

Case Report

Platelet rich fibrin: A boon for periradicular regeneration

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Abstract: A large periapical cyst could be an impressive indication for a periapical surgery. Once surgery is done different bone regenerative procedures can be used to promote healing. A 16 years old female patient complained of pain and mobility in relation to maxillary right lateral incisor (tooth 12). A history of trauma 8 years ago preceded it. The clinical and radiographic diagnosis was suggestive of an infected periapical cyst with invasive cervical root resorption in relation to tooth 12. Endodontic treatment along with periapical curettage was performed in 12 followed by apicoectomy and retrograde filling with white mineral trioxide aggregate (MTA). Regenerative procedure included the use of platelet rich fibrin (PRF) to fill up the periapical defect. Satisfactory healing and regeneration of periapical region was observed in the post operative follow up. PRF is now becoming interestingly popular regenerative procedure either used alone or in addition with other regenerative materials. Besides being rich in platelet concentration, it is also a reservoir of many growth factors that promotes successful hard and soft tissue healing. Its relative ease of availability from the patient's own blood also adds on to its success story.

Keywords: Platelet rich fibrin, periradicular regeneration, periapical surgery.

INTRODUCTION

A successful endodontic treatment includes complete periapical repair and regeneration. Most of the periapical lesions require nonsurgical endodontic approach yet surgical endodontics accounts for 3-10% of total cases[1].

Ross et al.[2] suggested the regenerative potential of platelets in the year 1974, and they described a growth factor from platelets.

Choukroun et al.[3] introduced this second generation platelet concentration (PRF) in 2001. As compared to the Platelet rich plasma (PRP), it is easy to obtain and apply, no use of bovine thrombin or anticoagulant is needed, sustained release of G-protein, no inflammatory processes are activated and is relatively cheaper. These advantages have made its use popular among the medical entities[4].

In this case, regenerative periapical surgery has been attempted using PRF to overcome the disadvantages of unreliable repair and to achieve optimal healing.

CASE REPORT

A 16 years old female patient reported to the Department of Conservative Dentistry and Endodontics with the chief complaint of mobility and pain in relation

to maxillary anterior region. She had a history of trauma 8 years ago. Patient had past dental history of endodontic therapy for the same tooth. Clinically present with discoloration and grade I mobility. Radiographic evaluation revealed a large periapical radiolucency in relation to the apex of tooth 12 measuring 1.5 cm in diameter. Also radiolucency was noted in the cervical and the middle-third region of root canal of the tooth. On electric pulp testing of the teeth 11-13 were found to be nonvital. The clinical and radiographic signs confirmed the diagnosis of periapical cyst with an invasive cervical root resorption in relation to tooth 12.

Multiple visit endodontic treatment included the use of intracanal medicament of calcium hydroxide for 3 weeks followed by obturation of the tooth with cold lateral condensation technique using guttapercha points [Dentsply] and AH Plus sealer [Dentsply]. [Figure 1]

Surgical procedure advocated the raising of a labial rectangular full thickness mucoperiosteal flap. Complete loss of palatal cortical bone was seen. A bony window was made labially and curettage of the cyst lining was done which was later sent for biopsy. [Figure 2] Histopathological examination further confirmed the diagnosis of radicular cyst. Later apicoectomy with retrograde filling done with white MTA (ProRoot, Dentsply) was done followed by the placement of the

regenerative biomaterial PRF in the bony defect. Labial sutures were placed. [Figures 3-6]

The preparation of PRF was in accordance with the protocol developed by Freymiller and Aghaloo which included the collection of 10ml blood by venipuncturing the antecubital vein in a sterile test tube without an anticoagulant and centrifugating it at 3000 rpm for 10 min. The product obtained was a structured fibrin clot in the mid of the tube the red corpuscles at the bottom and a cellular plasma (platelet poor plasma) at the top. This PRF was easily separated with a pair of sterile tweezers from the red blood cells after removing the platelet poor plasma. Postoperatively antibiotics, included the prescription of Augmentin (combination of Amoxicillin and Clavulanate potassium) 625 mg tablet every 8 hourly for 5 days and anti inflammatory drug i.e., Enzoflam (combination of Diclofenac , Paracetamol (Acetaminophen) and Serratiopeptidase) 8 hourly for 3 days.

Endodontic treatment after 10 days was performed in 11,13 in the following visits . The patient was kept on a follow-up for 4, 8 and 12 months. [Figures 7 and 8]

Twelve months follow-up showed radiographs with satisfactory bone fill in the periapical area . [Figures 9 and 10]

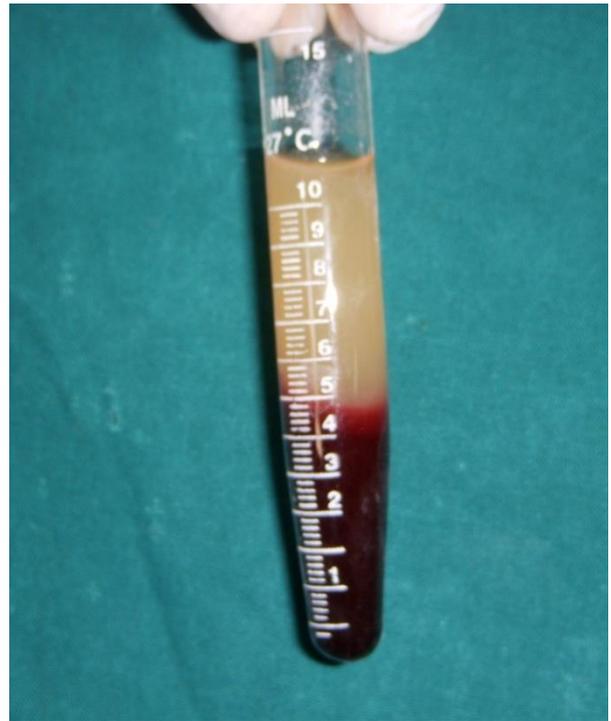


Fig-3



Fig-4



Fig-1



Fig-2



Fig-5



Fig-6



Fig-9



Fig-7



Fig-10

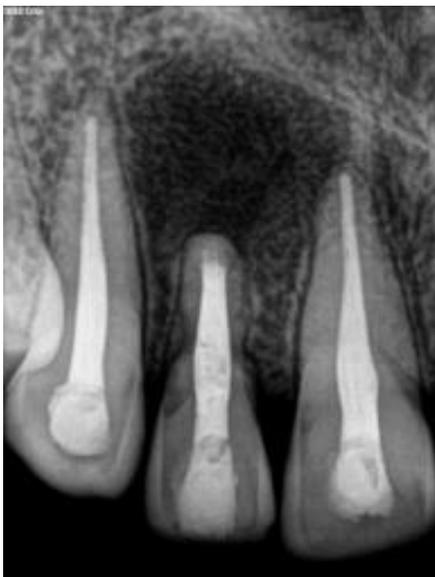


Fig-8

DISCUSSION

Complete periapical repair and regeneration are the success of endodontic therapy. Most of the cases with periapical lesions heals satisfactorily with nonsurgical therapy. But a small number of cases where infection and symptoms persists even after treatment has to be treated by surgical endodontics where the pathological tissues and the remaining source of infections are removed to promote healing[5]. From the middle of 20th century, research regarding the use of growth factors from platelets started[6].

PRF is widely used to promote hard and soft tissue healing. Many immunity and healing promoters are present in PRF[7].

PRF is nothing more than centrifuged blood that requires neither anticoagulant nor bovine thrombin (nor any other gelling agent) for its functioning. It polymerises naturally and slowly during centrifugation hence physiologic thrombin concentrations are achievable[8].

PRF is a fibrin clot charged with serum and platelets which can be obtained by adhering to the protocols used for PRF formation. By driving out (or desiccating) the fluids trapped in the fibrin matrix, practitioners will obtain a very resistant autologous fibrin membranes[9].

Some authors believed that PRF functions as a 'biologic connector' hence recommended the use of graft particles with PRF where the PRF would function to promote neoangiogenesis, trap the stem cells and migrate them to the centre of the graft[7].

Root end filling material used was MTA because of its distinct advantages like biocompatibility, antibacterial action, good peripheral seal, favorable osteoblastic responses and cementogenesis at the root apex[10-12].

The 12 months follow up of the patients radiograph shows adequate healing periapically concluding the use of PRF as a healing biomaterial and its success in promoting regeneration of the soft and hard tissues. Long term follow up is essential to evaluate the outcome of the treatment.

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