

CASE REPORT

SURGICAL MANAGEMENT OF LARGE PERIAPICAL LESION USING PRF AND MTA: A CASE REPORT

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ABSTRACT:

Introduction: Surgical endodontics is a reliable method for the treatment of teeth with periapical lesions that do not respond to conventional root canal treatment. A more recent paradigm shift from classical endodontic surgery to regenerative endodontic therapy is further revolutionized by the introduction of Platelet rich fibrin. **Aim:** Endodontic management of periapical lesion using MTA and platelet – rich fibrin membrane as regenerative procedure. **Method:** A 25 year old male patient complaint of pus discharge from his upper front teeth. Large periapical lesion and perforation was seen on intraoral periapical radiograph. The treatment plan executed was root canal therapy followed by endodontic surgery using PRF and retrograde MTA irt 11, 12. **Results:** At the end of six months, patient showed considerable bone regeneration. **Conclusion:** Production of a dense, cross-linked, physically robust PRF made of intact platelets and fibrin by high speed centrifugation, yields an ideal scaffold for use in tissue repair.

Keywords: PRF, periapical lesion, endodontic surgery, retrograde MTA.

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INTRODUCTION

The ultimate goal of endodontic therapy is to return the involved tooth to a state of health and function. All inflammatory periapical lesions should be initially treated with conventional endodontic therapy which has shown success in 85% of cases. However, failure after conventional root canal treatment calls for surgical intervention [1].

Endodontic surgery encompasses surgical procedures performed to remove the causative agents of periradicular pathosis and to restore the periodontium to a state of biologic and functional health. Surgical endodontics is a reliable method for the treatment of teeth with periapical lesions that do not respond to conventional root canal treatment or when orthograde treatment is not feasible. Traditional surgical approaches to treat periapical defects include debridement of apical lesions along with reshaping of the surrounding bone, resection, and retro filling of root apex, where healing is almost always by repair. Repair is defined as the healing of a wound by tissue that does not fully restore the architecture or the function of the part. Since this is not ideal, newer approaches such as regenerative procedures that aim to restore lost tissue have been introduced.

A more recent paradigm shift from classical endodontic surgery to regenerative endodontic therapy is further revolutionized by the introduction of PRF. Platelet rich fibrin (PRF), introduced by Choukroun et al., is a second-generation platelet concentrate enriched with platelets and growth factors which promote periapical tissue regeneration and healing [2].

CASE REPORT

A 25 year old male patient reported to Department of Conservative Dentistry and Endodontics, with the chief

complaint of pus discharge from his upper front teeth and history of trauma 13 years back. He had intermittent pus discharge from his upper anterior teeth since 2 months. He got treatment from local practitioner one and half months back but with no relief. Sinus formation and pain on palpation was seen irt 11, 12. Large periapical lesion was seen on intraoral periapical radiograph [figure1]. Incomplete root canal therapy irt 12 and lateral perforation irt 11 was also found. The diagnosis of chronic periapical abscess was made. The treatment plan executed was root canal therapy followed by endodontic surgery irt 11, 12. Endodontic treatment was initiated and previous restoration was removed irt 12. Following cleaning and shaping, the canal was disinfected with calcium hydroxide dressings for 2 weeks. Obturation was done using gutta percha and AH plus sealer [figure2]. Due to severe calcification, canal of 11 was not negotiated; hence it was decided to seal the perforation as well as the canal with MTA.

To remove large periapical lesion, endodontic surgery was initiated and retrograde preparation was done irt 11, 12 and filled with MTA. Protocol for PRF preparation [figure3]

10 ml of venous blood was drawn from the patient. Whole blood was drawn into the tubes without anticoagulant and immediately centrifuged at 3,000 rpm for 10 minutes. Within a few minutes, the absence of anticoagulant allows activation of the majority of platelets contained in the sample to trigger a coagulation cascade. The result is a fibrin clot containing the platelets located in the middle of the tube, just between the red blood cell layer at the bottom and acellular plasma at the top. This clot was removed from the tube and the attached red blood cells scraped off and discarded. PRF gel was carefully placed into the cavity till the entire cavity was

filled. Wound closure was performed with a 3-0 black silk suture. Post-operative radiograph was taken [figure4]. Analgesics (Paracetamol + Nimusulide bd-3 days), Antibiotics (Amoxicillin + Clavulanic acid [Co-amoxycylav-625 mg] tid-5 days) were prescribed post-operatively. The patient was reviewed after one, three and one year. Standard IOPA radiograph was done using the paralleling cone technique [figure5].



Figure 1



Figure 2

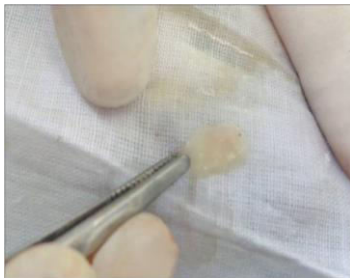


Figure 3



Figure 4



Figure 5

RESULTS

The patient did not complain of any unusual or severe pain. There were no signs of infection, untoward reaction, wound dehiscence or extrusion of material. Radiograph showed bone regeneration at the end of one year.

DISCUSSION

The objective of surgical approach is to remove diseased tissue, debride the canal system as far as possible and to seal the cavity or defect to prevent or reduce the spread of microorganisms in the periradicular tissues, thereby providing an environment conducive to regeneration of a normal periodontal apparatus [3].

The aim of retrograde filling material is to fill the apical canal space and to obtain a hermetic seal between the periodontium and root canal system. Several materials have been suggested for root end filling including Amalgam, Gutta-percha, Zinc oxide Eugenol cement, GIC, Gold foil pellet, Composite resin and MTA, etc [4]. In order to seal the apex of the tooth, root was resected and retrofilled with MTA.

MTA is a biocompatible biomaterial which has an acceptable sealing ability when used to seal the root end cavities and furcal perforations. It allows hard tissue forming cells to create a matrix layer, which enhances apical tissue regeneration. It is non-cytotoxic, non-resorbable, stimulates cementogenesis, and sets in the presence of moisture which makes it a good choice as a root-end filling material and perforation repair material [5].

Regeneration of tissue after periapical surgery requires [6]

- (a) recruitment of progenitor/stem cells to differentiate into committed cells,
- (b) growth/differentiation factors as necessary signals for attachment, migration, proliferation and differentiation of cells, and
- (c) local-microenvironmental cues like adhesion molecules, extra cellmatrix, associated non-collagenous protein molecules, and so forth.

Lack of any of these elements would result in repair rather than regeneration. Perhaps the most commonly used technique for regeneration is the use of bone replacement grafts which can promote tissue or bone regeneration.

Bone grafting materials include autografts, allograft, xenografts, and alloplasts. PRF is an autogenous osteoinductive material that enhances osteogenesis [1].

Calcific metamorphosis (CM) or pulp canal obliteration is defined as a pulpal response to trauma that is characterized by deposition of hard tissue within the root canal space. Although the exact mechanism of CM is still unknown, damage to the neurovascular supply of the pulp and stimulation of odontoblast is being postulated.

The first option for treatment of a calcified necrotic tooth is the conventional root canal therapy, but teeth with severe calcification may present challenges with locating and negotiating root canals. The other options beside nonsurgical endodontic treatment are root resection using a surgical method or intentional extraction and replantation. Intentional replantation procedure is usually considered as a last resort if surgical procedure is impractical [7].

In case where the canals cannot be negotiated, must be treated with periradicular surgery, in which root end resection followed by retrograde filling should be done [8].

Platelet rich fibrin (PRF) is a fibrin matrix in which platelet cytokines, growth factors and cells are trapped and may be released after a certain time and that can serve as a resorbable membrane. It can be obtained from blood with the help of a simple process.

PRF is basically a concentrate of growth factors that promote wound healing and regeneration which is used in various disciplines of dentistry to repair various lesions and regenerate dental and oral tissues. This is possible only with the use of growth factors, extracellular matrix, and the use of bone morphogenetic proteins instead of routinely used synthetic bone grafts because synthetic bone grafts induce regeneration by osteoconduction, whereas, these biological modulators induce regeneration by osteoinduction.

Role of PRF in regenerative endodontics [9]

- Post enucleation of large periapical lesions
- Apical matrix barrier for in root end apexification
- Revascularization in immature teeth with a necrotic pulp
- Pulpal floor perforation repair
- Pulpotomy in young permanent teeth

In vitro studies have proved that PRF releases autologous growth factors gradually for at least 1 week and upto 28 days [10]. When MTA combined with tissue regenerative procedures, the prognosis for many perforated teeth has been greatly improved [11]. It requires around 1 year for complete healing to occur after the periapical surgery while with the use of PRF, healing is fastened and requires approx 6 months for complete regeneration of bone.¹² Successful case of bone augmentation with combination of Platelet-Rich Fibrin (PRF) and MTA for treatment of chronic periapical cyst at 12 month follow up [13].

CONCLUSION

Early publications and clinical experience seem to indicate that PRF improves early wound closure, maturation of bone, and the final aesthetic result of the periodontal soft tissues.

Production of a dense, cross-linked, physically robust PRF made of intact platelets and fibrin by high-speed centrifugation in the absence of exogenous thrombin, yields an ideal scaffold for use in tissue repair.

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REFERENCES:

1. Platelet-Rich Fibrin with β -Tricalcium Phosphate—A Novel Approach for Bone Augmentation in Chronic Periapical Lesion: A Case Report. *Case Reports in Dentistry* 2012;1-6.
2. Choukroun J, Adda F, Schoeffler C, Vervelle A. An opportunity in perio-implantology: the PRF (in French). *Implantodontie* 2001;42:55-62.
3. Stock C. 2004. *Textbook of endodontics* 3rd ed. Elsevier Mosby; 225-47.
4. Duprez JP, Bouvier D, Bittar E. Infected immature teeth treated with surgical endodontic treatment and root-reinforcing technique with glass ionomer cement. *Dent Traumatol.* 2004 Aug;20(4):233-240.
5. Martin RL, Monticelli F, Brackett WW, Loushine RJ, Rockman RA, Ferrari M, et al. Sealing properties of mineral trioxide aggregate orthograde apical plugs and root fillings in an in vitro apexification model. *J Endod.* 2007 Mar;33(3):272-275.
6. Lin L, Melody YH, Ricucci D, Rosenberg PA. Guided tissue regeneration in periapical surgery. *Journal of Endodontics* 2010; 36(4): 618–625.
7. Moradi N, Arvin A, Darvish A, Aflaki S, Homayouni H. Treatment of Necrotic Calcified Tooth Using Intentional Replantation Procedure Case Reports in Dentistry 2014, 1-5.
8. Gutmann JL, Pitt Ford TR. Management of the resected root end: a clinical review. *Int Endod J* 1993;26:273-283.
9. Hotwani K and Sharma K. Platelet rich fibrin - a novel acumen into regenerative endodontic therapy. *Restor Dent Endod* 2014;39(1):1-6.
10. Asgary S, Eghbal MJ, Parirokh M, Torabzadeh H. Sealing ability of three commercial mineral trioxide aggregates and an experimental root-end filling material. *Iranian Endodontic Journal* 2006;1:101–105.
11. Barkhordar RA, Javid B. Treatment of endodontic perforations by guided tissue regeneration. *Gen Dent* 2000;48:422–426; quiz 427–428.
12. Smita S, et al. Application of PRF in surgical management of periapical lesions. *National Journal of Maxillofacial Surgery* 2013;4(1):94-99.
13. Jayalakshmi KB, Agarwal S, Singh MP, Vishwanath BT, Krishna A, Agrawal R. Platelet-Rich Fibrin with β -Tricalcium Phosphate-A Novel Approach for Bone Augmentation in Chronic Periapical Lesion: A Case Report. *Case Rep Dent.* 2012;902858.

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