

**SURGICAL MANAGEMENT OF A PERIAPICAL LESION ASSOCIATED WITH LEFT  
MAXILLARY CENTRAL AND LATERAL INCISORS USING PLATELET-RICH  
FIBRIN: A CASE REPORT**

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**ABSTRACT**

Periapical lesion is a local response of bone around the apex of tooth that develops after the necrosis of the pulp tissue or extensive periodontal disease. The successful treatment of periapical inflammatory lesion depends on the reduction and elimination of the offending organism. When the orthograde root canal therapy fails to provide a successful outcome to the patient, root end resection or apicoectomy is the technique through which the desired results can be achieved. In this report, surgical management of a periapical lesion in relation to left maxillary central and lateral incisors of a 17 years old female patient has been discussed wherein a retrograde filling with MTA was done after apicoectomy and platelets rich fibrin was placed in the bony defect to accelerate hard and soft tissue healing.

**KEYWORDS:** Apicoectomy; Root End Resection; MTA; PRF; Endodontic Surgery.

**INTRODUCTION**

Surgical intervention is required where endodontic treatment has failed and tooth is to be retained rather than extracted. The percentage of success of endodontic treatment has been consistently high but failures may arise due to infection, poor access cavity preparation, inadequate instrumentation, obturation, missed canals and coronal leakage.

Apicoectomy or root end resection endodontic surgery is a safe and well documented treatment alternative when teeth are not responding to conventional endodontic treatment and endodontic re-treatment. It can be applied in the situations where there is an endodontic treatment failure. Few examples are: extraradicular infections such as periapical actinomycosis; foreign body reactions that can be caused by endodontic material extrusion; endogenous cholesterol crystal accumulation in apical tissues; and unresolved cystic lesion.<sup>[1]</sup>

In 11th century, first case of endodontic surgery was performed by Abulcasis. Root end resection (Apicectomy) was first documented in 1871 and

apicectomy with retrograde cavity preparation and filling with amalgam was documented in 1890.

The need of a biological modulator to enhance the healing after such surgeries lead to development of Platelet Rich Plasma (PRP) by Whitman et al in 1997. Subsequently, Choukroun et al in France developed a second generation platelet concentrate known as Platelet Rich Fibrin (PRF) which proved to be better than PRP in terms of ease of preparation and application, was minimally expensive and needed very less biochemical modifications.<sup>[2]</sup>

This article describes a case report on surgical resection of apical root end in a 17 years old female patient in relation to left maxillary central and lateral incisors who reported to the Out Patient Department of Conservative Dentistry and Endodontics, Shree Bankey Bihari Dental College, Masuri, Ghaziabad. Patient complained of pain and swelling in upper front tooth region post endodontic treatment, which was done elsewhere. Treatment Plan was formulated to do a surgical root end resection with a retrograde filling of MTA and placement of PRF

membrane, a bio modulator to enhance healing of the soft and hard tissues. The patient was sent for a complete hemogram before the commencement of the surgical procedure.

**Indications of Apicoectomy:** (Table: 1)

Out of the several factors, failure of non-surgical endodontic retreatment had the greatest impact on the indications for surgical intervention in the treatment of endodontic pathosis.<sup>[3]</sup>

**Table 1. INDICATIONS FOR PERIRADICULAR SURGERY (ACCORDING TO ESE 1994)**

Obstructed canal with radiologic findings and/or clinical symptoms  
 Extruded material with radiologic findings and/or clinical symptoms  
 Failed root canal treatment when retreatment is inappropriate (isthmus tissue, persistent acute symptoms or flare-ups, risk of root fracture)  
 Perforations with radiologic findings and/or clinical symptoms, and where it is impossible to treat from within the pulp cavity

Abbreviation: ESE, European Society of Endodontology.

**Contra Indications:** (Table: 2)

**Table 2. CONTRAINDICATIONS FOR PERIRADICULAR SURGERY (ACCORDING TO ESE 1994)**

Local anatomical factors (eg, inaccessible root end)  
 Tooth with inadequate periodontal support  
 Nonrestorable tooth, tooth without function (no antagonist, no pillar for removable or fixed prosthesis)  
 Uncooperative patient  
 Compromised medical history

Abbreviation: ESE, European Society of Endodontology.

**CASE REPORT**

A 17 year old female patient with a non contributory medical history visited the Department of Conservative Dentistry and Endodontics with a chief complaint of pain and swelling in upper front tooth region since the past 1 month. Past Dental History - The patient gave a history of previous endodontic treatment done elsewhere 3 years back in upper front teeth.

On intra oral examination there was a swelling seen in the upper vestibule in the apical region of 21 and 22 (Fig. 1a). Examination of the head and neck revealed no palpable lymph nodes. All vital signs were found to be within normal limits. Radiographic examination revealed a well-defined periapical radiolucency of about 1.2 × 1.6 cm around the apices of maxillary left central and lateral incisors and extending upto the apex of left maxillary canine (Fig 1b). Both the teeth tested nonresponsive to thermal and electric pulp testing. There was only mild

tenderness to percussion and palpation. The diagnosis was pulpal necrosis with chronic apical abscess with respect to maxillary left central and lateral incisors.



**Figure: 1a and 1b (Pre Operative View).**

### PROCEDURE

Keeping in mind all the asepsis procedure and after effective local anaesthesia with 2% lignocaine, a full-thickness flap was reflected (Fig.2a). A small defect was visible in the cortical plate in relation to central incisor (Fig. 2b), which was enlarged to aid in complete curettage of the granulation tissue (which was sent for biopsy) and allowed room for retrograde instrumentation after root-end resection (Fig. 2c). This was followed by irrigation with betadine and sterile saline solution. The root-end resection was carried out followed by retrograde cavity preparation with tapered fissure bur using slow speed handpiece. The retrograde cavity was filled with mineral trioxide aggregate (Fig.3).



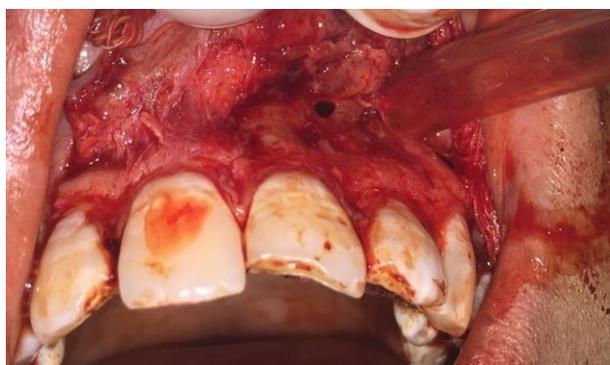
**Figure 2c (Enlarged bony window).**



**Figure: 2a (Full Thickness Flap).**



**Figure 3: (MTA placement as retrograde filling).**



**Figure 2b (Defect visible in cortical plate).**

PRF preparation was performed by taking blood sample without anticoagulant in 10 ml tubes, which was immediately centrifuged at 3000 rpm for 10 min. After PRF processing, three distinct layers were seen in the tube. The supernatant represented acellular plasma (or) platelet-poor plasma (PPP), second layer represented the fibrin clot (PRF) and the last one represented the exudates resulting from PRF clot corresponded to the solution trapped in the fibrin meshes.

For collection, it was necessary to compress the PRF clots in a sterile metal cup for approximately 10 min to let it slowly release the serum contained therein (Fig. 4). The PRF clot was then packed into the defect to

completely fill the bony crypt. Wound closure was then obtained with 3-0 silk sutures (Fig. 5).



**Figure 4 (PRF).**



**Figure 5 (Sutures placed).**

Antibiotics (Amoxicillin 500 mg + Clavulanic acid 125 mg) and nonsteroidal anti-inflammatory analgesics (Ibuprofen 500 mg) were prescribed twice a day for 5 days and the patient was advised to use chlorhexidine mouth wash for a week. The sutures were removed after 1 week, and satisfactory healing was observed. The patient was recalled at 3 months. Follow-up radiograph showed satisfactory bone regeneration in the periapical defect (Fig. 6).



**Figure 6 (3 months follow up).**

## DISCUSSION

Apical root surgeries aim to treat a tooth which can't be saved with conventional endodontic treatment. The goal is to achieve a bacterial tight seal to the root canal system with the help of a good retrograde filling material. Many authors have used different materials as retrograde

fillings such as Amalgam, Gutta-percha, Glass ionomers, Composite resins, Carboxylate cements, Zinc phosphate cements, Zinc oxide-eugenol cements (IRM), Mineral tri-oxide aggregate (MTA). Out of these use of IRM and MTA have been advocated by a large number of authors.<sup>[4]</sup>

Platelet rich factor has given new revolutionary step in the platelet gel therapeutic concept. Attempts to accumulate platelets and released cytokines in a fibrin clot.<sup>[5]</sup> Platelet rich fibrin (PRF) is a fibrin matrix in which platelet cytokines, growth factors and cells are trapped and released after a certain time that can serve as a resorbable membrane.<sup>[6]</sup> PRF has several advantages such as it does not require any biochemical handling of blood and also economic. Slow polymerization which is observed during PRF processing leads to the intrinsic incorporation of platelet cytokines and organic chains in the fibrin mesh to bring about efficient cell migration. This result implies that PRF, unlike the other platelet concentrates would be able to release more cytokines during fibrin matrix remodelling. Such a mechanism might explain clinically observed healing properties of PRF. PRF has a supportive effect on the immune system.<sup>[6,7]</sup>

## CONCLUSION

Patient's well being and satisfaction with the procedure is the ultimate reward for the treating surgeon. As in this case, patient was very contented with the treatment. Also, the radiographic evaluation reported clear and slow bone deposition in the cavity after apicoectomy, obturation, and PRF membrane placement. These criteria highlight the success of the treatment after 3 months. Therefore, after the previous failure of the endodontic treatment, we can consider this a valid treatment. Further follow up will be done to assess the outcome of the treatment. Apicoectomy has a high rate of success that must be considered on certain occasions by the experienced surgeon. This procedure was suggested to the patient as an act of pure preservation and to provide the anatomical and functional restoration of the tooth.

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