Journal of Multidisciplinary Dental Research

Case Report

Combined Resective and Regenerative Therapy - A Novel Approach in the Management of Furcation Involvement: A Case Report

Amruth Ganesh[1,*], Jyosthna Ganapathi Madhurkar[2], Shashikanth Hegde[3], Sneha Bhat[4], Haziel Jenifer[4]

[1]*Post graduate, Department of Periodontology, Yenepoya Dental College, Yenepoya (Deemed to be) University, Derelakatte, Mangalore, 575018, Karnataka, India*
[2]*Assistant Professor, Department of Periodontics, SDM College of Dental Science and Hospital, Dharwad, 580009, Karnataka, India*
[3]*Professor, Department of Periodontology, Yenepoya Dental College, Yenepoya (Deemed to be) University, Derelakatte, Mangalore, 575018, Karnataka, India*
[4]*Reader, Department of Periodontology, Yenepoya Dental College, Yenepoya (Deemed to be) University, Derelakatte, Mangalore, 575018, Karnataka, India*

ARTICLE INFO

Article history:
Received 13.04.2022
Accepted 22.04.2022
Published 08.07.2022

[*] *Corresponding author.*
Amruth Ganesh
dr.amruthganesh@gmail.com

https://doi.org/10.38138/JMDR/v8i1.22.13

ABSTRACT

Periodontal furcation involvement represents a challenge in the treatment of periodontally compromised molars. Different treatment modalities are advocated in the treatment of FI including non-surgical therapy, resective and regenerative treatment, according to subject and site factors and degree of involvement of individual affected molars. The aetiology of FI include anatomic factors, extension of inflammatory periodontal disease, trauma from occlusion, pulpo periodontal disease and root fracture involving furcations. An emerging approach to periodontal therapy is a concept of regeneration. In this case report a novel combination therapy of a blend of platelet rich fibrin with bone graft was used in the management of grade III furcation involvement. Results showed successful outcome in terms of esthetics and function.

Keywords: Root resection; Furcation involvement; Bone graft; PRF

1 INTRODUCTION

Periodontal disease is a multi-factorial disease often denoted by loss of connective tissue attachment. Attachment loss in the furcation is one of the most serious anatomical sequels of periodontitis. Furcations are frequently not accessible for adequate professional debridement.[(1)]

Furcation lesions are particularly difficult to treat both by nonsurgical and surgical treatment modalities. The anatomical characteristics, such as size of the furcation entrance, presence of root concavities and uneven surface of furcation roof, make adequate instrumentation of the inter-radicular area extremely difficult even with Open-flap technique.[(1)]

In 1954 several authors advocated root resection technique which was initially reported in 1884 and 1886 to eliminate furcation invasion of diseased molars.[(2)]

Recently the combination of resective and regenerative therapy has been developed in order to reduce the risk of molar tooth loss (Varughese et al. 2015).[(3)]

The present case report describes a successful Management of furcation involved maxillary first molar by combined resective and regenerative approach using a blend of Platelet-Rich fibrin and bone graft.

2 CASE REPORT

A 50-year-old male patient reported to the Department of Periodontology with the chief complaint of pain and mobility in the upper right back tooth, the pain was intermittent for the past 6months, which aggravated on mastication and relieved on medication. The patient was a known diabetic and was under medication for the past 3years. Past dental history revealed patient underwent multiple restorations.

On clinical examination with respect to 16, probing pocket depth of 2 mm mesially, 3 mm distally, Loss of attachment of 5mm mesially, 8mm distally. Inadequate attached gingiva, grade III furcation involvement, Grade I mobility was also noticed. Radiographic examination revealed bone present till the middle third of the mesial root and at the apical third of the distal root, radiolucency seen at the furcation region. A clinical diagnosis of chronic generalised gingivitis with localised periodontitis was arrived. Prognosis of 16 was fair. Treatment plan of Root canal treatment followed by root amputation of distobuccal root of 16 was planned to salvage the periodontally compromised tooth.

The patient was subjected to scaling and Root planing using a combination of the ultrasonic scaler and Gracey curettes and provided with oral hygiene instructions. The patient then underwent Root canal treatment of 16.

The surgical site was isolated and anesthetized with 2% Lignocaine hydrochloride with adrenaline (1:80000). The intra-sulcular incision from the mesial of 15 till distal of 17 was made using #15 blade (Fig. 5) and full-thickness flap was elevated beyond the mucogingival junction (Fig. 6). After degranulation (Fig. 7), the distobuccal root was resected using straight fissure carbide bur(Fig. 9). Thorough debridement was carried out and the socket was irrigated with saline.

Fig. 1: First Visit

Fig. 2: After Phase I therapy

In the meantime, intravenous blood from the antecubital vein was collected (Fig. 14) in a 10 ml sterile tube without anticoagulant and immediately centrifuged at 3000 rpm for

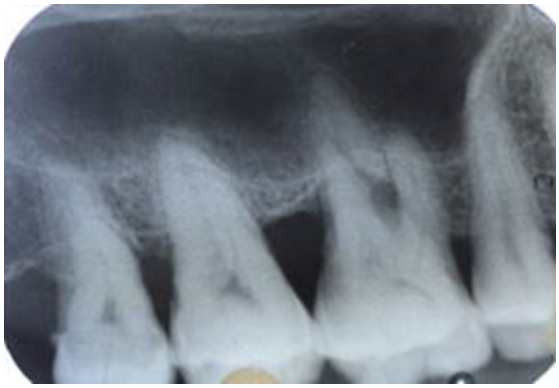

Fig. 3: Pre-operative radiograph

Fig. 4: Pre-surgical radiograph

Fig. 5: Incision placed

10 min. PRF was easily separated from red corpuscles base (preserving a small RBC layer) using sterile tweezers (Fig. 16) just after removal of PPP (platelet-poor plasma) and then transferred into a sterile dappen dish(Fig.17).

A blend of β-TCP (R.T.Rcone) and PRF was placed in the defect (Fig. 19). The mucoperiosteal flap was coronally advanced using 3-0 silk (Mersilk) sutures (Fig. 21). Periodontal dressing (COE-pack) was placed in relation to the surgical site (Fig. 22). The resected tooth was ground out of occlusion. Antibiotics (C.Amoxicillin 500mg)

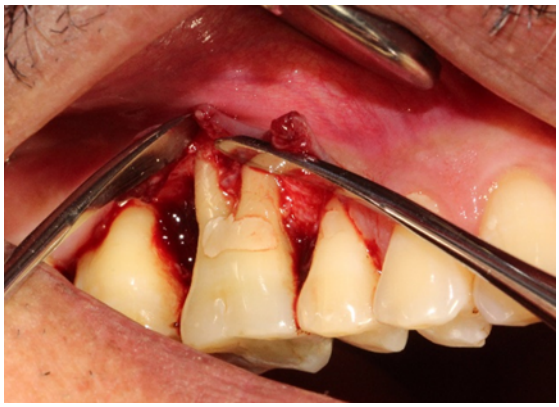

Fig. 6: Flap reflected

Fig. 7: Debridement done

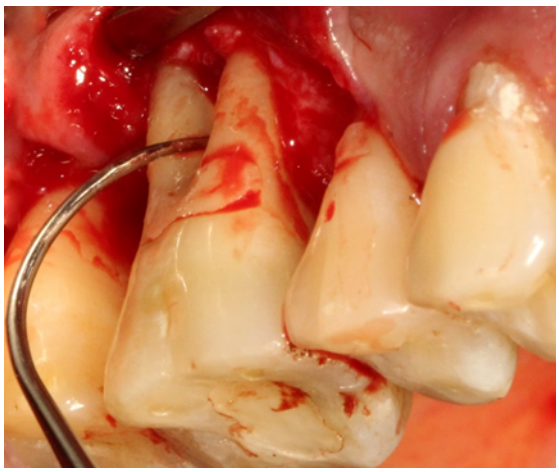

Fig. 8: Probing done to assess furcation involvement

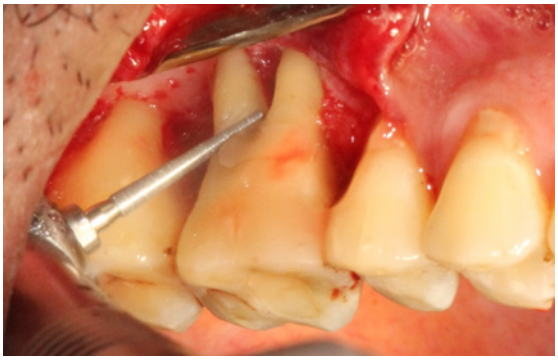

Fig. 9: Resection ofdisto-buccal root

Fig. 10: Separated disto-buccalroot

Fig. 11: Resected disto-buccalroot

and Analgesics (T.Paracetamol 650mg) were prescribed for 5days. The patient was recalled after 1week for suture removal (Fig.23). Healing was found to be satisfactory.

9months post-operatively, PFM crown was fabricated and fixed in relation to 16(Fig. 30). The clinical and radiographic evaluation indicated good bone healing and a successful outcome of saving the functional component of the furcally involved periodontally compromised tooth.

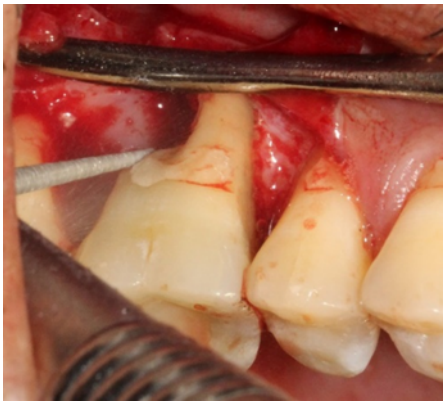

Fig. 12: Smoothening the resected site

Fig. 13: After thorough debridement of 16

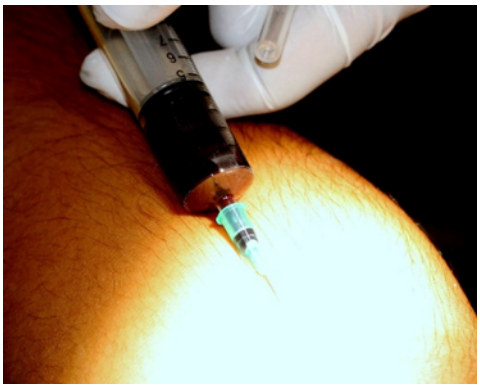

Fig. 14: Blood drawn from ante cubital vein

3 DISCUSSION

The present case demonstrated that root-resective therapy and regenerative therapy in the management of furcation involving molar can be considered as an effective measure to resolve the periodontal problem of furcation defect and to maintain a favorable long-term prognosis of the treated tooth.

Fig. 15: Prepared platelet concentrate

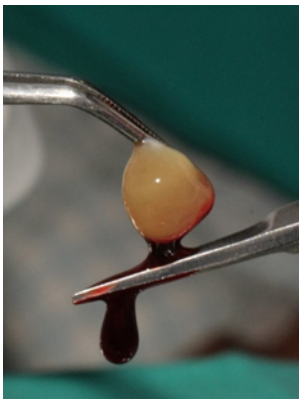

Fig. 16: Removal of RBC from the obtained fibrin clot

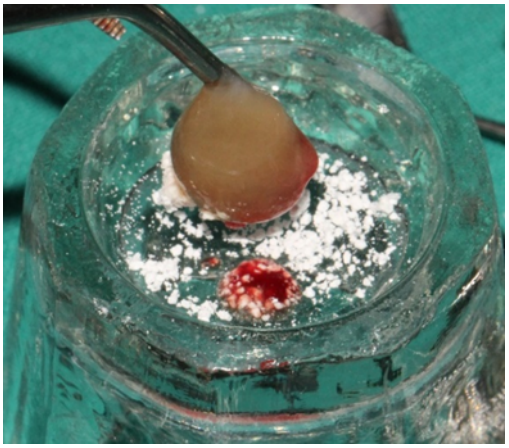

Fig. 17: PRF mixed with β-TCP

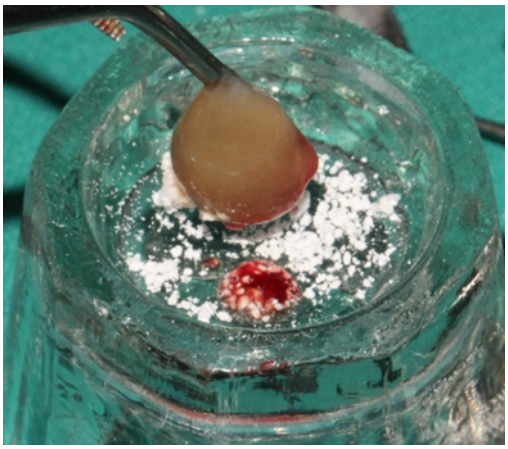

Fig. 18: Prepared graft material

Fig. 19: Placement of graft

Fig. 20: Graft placed in the socket

Fig. 21: Suturing done

Fig. 22: Periodontal pack placed

Fig. 23: 1-week post-operative

Fig. 24: 2-weeks post-operative

Fig. 25: 3-monthspost-operative

Fig. 26: 4-monthspost-operative

Fig. 27: 6-monthspost-operative

Fig. 28: Prosthetic preparation of 16 done for PFM crown

Fig. 29: Temporary crown fabricated

Fig. 30: PFM fabricated and placed in 16

Studies conducted Wang et al, Bergenholtz et al for a period of 5-10 years concluded that root resection of the molars that were furcally involved showed better long term successful outcomes.[4,5]

In a 5year follow up study carried out by Hamp et al. total elimination of plaque retention areas in the furcations and meticulous oral hygiene in conjunction with maintenance therapy was cited as the reason for success.[6]

Resorable-tissue-replacement (RTR) is composed of β-tricalcium phosphate coated with highly purified bovine collagen fibers which is ideal for Osteoconduction. This heterologous biomaterial, once placed, is completely absorbed in 6-9 months, and replaced by new bone. During resorption, it provides with Ca and phosphate ions at the site of regeneration, creating an ideal alkaline pH, which stimulates the activation of alkaline phosphatase enzyme, which is essential to the ossification.[7]

Faster and uneventful healing is achieved when platelet concentrates like PRF is used. It contains growth factors

and cytokines that combats inflammation and aid in bone healing. It also acts as a scaffold for regeneration of bone cells. A study conducted by Dohan et al. concluded that there was definite improvement in bone regeneration in cases treated with PRF than without PRF. [8]

The failure rates of single-implants and hemisection are similar. Therefore, root resection after endodontic treatment was preferred. The distal root was resected because of poor bone support. The literature on distal root resection is limited; often, this root is retained. [9]

The use of a blend of PRF and bone graft to form a gel consistency gives enhanced graft stability, retention and lesser chances of displacement. This being an important pre-requisite for successful regeneration, lead to improved treatment outcome and bone fill in this case.

4 CONCLUSION

Regeneration or restoration is the primary goal of periodontal therapy, Root resection is a treatment modality that restores the function of the tooth involved, but regenerative procedures are the ones restoring the balance in the periodontal tissues. Use of PRF and β-TCP has proven to help in achieving regeneration. A combined approach of resective and regenerative therapy is the final attempt to salvage a furcally involved tooth that might otherwise be extricated.

REFERENCES

1) Balachandran A, Sundaram S. Resective procedures in the management of mandibular molar furcation involvement: A report of three cases. *Journal of Interdisciplinary Dentistry*. 2014;4(1):41–45. Available from: https://www.jidonline.com/text.asp?2014/4/1/41/135010.
2) Newell DH. The role of the prosthodontist in restoring root-resected molars: A study of 70 molar root resections. *The Journal of Prosthetic Dentistry*. 1991;65(1):7–15. Available from: https://doi.org/10.1016/0022-3913(91)90039-y.
3) Varughese V, Mahendra J, Thomas AR, Ambalavanan N. Resection and Regeneration – A Novel Approach in Treating a Perio-endo Lesion. *Journal of Clinical and Diagnostic Research*. 2015;9(3):8–10. Available from: https://doi.org/10.7860/jcdr/2015/11096.5643.
4) Wang HL, Burgett FG, Shyr Y, Ramfjord S. The Influence of Molar Furcation Involvement and Mobility on Future Clinical Periodontal Attachment Loss. *Journal of Periodontology*. 1994;65(1):25–29. Available from: https://doi.org/10.1902/jop.1994.65.1.25.
5) Bergenholtz A. Radectomy of Multirooted Teeth. *The Journal of the American Dental Association*. 1972;85(4):870–875. Available from: https://doi.org/10.14219/jada.archive.1972.0445.
6) Hamp SEE, Nyman S, Lindhe J. Periodontal treatment of multi rooted teeth.. Results after 5 years. *Journal of Clinical Periodontology*. 1975;2(3):126–135. Available from: https://doi.org/10.1111/j.1600-051x.1975.tb01734.x.
7) Coetzee AS. Regeneration of Bone in the Presence of Calcium Sulfate. *Archives of Otolaryngology - Head and Neck Surgery*. 1980;106(7):405–409. Available from: https://doi.org/10.1001/archotol.1980.00790310029007.
8) Ehrenfest DMD, Diss A, Odin G, Doglioli P, Hippolyte MPP, Charrier JBB. In vitro effects of Choukroun's PRF (platelet-rich fibrin) on human gingival fibroblasts, dermal prekeratinocytes, preadipocytes, and maxillofacial osteoblasts in primary cultures. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology*. 2009;108(3):341–352. Available from: https://doi.org/10.1016/j.tripleo.2009.04.020.
9) Rajesh H, Dharamsi A, Rajesh KS, Hegde SA. Root resection: Apropos of 6 cases. *Archives of Medicine and Health Sciences*. 2014;2(2):209–209. Available from: https://doi.org/10.4103/2321-4848.144342.