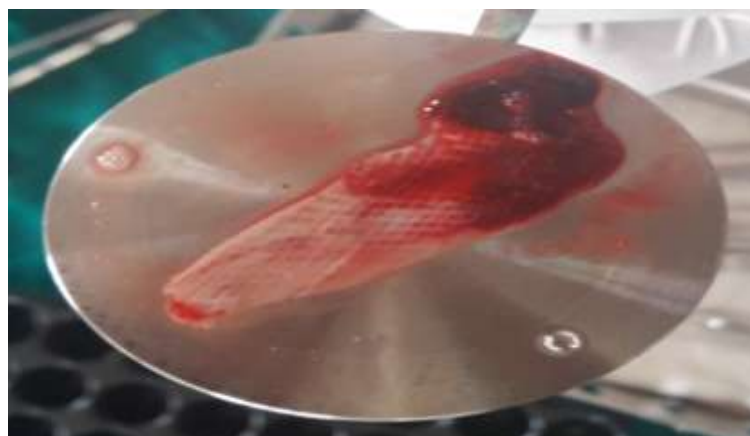


Fig.6: CGF prepared as membrane

Surgical produce:

The surgical protocol was involved in this study. After proper isolation of the surgical field, the operative sites were anaesthetized using 2% xylocaine hydrochloride with adrenaline (1:200000). Crevicular incisions were made using Bard–Parker No.15 blade on the facial and lingual surfaces of tooth involved. A full thickness muco-periosteal flap was reflected using periosteal elevator. After exposure, the furcation defect was thoroughly debrided[fig.7]



Fig.7: Grade II furcation involvement in relation to 46



Fig.8: Bone graft mixed with CGF

The root surface was then planed and the flap trimmed to remove granulation tissue tags and minimize bleeding. After debridement and pre-suturing was prepared. bone replacement graft is mixed with the concentrated growth factor preparation in a sterile dappen dish and placed into the defects to the level of the surrounding bony walls taking care not to over fill[fig.8,9] .



Fig.9: pre suture done and bone replacement graft placed in relation to 46

Remaining CGF was used as membrane above which collagen membrane was placed, following guided tissue regeneration membrane and closure of flap was done using 3-0 silk suture material[fig.10,11,12]. And periodontal dressing given [fig.13].



Fig.10: CGF membrane placed in relation to 46



Fig.11: GTR membrane placed in relation to 46



Fig.12: closure of flap done with 3-0 suture



Fig.13: periodontal dressing given

Post Operative Care

Following surgery the patient was instructed to rinse with a solution of 0.2% Chlorhexidine digluconate two times per day for 2 weeks postoperative. For the same period they were also advised not to brush the operated area. In addition, patient received, Antibiotics (Amoxicillin 500 mg 3 times for 5 days) Analgesic (Ibuprofen 400mg 2 times a day for 3 days) for 1 week postoperative. The sutures were removed after 2 weeks of healing.

Recall appointments were scheduled once in 20 days .At every recall appointment oral hygiene was checked and reinforced. Patient was reexamined and radiographs were taken at 6 months.



Fig .14: Probing depth of 5 mm in relation to 46



Fig.15: post operative radiograph view in relation to 46

III. Discussion

Periodontal diseases are among the most prevalent diseases world wide. They are the major causes of tooth loss in adults. The ultimate objective of periodontal therapy is to regenerate tissues lost as a consequence of periodontal disease. The classic approach to periodontal regeneration in the last many years has been the use of bone grafts only. The anatomical characteristics of the areas involved, particularly the size of the furcation entrance, the presence of root concavities and the uneven surface of the roof of the furcation, make adequate instrumentation of the inter-radicular area extremely difficult.³ Regeneration of new bone, cementum, and periodontal ligament is considered one of the primary objectives of periodontal therapy and has been demonstrated by numerous therapeutic grafting modalities for restoring⁴

The combination of various regenerative biologic agents and techniques has recently attracted in the field of reconstructive periodontal surgery. Growth factors play a major role to repair or generate damaged tissue.² Most of growth factors are in blood plasma and platelet. So platelet concentrates contains sufficient growth factors such as platelet derived growth factor(PDGF), transforming growth factor(TGF- β), Insulin-like growth factor(IGF-I), epidermal growth factor(EGF), vascular endothelial growth factor(VEGF), basic fibroblast growth factor(bFGF)

CGF is known to have higher tensile strength, higher growth factors and higher viscosity than PRF, so compressed CGF can be used barrier membrane with growth factors as alternative collagen membrane. This barrier induces faster formation and soft tissue healing. Concentrated growth factor(CGf) was first developed

by Sacco. CGF is produced by the centrifugation of venous blood as same as PRF. However, the technique is different on centrifugation speed. When it is mixed with bone graft, faster bone formation can be obtained as seen in this case report. The regeneration of class II furcation lesion, although possible, is not considered a totally predictable procedure, especially in terms of complete bone fill⁵. Despite achieving significant positive gains in new attachment using GTR, consistently successful treatment of furcation defects with membrane techniques remains a challenge⁶. In a concurrent Cochrane Summaries study of guided tissue regeneration for periodontal infra-bony defects, it was concluded that there is marked variability between studies of GTR. However, GTR plus bone grafts showed a greater amount of hard tissue sounding⁷

Furcation morphology may restrict access for adequate debridement and root instrumentation and may have a reduced source of available cells and blood supply from the periodontal ligament and bone defect. One important factor for successful regeneration at furcation and non-furcation sites is the amount of periodontium that remains apical and lateral to the defect. Coronal migration of cells originating from the periodontal ligament and bone marrow spaces is particularly critical to the healing outcome following periodontal regenerative procedures in furcation defects. Results of this clinical trial demonstrate that the functioning of GTR in association with grafting material includes an improved space making effect of the barrier which is conducive to cell events leading to periodontal regeneration and facilitation of mineralized tissue formation due to osteoconductive properties possibly inherent in the graft material. The use of CGF in the form of gel in conjunction with bone grafts, which offers several advantages including promoting healing, bone graft and maturation, graft stabilization, wound sealing and hemostasis, and improving the handling properties of graft materials⁸. Other treatment modalities that have been used successfully are root resection and hemisection procedures.

IV. conclusion

In conclusion, the results of this report suggest that use of this three materials is effective in treating furcation defects.

Reference

- [1]. Gokmenoglu C et al. Bone Defects with Concentrated Growth Factor: Four Case Reports. *International Journal of Oral and Dental Health* 2016;2(2):1-3.
- [2]. Anilkumar k et al. Triple Combination Therapy-A 12 Month Case Series. *International Journal of Science and Research (IJSR)* 2013;4(1):1684-89.
- [3]. DeSanctis M, Murphy KG. The role of resective periodontal surgery in the treatment of furcation defects. *Periodontol* 2000;22:154-68.
- [4]. Parihar S A. Furcation involvement & its treatment: a review. *Journal of Advanced Medical and Dental Sciences Research* 2015; 3(1):81-87
- [5]. The effect of concentrated growth factors on ridge augmentation. *Dental inc* 2009:37-40.
- [6]. Novaes A B. Regeneration of Class II Furcation Defects: Determinants of Increased Success. *Braz Dent J* ;2005;16(2): 87-97
- [7]. Tsung-Hung Chen. A systematic review and meta-analysis of guided tissue regeneration/osseous grafting for the treatment of Class II furcation defects. *Journal of Dental Sciences* 2013; 8: 209-224.
- [8]. Marinescu G A. Evaluation of treatment techniques for advanced (grade ii – iv) furcation defects. A literature review of the regenerative methods. *Tmj* 2011;l. 6:115-124.