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Application of Platelet Rich Fibrin in Surgical Management of Periapical Lesions: Case Report

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Abstract

Periapical surgery aims to remove periapical pathology to achieve complete wound healing and regeneration of bone and periodontal tissue. Platelet rich fibrin (PRF) is a biomaterial which was prepared by patients own blood. Its principal advantage of Platelet Rich Fibrin include ease of preparation and lack of biochemical handling of blood , which makes this preparation strictly autologous (Choukroun et al. 2006) . In this case report PRF membrane was used as a healing material.

Keywords: Platelet Rich Fibrin, Biomaterial, Autologous and healing material.

Introduction

The success of endodontic treatment includes entire periapical repair and regeneration[1]. Most of the periapical lesions required periapical surgery, extraction of the tooth might be the treatment alternatives.[1,2,3]. Successful treatment for periapical lesion depends on exclusion of pathological tissue along with the contributing microorganism.

Periapical surgery contain exclusion of diseased periapical tissues, stipulation of accurate seal between root canal system , periradicular tissues and sometimes application of different graft material to improve new bone formation at the defective site.[4]

In a dental field Platelet rich fibrin (PRF) is coming up as a biological revolution. It was first introduced in France by Choukroun et al in 2001 It is used for wound healing was first introduced in France by Choukroun et al in 2001. Platelet rich fibrin is a second generation platelet concentrate, which has been shown to have several advantages over traditionally prepared platelet-rich plasma . Its principal advantage of Platelet Rich Fibrin include

ease of preparation and lack of biochemical handling of blood , which makes this preparation strictly autologous (Choukroun et al. 2006) . A case report is presented where PRF membrane was used as a healing material.[5]

Case Report

A 17 – Years old boy reported to the Department of Pedodontics and Preventive Dentistry, Santosh Dental College and Hospital, Ghaziabad , with a chief complaint of pain and swelling in the upper central incisors (11, 21) . The patient presented with previous endodontic treatment . According to his past dental history he visited to the dentist two months ago with a complain of pain in the upper front teeth region . He gave a history of trauma of those teeth three years ago . On clinical examination, they were found to be tender on percussion and were non-responsive to the electric pulp test . There was no discoloration, mobility or mal alignment of the incisors. The patient's medical history was non-contributory. Radiographic examination revealed a well performed Root canal treatment and periapical radiolucency around the apices of maxillary #11,12,22 [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 teeth (# 11,12,22). An trapezoidal flap was raised extending from the distal surface of right central incisor to the distal surface of left lateral incisor of one side to that of the opposite side (Figure 2). Thin cortical bone was removed to create a window in relation to #11 with a slow speed fissure cutting bur using water coolant. 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.

PRF was prepared by drawing the required amount of blood into a 10-mL test tube without an anticoagulant and centrifuged immediately using a table top centrifuge (REMI Laboratories, Mumbai, Maharashtra, India) for 12 min at 2700 rpm. The resultant product consisted of the following three layers (Figure 3) :

- 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. Antibiotics, and an oral rinse solution were prescribed . The patient was recalled next day for evaluation of postoperative pain if any and radiograph was taken, the sutures were removed on the seventh postoperative day. Patient was recalled after 1month, 3 month, and 6 month of the treatment (Figure 4). In clinical examination, the tooth were asymptomatic.

Figure 1: (a) PreOperative IOPA

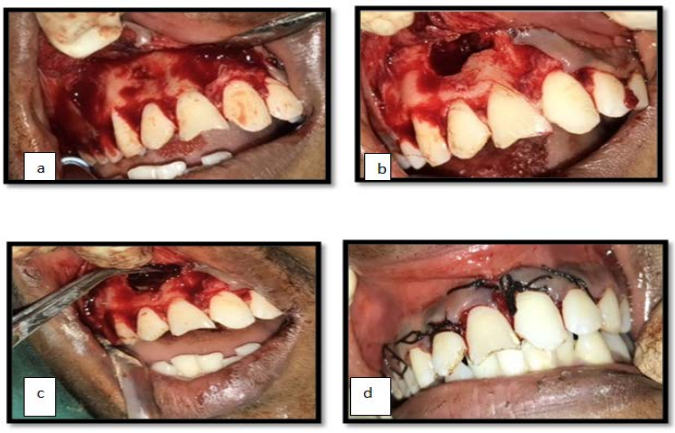

Figure 2: (a) Flap Raised ,(b) Window Created at Periapical Region 11,21,22 (c)Placing PRF (d)Sutures given with 3-0 suture material

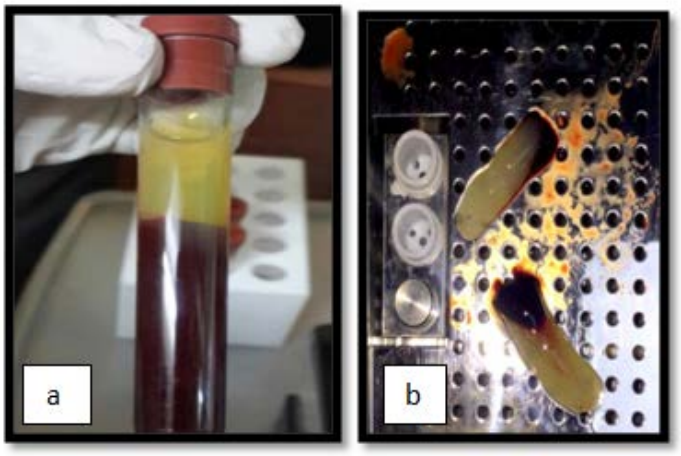

Figure 3: PRF prepration technique; (a) a structured fibrin clot found after centrifugation in the middle of the tube, just between the red blood corpuscles at the bottom and acellular plasma at the top ; (b) the fibrin clot with attached RBCs .

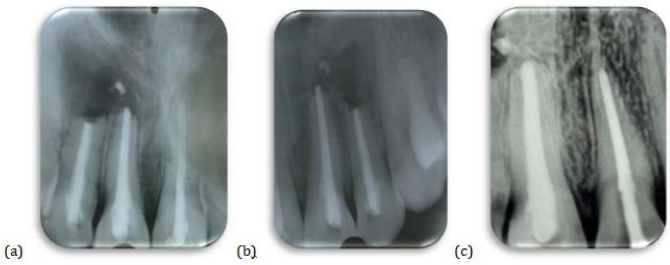

Figure 4: Radiographs of case: (a) 1 month Postoperative radiograph after apicocetomy; (b) 3 months postoperative radiograph showing bone healing; (c) 6 months postoperative radiograph

Discussion

The success of endodontic treatment is complete periapical repair and regeneration[1] . In most of the cases the periapical lesions heals adequately with nonsurgical therapy. But in some 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[10,11].

Platelet rich fibrin (PRF) is coming up as a biological revolution in dental field. It is widely used to promote hard and soft tissue healing. PRF is a material which prepared with 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[12].

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. 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[8,9] .

In this case 6 months follow up of the patient radiograph shows adequate healing periapically using platelet rich fibrin (PRF) as a healing biomaterial . Long term follow up is essential to evaluate the outcome of the treatment.

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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