

Surgical Management of Periapical Lesion in Maxilla Using Platelet-Rich Fibrin (PRF) As an Autologous Biomaterial: Case Report

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Abstract

The successful treatment of periapical inflammatory lesion depends on the reduction and removal of the offending organism. Periapical surgery is one of the alternative treatment, includes the curettage of all periapical soft tissues and sometimes application of different biomaterials to improve the new bone formation in the defect site. This case report present the management of the periapical inflammatory lesion using platelet-rich fibrin (PRF) which acts as a source of growth factors at the healing site. PRF is now becoming grippingly 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.

Keywords: Platelet Rich Fibrin, Periapical surgery, biomaterials, Growth factors.

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INTRODUCTION

The success of endodontic treatment includes complete periapical repair and regeneration [1]. Most of the periapical lesions required periapical surgery, extraction of the tooth might be the treatment alternatives [1-3]. Periapical surgery bear the curettage of all periapical soft tissues and sometimes application of different biomaterials to improve the new bone formation in the defect site [4]. Bone grafts and barrier membrane have been used for optimal healing of the periapical defect area after degranulation of the lesion. All these approaches are known as regenerative therapies [5].

Ross *et al.*, propose the regenerative potential of platelets in the year 1974, and they described a growth factor from platelets [6].

Platelet-rich fibrin (PRF) was introduced by Choukroun *et al.*, in France [7]. It is second-generation platelet concentrate, which has been shown to have several advantages over traditionally prepared platelet-rich plasma [8]. Its principal advantage of Platelet Rich Fibrin include ease of preparation and lack of biochemical handling of blood, which makes this preparation strictly autologous [11]. A case report is

presented where PRF membrane was used as a healing material.

CASE REPORT

A 16- year-old female patient who reported to the Department of Pedodontics and Preventive Dentistry in Santosh Dental College and Hospital ,Ghaziabad with the complaint of pain in relation to the maxillary anterior region. The patient give the history of trauma 5 years back. On clinical examination, they were found to be tender on percussion and were non-responsive to the electric pulp test. Radiographic examination revealed a well performed Root canal treatment (#22) and periapical radiolucency around the apices of maxillary left lateral incisor (Figure-1). A periapical endodontic surgery was planned as the lesion was non healing. The patient was informed about the treatment modality followed with Apicoectomy using Platelet- Rich Fibrin (PRF). After receiving written consent from the patient, the surgery was performed.

PROCEDURE

A standard anesthesia protocol was administered, the tooth (#22). An trapezoidal flap was raised from mesial of #21 to distal of #23 (Figure-2a), thin cortical bone was removed to create a window in

relation to #22 with a slow speed fissure cutting bur using water coolant (Figure-2b). Periapical curettage was done with straight or angled instruments to remove the infected granulation tissue. Apical resection was made to the amount just required for preparing the retrograde cavity (less than 2 millimeters) and the PRF (Platelet Rich Fibrin) was placed (Figure-3a). PRF preparation was performed using the procedure described by Dohan *et al.*, A blood sample was taken without anticoagulant in 10 ml tubes, which was immediately centrifuged at 3000 rpm for 10 min a table top centrifuge (REMI Laboratories, Mumbai, Maharashtra, India). The resultant product consisted of the following three layers (Figure-4):

- Acellular Platelet Poor Plasma at the top of the tube,
- Fibrin clot (PRF) in the middle of the tube; and
- Red blood corpuscles at the bottom of the tube

Suturing was done with 3-0 silk to reposition the flap (Figure-3b). Antibiotics, and an oral rinse solution were prescribed. The patient was recalled after 24 hr for evaluation of postoperative pain if any and the sutures were removed on the seventh postoperative day. For the follow-up the patient was recalled after 1 month, 3 month and 6 month of the treatment (Figure-5). In clinical examination, the tooth were asymptomatic.



Fig-1: Preoperative Radiograph



Fig-2a: Flap Raised



Fig-2b: Window Created

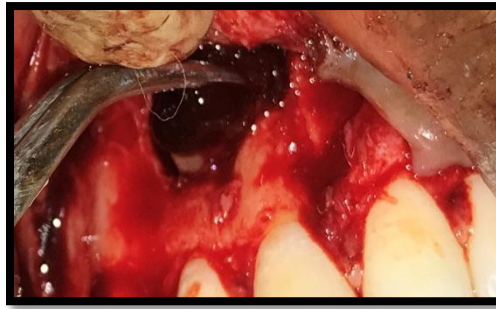


Fig-3a: Platelet Rich Fibrin Placed



Fig-3b: Sutures given with 3-0 silk suture material

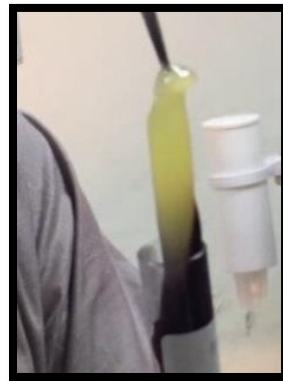


Fig-4: Platelet –Rich Fibrin membrane (PRF)

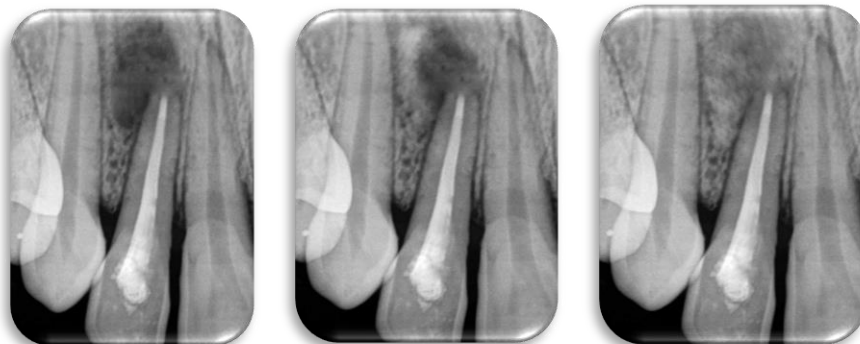


Fig-5: Radiograph Flowup 1 month, 3 months and 6 months

DISCUSSION

Apicoectomy is a type of endodontic surgery, which is typically performed when a traditional root canal fails to remove all the dead nerves and infected tissues. However, apicoectomy, as the first choice of treatment for non-vital incisors with large periapical

defects. The present study evaluated the effects of the application of PRF in endodontic surgery. On the contrary, radiographic healing in PRF test group appeared to be significantly improved after one and three months from the surgical intervention. A clinical trial reported a beneficial effect of the use of plasma

rich in growth factors (PDGF) during endodontic surgery in affecting postoperative symptoms and patient's quality of life after surgery [8]. PRF is in the form fibrin which can be used in conjunction with bone grafts, which offers several advantages including bone growth, promoting wound healing, wound sealing, graft stabilization, hemostasis and improving the handling properties of graft materials [9, 10]. Clinical applications suggest that the combination of bone grafts and growth factors contained in PRP and PRF may be suitable to enhance bone density.

CONCLUSION

In the present case report the clinical experience confirms that PRF can be considered as a healing biomaterial and it features all the necessary parameters permitting optimal healing, but numerous perspectives of PRF have still to be clinically tested.

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