

Case Series

Periodontal Tissue Regeneration in Various Osseous Defects Treated With GTR and Bone Grafts- A Case Series

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Abstract: Periodontal therapy eliminates inflammatory process, arrests disease progression and ultimately regenerates lost periodontal structures. Periodontium consists of four different tissues with different healing abilities. Full regeneration of the periodontium following different periodontal treatment has been difficult to achieve. Bone graft acts as scaffold and GTR membrane enables cell exclusion separating the flap from the fibrin clot and guards the space for the new alveolar bone and the periodontal ligament regeneration. Thus bone graft along with GTR membrane enhances desired periodontal tissue regeneration. This case report describes the management of different osseous defects with the help of surgical periodontal therapy using bone graft and guided tissue regeneration (GTR) membrane. Radiographic evidence of alveolar bone gain with restored health and function were observed in these clinical cases.

Keywords: Periodontal regeneration, Osseous defects, Bone graft, Guided tissue generation

INTRODUCTION

The aim of periodontal therapy is to arrest & control periodontal infection and ultimately to regenerate lost periodontal structures. Regeneration is the growth and differentiation of new cells and intercellular substances to form new tissues [1,2]. Melcher stated that regeneration of the periodontal ligament is the key to new attachment. New attachment occurs on tooth surface previously denuded by the disease and it constitutes ideal periodontal healing [3-5].

One of the important factors that limit the predictable regeneration is down growth of the junctional epithelium along the denuded root surface. Nyman *et al.*; suggested the placement of a physical barrier between the flap and the root surface to exclude gingival connective tissue and epithelium from the healing process, giving the periodontal ligament cells the opportunity to repopulate on the root surface [6,7]. Bone graft materials are capable of differentiation and formation of bone or acts as a scaffold for bone growth [4, 5]. The following case series shows the regeneration in various osseous defects with the combined use of bone graft and GTR membrane.

CASE REPORT SERIES

All three cases reported to the Department of Periodontology, Darshan Dental College and Hospital, Udaipur. Initial treatment plan included motivation, instructions for home care, professional supra-gingival debridement and sub-gingival root planning.

Treatment objectives were to gain periodontal health, preservation of the teeth and improvement in function.

Case 1: Combined endo-perio lesion

A 45 year old male patient reported with chief complaints of pain, swelling, and mobility in right lower posterior jaw region since 7 days. On clinical examination, severe gingival inflammation associated with periodontal abscess, grade II mobility, probing depth of 12mm on the mesial and distal roots and class II buccal furcation involvement was present in relation to 46 (figure-1). Radiograph revealed presence of a deep intrabony and furcation defect associated with tooth 46. (Figure 2).



Fig 1: Pre-operative view of tooth 46 with periodontal abscess & probing depth of 12 mm



Fig 2: Pre-operative radiograph of 46 showing endo-perio lesion

Drainage of periodontal abscess followed by local drug delivery with tetracycline fiber (Periodontal plus AB™) was done. Intentional root canal treatment was done in 46 followed by surgical periodontal therapy

(figure 3, 4, 5). Post-operative evaluation after six months showed asymptomatic tooth, probing depth reduced to 3mm and resolution of osseous defect. (Figure 6, 7).



Fig 3: After full thickness flap reflection



Fig 4: After bone graft placement



Fig 5: After GTR membrane placement



Fig 6: Post-operative view after 8 months showing no gingival recession and 3 mm of residual probing depth

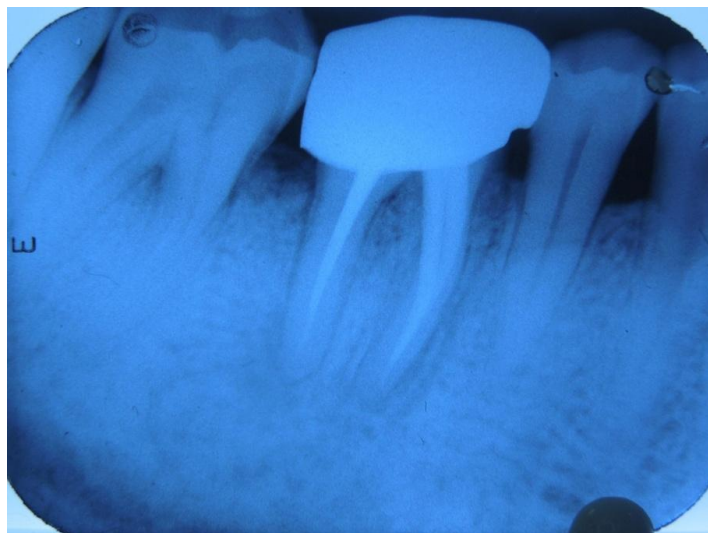


Fig 7: Post-operative radiograph shows resolution of intrabony & furcation defect

Case 2: Wide one wall osseous defect with severe osseous dehiscence extending till apex

A 50 year old woman reported with complaints of pain and mobility in right lower front jaw region. The clinical examination revealed periodontal abscess, probing depth of 10 mm on the mesial and buccal aspects with grade II mobility in relation to 42 (figure 8). Radiographic examination revealed horizontal and

vertical bone loss in tooth 42. Treatment included surgical periodontal therapy (figure 9, 10, 11). Provisional splinting was done to stabilize the mobile tooth. Post-operative evaluation after six months showed reduction in mobility and probing depth along with apparent bone fill in the osseous defect. (Figure 12).



Fig 8: Pre-operative view of 42 with abscess



Fig 9: After flap reflection dehiscence extending till root apex of 42



Fig 10: Bone graft placed and condensed into defect



Fig 11: Bone graft supported by GTR membrane

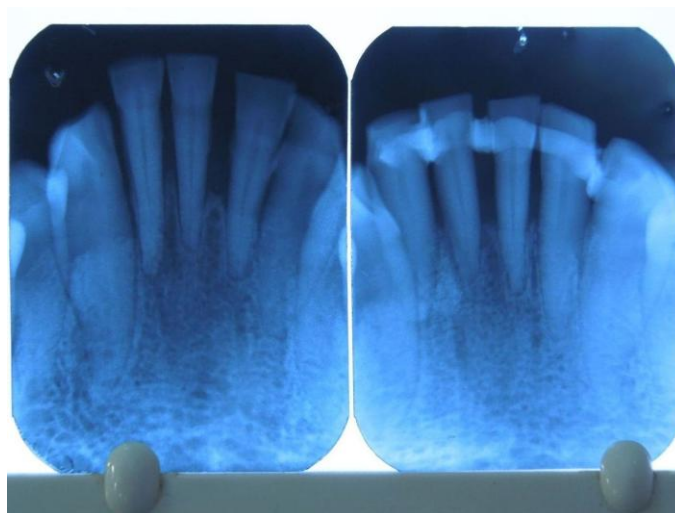


Fig 12: Pre and post-operative radiographs after 6 months

Case 3: Class II furcation defect

A 45 year old male was referred for periodontal therapy. The clinical examination revealed chronic generalized periodontitis with class II buccal furcation in tooth 46 (figure 13). The probing depth was

7 mm with distal root of 46. Treatment included surgical periodontal therapy (figure 14, 15, 16). Post-operative evaluation after six months revealed apparent bone fill in furcation with resolution of osseous defect. (figure 17).



Fig 13: Pre-operative view of 46 showing class II furcation involvement



Fig 14: After flap reflection



Fig 15: Bone graft placed and condensed into buccal furcation



Fig 16: GTR membrane placement

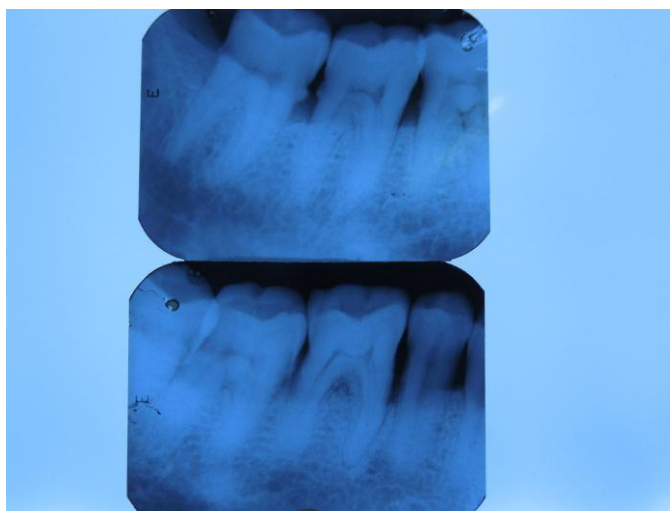


Fig 17: Pre and post-operative radiographs after 6 months

Surgical periodontal therapy-

After evaluation of non-surgical therapy response, surgical treatment was performed. The surgical technique employed full-thickness envelope flap reflection with sufficient exposure of the defect for

adequate visualization and access for debridement. The defect was debrided of granulation tissue and the root surface planned to remove plaque, calculus, enamel projections and other root surface alterations using ultrasonic and hand instrumentation. The area was

thoroughly cleansed and isolated. Bone graft G-BONE™ (Modified hydroapatite granules) was packed firmly in the defect along with covering the root trunk, furcation and combination or confluent intrabony, dehiscence or horizontal/crystal osseous defects. The custom fitted guided tissue membrane HEALIGUIDE™ (absorbable collagen membrane) was placed over the graft in the desired region. The flap was repositioned to cover the membrane and sutured. Periodontal dressing was applied over the surgical area with COE-PAK™ covering the sutures. Dressing was removed after 10 days. Gentle debridement of the area with supra-gingival plaque removal was performed. Postoperative medication regimen included 7 day antibiotic coverage. Supportive periodontal therapy program was then pursued to evaluate healing pattern and plaque control. Follow up was done weekly in first month after surgery, followed by monthly visit for 6 months. Radiographic evaluations were done after 6 months [8, 9].

DISCUSSION

Bone replacement grafts (bone grafts and bone graft substitutes) provides a structural framework for clot development, maturation and remodelling that supports bone formation in osseous defects. Guided tissue regeneration (GTR) materials have been used to exclude epithelium and the gingival cells from the root to delay epithelial down growth during healing and to provide an opportunity for the progenitor cells of the periodontal ligament and bone to repopulate. Wang and Boyapati have suggested four factors as the PASS principle, that are critical for predictable bone regeneration:(1) Primary wound closure, (2) angiogenesis as a blood supply and source of undifferentiated mesenchymal cells, (3) space maintenance, and (4) stability of the wound [10]. Combining osseous grafting with guided tissue regeneration may enhance support to the gingival tissues in presence of non-supportive wide intrabony and furcation defects [8]. Regeneration at the furcation and intrabony sites is depended on the amount of periodontium that remains apical and lateral to the defect. Murphy stated use of augmentation materials in addition to the physical barrier enhances the regenerative outcome in the treatment of intrabony and furcation defects. GTR is a technique sensitive procedure requiring adequate covering of the membrane to prevent any kind of exposure [11-13]. The clinical and radiographic outcome in all the cases discussed showed improved results in resolution of lesion, reduction in probing depth and mobility with significant gain in bone fill when combined technique of bone graft and GTR was followed.

CONCLUSION

Combined use of bone graft and GTR membrane in these different osseous defects like endo-perio lesion, wide one walled defect and class II furcation resulted in significant clinical and radiographic improvements over a period of 6 months.

The predictive outcome in such cases also depends on thorough examination, case selection, patient motivation and long term maintenance.

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