

Management of Ellis Class IV Fracture Using Two Different Materials: MTA vs Reverse Cone Technique: A Case Report

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ABSTRACT

During root development, if tooth is subjected to trauma or caries, it results in tooth with immature and open root apices. The primary factor affecting the success of endodontics is achievement of perfect apical seal. Apexification is done to achieve an apical barrier against which the obturating material can be condensed. Various treatment modalities are used to treat immature open root apices. In the following case reports, apexification using different treatment modalities and both traditional and newer biomaterials have been explained.

Keywords: Apexification, Ellis Class IV fracture, mineral trioxide aggregate, reverse cone technique.

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I. INTRODUCTION

Complete root development along with apical closure of a permanent tooth continues for up to 3 years following tooth eruption. Immature teeth have wide dentinal tubules and allow the penetration of bacteria and their irritants [1]. The immature tooth that develops pulpal or periapical diseases in children presents different set of challenges as the apex may be wide open, conventional root canal treatment procedures are not indicated and prognosis would be unpredictable. Depending upon the vitality of the pulp, possible two approaches are apexogenesis or apexification [2].

Apexification is defined as the procedure to induce a calcific barrier in a root with open apex or continued apical development of an incomplete root in a teeth with necrotic pulp [3].

II. CASE REPORT

A 12-year old male patient reported to the clinic with the complaint of pain and swelling in upper front teeth region since a week. Patient had fallen down while playing four days before reporting to the clinic. Moreover, when he fell down, there was bleeding from the site of injury in the oral cavity which was controlled within an hour at home by using pressure packs. No any sign of unconsciousness or bleeding from the nose was reported. On clinical examination, hard tissue examination revealed Ellis Class IV fracture in relation with 11,21 was found along with Grade I mobility in relation with 21 Class I caries in relation with 75, 85, 55, 54 while soft tissue examination showed gingival swelling in relation with 21 (Fig. 1). IOPA in relation with 11, 21 showed fracture involving enamel,

dentin and pulp along with open apices in relation with both the teeth (Fig. 2).



Fig. 1. Intraoral view.

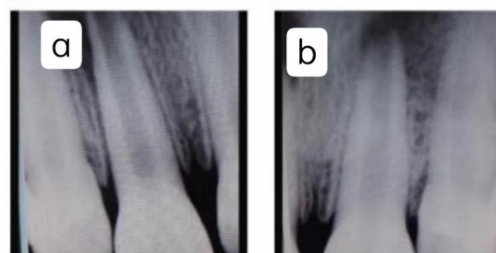


Fig. 2. Intraoral Periapical Radiograph in relation to 11,2.



Fig. 3. Root Canal Opening of 11,21 and application of triple antibiotic mix.

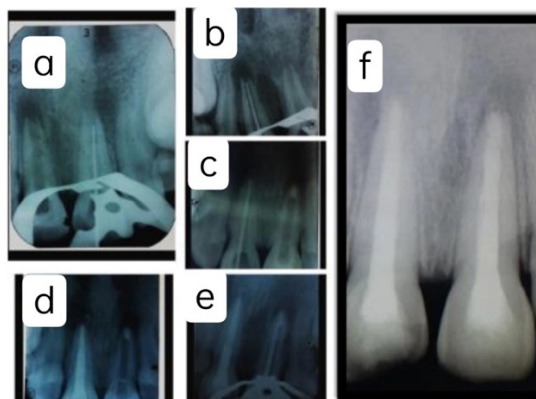


Fig. 4a.& 4b. Working length determination in relation to 11 and 21
Fig 4c. Formation of apical plug-in relation with 21 and master cone selection in relation to 11.
Fig 4d., 4e. & 4f. Obturation of 11,21 with gutta percha points.

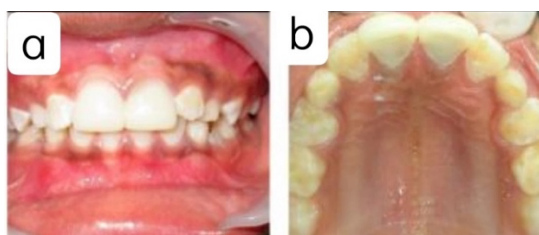


Fig. 5. Postoperative final photograph after crown application.

Treatment plan was made, and parental consents were obtained after explaining them all the procedures. In the first visit, Root Canal Opening along with Biomechanical preparation was done under rubber dam in relation with 11,21 and triple mix antibiotic (ciprofloxacin, metronidazole and doxycycline) dressing was given and metronidazole (0.5% w/v) was used for irrigation along with sodium hypochlorite (3%) and normal saline (Fig 3). The subsequent visit after 7 days consisted of patient informing subsiding of pain and swelling, so then the process of forming a 4 mm MTA plug was done in relation with 21 and obturation of 11 using reverse cone technique in the second visit. After 15 days, the obturation was done in relation to 21 (Fig 4). The teeth were then restored using polymethyl methacrylate crowns (Fig 5). Composite restorations were done in relation with 75, 85, 55, 54. Patient was recalled for follow up regularly postoperatively.

III. DISCUSSION

MTA has superior biocompatibility and is less cytotoxic due to its alkaline pH and presence of calcium and phosphate ions in its formulation results in capacity to attract blastic cells and promote favorable environment for cementum deposition. An apical plug of 4-5mm thickness is usually considered optimal [4]. Various studies have concluded that MTA provides an excellent apical seal, and it could also be elicited that MTA has demonstrated its superiority over other commonly used materials [5], [6]. Moreover, due to discoloration caused by minocycline, doxycycline was used in this case in the triple antibiotic mix [7].

It has been observed that orthograde filling of MTA has exhibited significantly lower filling quality than gutta percha [8]. Furthermore, several studies have compared single-cone

technique to other root canal filling techniques in relation to leakage and have reported no differences between the two techniques [9]-[11].

It can be pointed out that achievement of a perfect seal at the apex using an inert filling material is the most important factor affecting success in endodontics. As a pedodontist, care must be taken to adopt the best available evidence for supporting clinical treatment plans in treating a young permanent tooth.

IV. CONCLUSION

There have been changes in the rationale governing the treatment of teeth with open apex during the past two decades. Recent materials, such as MTA and Biodentine are promising materials and play an important role in healing and sealing of root canals and thus saving patients from psychological trauma of surgical procedures.

CONFLICT OF INTEREST

Author declares that they do not have any conflict of interest.

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