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CASE STUDY

PERIODONTAL REGENERATION FOR INTRABONY DEFECT AND CLASS II FURCATION INVOLVEMENT –A CASE SERIES

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ABSTRACT

The main goal of Periodontal regeneration is the treatment of teeth affected by periodontitis. Periodontal regeneration is quite challenging to the dentist especially when it is in the furcation area and in intra bony defects. Furcation-involvement is an extension of inflammation into the: bi or trifurcation region of multirooted teeth. Several treatment modalities have been proposed based on the grade of furcation involvement and intra bony defects. This paper presents a case series of an endodontically, treated tooth with a furcation involvement and intra bony defects with the help of surgical intervention, including the guided tissue regeneration (GTR) membrane and bone graft materials. This combined treatment resulted in a healthy periodontium, with radiographic evidence of alveolar bone gain at 3 months follow up.

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INTRODUCTION

Periodontal regeneration is the natural renewal of a structure produced by growth and differentiation of new cells and intercellular substances to form new tissues. (Newman *et al*., 2006) The ultimate objective of periodontal therapy is to regenerate tissues, lost as a consequence of periodontal disease. However, when a significant loss of the periodontal attachment apparatus and osseous structure occurs, the long-term prognosis of the tooth becomes poor. One of the most important indications of guided tissue regeneration (GTR) technique is treatment of grade II furcation defect. The concept of GTRis a barrier inserted 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. (Verma *et al*., 2012) The etiologies of furcation involvement may include anatomic factors, extension of inflammatory periodontal disease, trauma from occlusion, pulpo-periodontal disease and root fracture involving furcations. (Raja *et al*., 2007) Furcation involvemrnts are classified in several ways: given by Glickman, Lindhe, Tarnow and Fletcher classified the vertical depth from the roof of furca apically. (Manjeetmapara *et al*., 2012) Initial grade II furcation can be treated by GTR and advanced grade II furcation and initial grade 3 furcation can be treated by using bone graft materials. (Lindhe *et al*., 2008) This case series deals with treatment of grade II furcation (Glickman s classification) and intra bony defect. The furcation was treated using resorbable collagen membrane and bone grafts for regeneration of endodontically treated teeth in lower quadrants. The results of each case were monitored by radiographic evaluation for a period of 3 months followup.

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Case series

Case 1: A 63 year old male patient visited to department of Periodontics KLE VK Institute of dental sciences Belagavi. His chief complaint was pus discharge in lower left back region of the jaw since 6 months. Patient was apparently all right until 4-5 years ago when he started experiencing pain in the lower left back region of jaw. Pain occurred spontaneously and was nocturnal in nature, the pain was relieved by consuming analgesics. Patient has undergone root canal treatment for the same (tooth- 36). On examination of 36 region there was a draining sinus. Thus patient was advised to undergo Re-RCT with 36. The sinus tract healed uneventfully with healthy gingiva. Patient also gave history of hypertension since 6 yrs, and he was on Losartan (50mg) + Amlodipine (5mg) hence BP was monitored at each appointment. Dental history reveals scaling, extraction with 37. RCT with 36 4-5 yrs ago. On clinical examination with 36 it was noted that there was a pocket ranging 7mm buccally, grade 2 furcation

involvement. On radiographic examination, 70-80% bone remaining Mesially & distally, hence Periodontal prognosis was good. Based on clinical and radiographic findings diagnosis was given as Primary endodontic lesion with secondary periodontal involvement with 36.

Treatment

Phase I therapy was carried out and then patient was prepared for surgical intervention. Regenerative periodontal surgery was done to treat the furcation defect. A localized Kirkland flap (access flap) was elevated (Case No. 1 Figure A), after debridement and curettage of the defect, a freeze dried bone allograft (particle size < 500 um) (TATA TISSUE BANK, PAREL, MUMBAI) was placed in the defect followed by coverage by a resorbable collagen membrane (presutured) (HEALIGUIDE) and sutured with 4-0 Vicryl resorbable sutures. Antibiotics Amoxycillin (500mg) – TDS x 5days and Metrogyl (400mg)- TDS x 5days and anti-inflammatory Aceclofenac- 100mg B.D x 3days were prescribed. Healing at 10 days post-operative (Case No. 1 Figure B), was excellent with no clinical recession or membrane exposure. Pre operative and 3 months post operative radiographs were taken (Case No. 1 Figure C &D) and evaluated.

Case 2: A 29 year old male patient visited to department of Periodontics KLE VK Institute of dental sciences Belagavi with chief complaint of Pain in lower right back region of jaw since 7 days. Patient was apparently all right 1 week ago until he started experiencing pain in the lower right back region of jaw with swelling in the same region. The patient also complained of inability to chew from that region. General health was good without any medical history. Dental history reveals restoration with 16, 37 & extraction with 47. On clinical examination Class 1 recession with 14, 24 and Crowns with 26, 36 and composite restoration with 46, Tender on

Case No 1

Figure A Pre operative grade II furcation

Figure B Post operative 3 months

Figure C Pre operative Radiograph

Figure D Post operative Radiograph

Case No 2

Figure A Pre operative

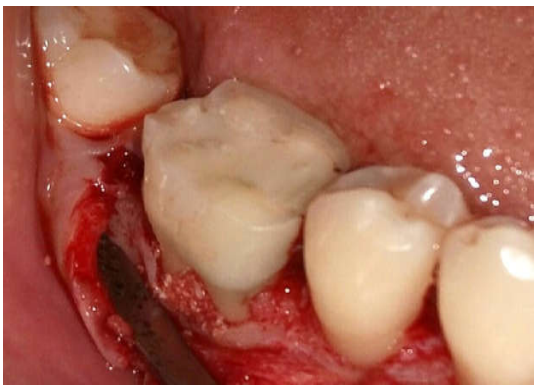

Figure B bone graft placement

Case No 3

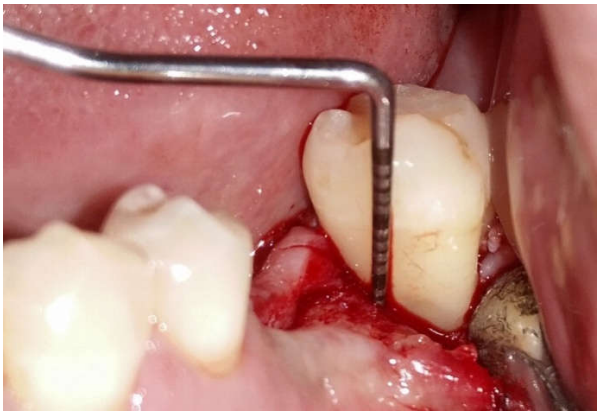

Figure A Pre operative

Figure B Graft and membrane placement

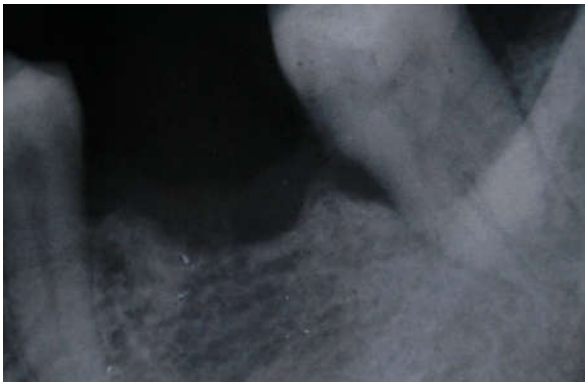

Figure C pre operative Radiograph

Figure D post operative Radiograph

percussion was (TOP) Positive, and on probing there was a pocket measuring 9mm buccally, and grade 2 furcation involvement buccally, was observed with 46 (Case No. 2 Figure A). On radiographic examination, 80-90% bone was remaining mesially and distally therefore Periodontal prognosis was good with 46. Based on clinical and radiographic findings diagnosis was given as Primary endodontic lesion with secondary periodontal involvement with 46

Treatment

Non surgical therapy was done and pt was prepared for surgery. Regenerative therapy was planned with 46. A localized Kirkland flap (access flap) was elevated, after debridement and curettage of the defect, a freeze dried bone allograft (particle size < 500 um) (TATA TISSUE BANK, PAREL, MUMBAI) was placed in the defect followed by coverage by a resorbable collagen membrane (HEALIGUIDE) and sutured with 4-0 Vicrylresorbable sutures (Case No. 2 Figure B). Antibiotics Amoxycillin (500mg) – TDS x 5days and Metrogyl (400mg)- TDS x 5days and anti-inflammatory Aceclofenac- 100mg B.D x 3days were prescribed. Healing at 10 days post-operative was excellent with no clinical recession or membrane exposure.

Case 3: A 58 year old male patient visited to department of Periodontics KLE VK Institute of dental sciences Belagavi with chief complaint of replacement of missing teeth. On clinical examination it was noted there was missing 36 and Class 1 gingival recession with 37 and grade 1 mobility with pocket measuring 6 mm mesially was present (Case No. 3 Figure A). On radiographic examination adequate amount of bone was remaining, 2 wall defect- 4mm depth, radiographic defect angle- 20 degrees (Case No. 3 Figure C). Thus the Periodontal prognosis was fair with 37. After phase I therapy regenerative therapy was planned with 37. Regenerative periodontal surgery was done to treat and regenerate the intra bony defect. A localized Kirkland flap (access flap) was elevated with a crestal incision on edentulous ridge, after debridement and curettage of the defect, a freeze dried bone allograft (particle size < 500 um) (TATA TISSUE BANK, PAREL, MUMBAI) was placed in the defect followed by coverage by a resorbable collagen membrane (HEALIGUIDE) and sutured with 4-0 Vicryl resorbable sutures (Case No. 3 Figure B). Antibiotics Amoxycillin (500mg) – TDS x 5days and Metrogyl (400mg)- TDS x 5days and anti-inflammatory Aceclofenac- 100mg B.D x 3days were prescribed. Healing at 10 days post-operative was excellent with no clinical recession or membrane exposure. 3 months post operative radiographs were taken (Case No. 3 Figure D).

DISCUSSION

Traditionally the elimination of deep pockets is achieved by gingivectomy or apical displacement of raised tissue flaps, sometimes associated with bone contouring. In recent years, however, the use of regenerative procedures aimed at restoring the lost periodontal support has become more common. An indication to apply regenerative periodontal therapy is to obtain root coverage in order to improve esthetics and reduce root sensitivity. Another indication for regenerative periodontal therapy is furcation involved teeth. The furcation area is often inaccessible to adequate instrumentation and frequently the roots present concavities and furrows which make proper cleaning of the area after resective surgery impossible. The

long term prognosis of furcation involved teeth can be improved considerably by successful regenerative periodontal therapy. (Lindhe *et al*., 2008) Randomized controlled studies document the potential to achieve periodontal regeneration in intra bony defects using a variety of regenerative therapies, including selected bone replacement grafts such as demineralised freeze –dried bone allograft(DFDBA) guided tissue regeneration (GTR), biologics (enamel matrix derivative (EMD) and recombinant human platelet derived growth factor-BB(rhPDGF) and β tricalcium phosphate as well as combination therapies. Improvements in clinical parameters are generally associated with radiographic evidence of hard tissue defect fill. Defectfill of 50% to 60% or greater is commonly observed after regenerative therapy. (Mark A. Reynolds *et al*., 2015) Surgical therapy involving regenerative procedures are indicated in class II and III furcation involvements. The regenerative procedures used in these cases include bone grafts and guided tissue regeneration. One important factor for successful regeneration at the furcation and non furcationsites is the amount of periodontium that remains apical and lateral to the defect. Coronal migration of cells originating from periodontal ligament and bone marrow spaces is particularly critical to the healing outcome following periodontal regenerative procedures in furcation defects. Here. The role of the bone graft is space making and also inducing bone formation. Space maintenance involves the creation of space for periodontal tissues to grow.[2,3] Periodontal regeneration is a technique sensitive procedure. A poor operative technique in membrane placement or surgical soft tissue management and failure to cover membrane adequately can cause gingival recession and membrane exposure. (Lindhe et al., 2008) However in the above case series use of GTR membrane combined with a bone graft, resulted in successful healing after an 3-month followup period. The clinical and radiographic findings have shown good result in significant reduction of probing depth and gain in bone fill in all the 3 treated cases.

Conclusion

Multiple regenerative strategies including bone regenerations, GTR, biologics and combination therapies are effective in achieving periodontal regeneration in intra bony defects. At present, multiple regenerative techniques are widely available. In the above mentioned case series with the use of collagen membrane along with bone graft material has been successfully used in the treatment of grade II furcation and intra bony defects. Clinical improvement after regenerative therapy can be maintained long term with effective oral hygiene combined with appropriate professional care.

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