

Surgical Management of Periapical Lesion in Maxillary Incisors with Combined Bone Graft and Platelet – Rich Fibrin: A Case Report

Saranya Dhanapal^[1], Mohamed Jubair Hashir.M^[2]

^[1] ^[2] Department of Conservative Dentistry & Endodontics, Thai Moogambigai Dental College and hospital.

ABSTRACT

Chronic periapical lesions usually occur as an inflammatory response due to bacterial infection within the root canals. Periapical surgeries are considered as an important alternative when non-surgical conservative endodontic treatment fails in resolution of the lesion. Commercially various bone substitutes and regenerative methods are available after degranulation of tissue in order to attain favourable healing promoting bone regeneration. This case report represents healing of periapical lesion in maxillary incisors after periapical surgery, in conjunction with bone graft and platelet-rich fibrin after 12 months follow up.

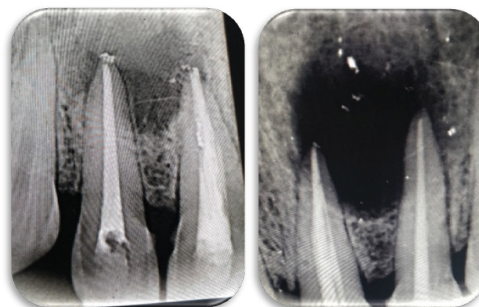
INTRODUCTION

A successful root canal treatment with adequate coronal restoration should restore the tooth to its normal function within the oral cavity (1, 2). Inadequate root canal treatment leads to failure and progression of periapical lesion (3).

Periapical inflammation results from necrosis of pulpal tissue or extensive periodontal disease due to local response of bone around periapical apical region of tooth. Reduction and elimination of microorganisms either by root canal therapy alone or with periapical surgery or extraction results in resolution of periapical inflammation (4). Abramovitz et al (5) have discussed case selection for apical surgery and nonsurgical re-treatment and reported that 24.5% of the referred cases did not heal without surgical therapy. The term periapical surgery incorporates root resection, complete curettage of periapical soft tissues, retro filling and administration of various biomaterials to promote new bone formation in the defect site. Traditionally available bone grafts and barrier membranes are used for favourable healing in the periapical region (6, 7).

CASE REPORT

A 24-year-old female patient reported to the department of Conservative dentistry and Endodontics, Thai Moogambigai Dental College, for crown placement in maxillary right incisors (11 and 12). Patient gave history of root canal treatment, so an intra oral periapical radiograph was made to evaluate the status of root canal treated teeth which revealed inadequate root canal filling with periapical lesion measuring about 4X3 mm. Retreatment of the root canals was initially planned as a conservative approach followed by surgical enucleation of lesion.



PRE-OPERATIVE RADIOGRAPH RE CT DONE IN 11 & 12

Teeth were isolated using rubber dam and access was

reopened for complete retrieval of gutta percha from root canals using H file (#30 size). Irrigation was done using 3 % sodium hypochlorite and saline followed by placement of intra canal medicament using calcium hydroxide (RC CAL, Prime Dental Products, India). After 2 weeks, the patient was recalled, further irrigation followed by root canal filling was done using lateral compaction technique with AH plus sealer (Dentsply, Konstanz, Germany). Patient was asked to report after 3 months and radiograph was taken to evaluate the status of periapical lesion. Since there was no reduction of periapical lesion radiographically surgical procedure was planned.

THE PROCEDURE WAS AS FOLLOWS

Blood sample was drawn from the patient for PRF gel preparation prior to the surgery. Local anaesthesia was administered and crevicular incision was done on the buccal aspect extending from the distal side of 12 to mesial side of 21. A full thickness mucoperiosteal flap was elevated and access to the lesion was gained for complete curettage. Root end resection was done in 11 and 12 followed by retrograde filling with MTA (Angelus, Londrina, PR, Brazil). Commercially available bone graft material B-OstIN (Basic health care, India) was placed at the bottom of defect over which PRF was placed as a second layer. Mucoperiosteal flap was repositioned and sutured using 3-0 silk following haemostasis.



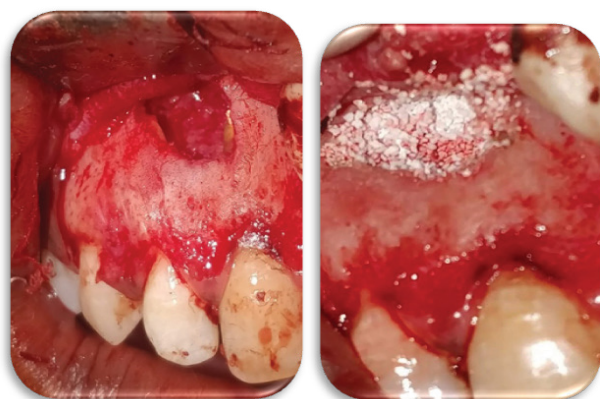
4 months follow up



6 months follow up



12 months followup



Flap elevation and visualization of bony defect
Placement of bone graft

Post-operative instructions and medications were prescribed to the patient. Recall was done at intervals of 7 days, 3, 6 and 12 months.

DISCUSSION

Endodontic surgery involves excision of pathological periapical tissues from root surface and sealing of root end against pathological microorganisms for establishing healthy tissue and regeneration of repaired tooth (8). The most commonly adopted surgical methods include apical planing, apicoectomy, apicoectomy with retro filling (9).

Apicoectomy is surgical removal of apical portion of tooth and is indicated in clinical situations such as periapical lesions persistent to conventional treatment, apical perforations, fractured instruments, apical delta removal and external resorption (10, 11).

Mineral Trioxide Aggregate (MTA) is the most commonly used root end filling material owing to the advantage of biocompatibility, good marginal adaptation and compressive strength (12). Bonson et al (13) reported that clinically derived human gingival and periodontal ligament fibroblasts survived and proliferated in direct contact with MTA particles and Balto et al (14) found that human periodontal ligament fibroblasts attached to MTA within the first 4 hours and then spread over the surface during the subsequent 20 hours. Hydrophilic property of MTA allows its use even in the presence of moisture. Owing to these advantages MTA was chosen as a retrograde filling material in our treatment.

The most popular materials used for periapical regeneration include bone replacement grafts, barrier membranes and host modulating agents such as platelet-rich plasma.

Platelet rich fibrin (PRF) was first used in 2001 by Choukroun et al (15), considered as a new generation of platelet concentrate. PRF serves as vehicle in carrying cells involved in tissue regeneration and may release growth factors after 1 and 4 weeks of placement, stimulating the environment for wound healing for a significant amount of time. PRF has potential for bone and soft tissue regeneration and can be used alone or in combination with bone grafts promoting haemostasis, bone growth (15).

Bone grafts contain osteogenic (autograft), osteoinductive (allograft) or osteoconductive (xenograft/alloplast) properties depending on the nature and processing of the graft (16). Calcium sulphate, hydroxyapatite, beta-tricalcium phosphate

(β -TCP) or calcium phosphosilicate are some examples.

B-OstIN is a synthetic bone graft which is prepared by wet chemical processing. They are made of pure hydroxyapatite with pore size ranging from 100-300 μ m which is optimum for bone growth (17). The manufacturer claims that the material is biocompatible, osteoconductive and non-immunogenic in nature and hence was chosen for this patient.

In the present case, the follow-up radiograph showed excellent periapical healing after 4 months, 6 months and 12 months follow up.

CONCLUSION

When orthograde root canal treatment fails to heal the periapical lesion, it is appropriate to consider periapical surgery with regenerative procedure to achieve optimum healing.

REFERENCES

1. B. M. Gillen, S.W. Looney, L.S. Gu et al. "Impact of quality of coronal restoration versus the quality of root canal fillings on success of root canal treatment: a systematic review and meta-analysis. *J Endod* 2011; 37:895–2.
2. B. G. Nur, E. Ok, M. Altunsoy, O. S. Aglarci, M. Colak, and E. Gungor. "Evaluation of technical quality and periapical health of root-filled teeth by using cone-beam CT". *J Appl Oral Sci* 2014; 22:502–8.
3. G. DiFilippo, S.K. Sidhu and B.S. Chong. "Apical periodontitis and the technical quality of root canal treatment in an adult subpopulation in London". *Br Dent J* 2014; 216: E22.
4. B. Demiralp, H. G. Keçeli, M. Muhtarogullar, A. Serper, B. Demiralp, K. Eratalay. Treatment of periapical inflammatory lesion with the combination of platelet-rich plasma and tricalcium phosphate: a case report. *J Endod* 2004; 30:796–0.
5. Abramovitz I, Better H, Shacham A, Shlomi B, Metzger Z. Case selection for apical surgery: a retrospective evaluation of associated factors and rationale. Choukroun J, Adda F, Schoeffler C, Vervelle A. Une opportunité en parodontologie: le PRF. *Implantodontie* 2000;42:55–62. [Kinaia BM](#), [Kazerani S](#), [Korkis S](#), [Masabni OM](#), [Shah M](#), [Neely AL](#). Effect

- of guided bone regeneration on immediately placed implants: Meta-analyses with at least 12 months followup after functional loading. *J Periodontol* 2019; 00:1-12.
7. Menon, Venugopal & Varma, H. Radiological outcome of tibial plateau fractures treated with percutaneously introduced synthetic porous Hydroxyapatite granules. *Eur.J. of Orthop. Surg. Traumatol* 2005; 15:205-213. *J Endod* 2002; 28:527-30.
 8. Stassen LFA, Hislop WS, Still DM, Moos KF. Use of an organic bone in periapical defects following apical surgery-a prospective trial. *Br J Oral Maxillofac Surg* 1994; 32:83-5.
 9. Uchin RA. Use of a bioresorbable guided tissue membrane as an adjunct to bony regeneration in cases requiring endodontic surgical intervention. *J Endod* 1996; 22:94-6.
 10. Oliveira Pedroche, Lorena; Barbieri, Neisiana; Fagundes Tomazinho, Flávia Sens; Miranda Ulbrich, Luciene; Piotto Leonardi, Denise; Martins Sicuro, Stephanie Apicoectomy after conventional endodontic treatment failure: case report. *RSBO* 2013; 10:182-187.
 11. Orso VA, Sant'ana FM. Cirurgia parendodôntica: quando e como fazer. *RevFac Odontol Porto Alegre* 2006; 47: 20-3.
 12. Matura SJ. A simplified root-end filling technique using silver amalgam. *J Mich St Dent Assoc.* 1962; 44:40-1.
 13. Messing JJ. The use of amalgam in endodontic surgery. *J Br Endod Soc.* 1967;1:34-6.
 14. Torabinejad M, Hong CU, Lee SJ, et al. Investigation of mineral trioxide aggregate for root end filling in dogs. *J Endod* 1995; 21:603-8.
 15. Bonson S, Jeansonne BG, Lallier TE. Root-end filling materials alter fibroblast differentiation. *J Dent Res* 2004; 83:408-13.
 16. Balto HA. Attachment and morphological behavior of human periodontal ligament fibroblasts to mineral trioxide aggregate: a scanning electron microscope study. *J Endod* 2004; 30:25-9.