



## Case Report

# MTA apexification as a savior of questionable tooth: A Case report

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### ABSTRACT

Treatment of traumatized immature teeth poses a challenge for clinician. Apexification is considered to be the treatment of choice for non-vital young permanent teeth. The present report, highlight the case of traumatized young permanent tooth where apexification was achieved in a previously endodontically treated tooth. Endodontic treatment of immature permanent teeth without apical barrier leads to failure of treatment due to incomplete sealing of the canal. Also, the success of endodontic treatment is determined by the quality of obturation. In wide canals, traditional obturating technique may result in spaces being left in the canal space. Obturation using rolled cone technique to achieve a good seal is used in the present case.

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## 1. Introduction

Trauma to anterior teeth is common during childhood. Traumatic injury to young permanent teeth accounts for almost 30% of the trauma in children.<sup>1</sup> The diagnosis and treatment of immature permanent tooth which is followed by traumatic injury is a challenge for clinician. Traumatic injuries often result in pulpal inflammation or necrosis which hampers the development of dentinal wall and root apices in immature tooth, resulting in short roots (altered crown root ratio) with very thin walls producing a greater risk of fracture.<sup>1–3</sup> Obturation of tooth with blunder buss canal is considered difficult due to lack of apical barrier resulting in a seepage for bacteria and toxins to leach out to the periapical space.<sup>4,5</sup>

Apexification is considered to be a choice of treatment in such cases where young permanent tooth is traumatized and apical barrier is to be achieved. Initially, calcium hydroxide was used as the material of choice, however recently mineral trioxide aggregate (MTA) has gained a lot of popularity as material for apexification. MTA has superior properties than calcium hydroxide.<sup>6</sup>

In the present case report, the authors highlights achieving apical seal with MTA and obturation of root canal with rolled cone technique as a retreatment modality in a failed RCT treated tooth.

## 2. Case Report

A 17 year old female patient reported with a chief complaint of sharp, shooting pain in upper front region since 4 months. Patient gave the history of trauma 10 years back and treatment of the same tooth 4 months back. No relevant past medical history was reported by the patient. On examination, tooth 11 was discolored, fractured and tender on percussion (Figure 1 A). A provisional diagnosis of Ellis Class IV fracture with respect to tooth 11 was made. On radiographic examination, root canal space was found to be filled with radiopaque material suggestive of an attempted root canal treatment (RCT) previously (Figure 2 A).

Re-RCT was planned for the patient. In first appointment, guttapercha (GP) points were removed from the canal using H-files. While removing GP points, there was profuse bleeding from the canal. Radiograph was repeated on removal of GP points. Radiograph revealed open apex and very thin dentinal walls (Figure 2 B). After removal of GP points, canal was irrigated with 2.5% sodium hypochlorite

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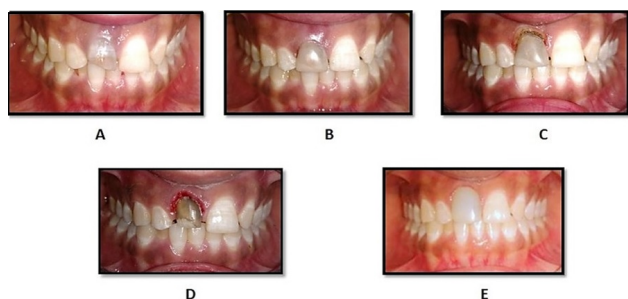
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and 2% chlorhexidine followed by placement of calcium hydroxide powder mixed with saline as an intracanal medicament for 1 week.

In second appointment calcium hydroxide was removed followed by irrigation of canal, drying of canal and placement of MTA. MTA was placed at the apex to obtain apical seal and also on the lateral walls of the root canal as dentinal walls were very thin (Figure 2C). Temporary dressing was given and patient was recalled after 3 days. In third appointment, temporary restoration was removed, canal was dried followed by obturation with rolled cone technique and composite build up (Figure 2 D and Figure 1 B).

Though the tooth had poor prognosis owing to very thin dentinal walls and even discontinuity in the canal walls, an attempt was made to save the tooth as the patient insisted for the same and the patient was recalled on regular follow up. Patient was asymptomatic till 6 months, then composite veneer was placed after 6 months of obturation and was advised for placement crown. To achieve esthetic cervical margins, crown lengthening was performed using diode laser (Figure 1 C) followed by tooth preparation (Figure 1 D) and placement of composite over it (Figure 1 E).

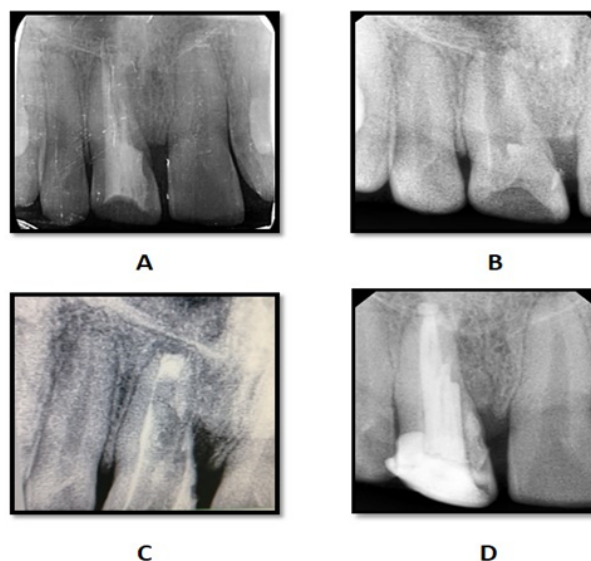
After 1 year also, patient is asymptomatic and composite veneer was not replaced by crown due to unwillingness of the patient.



**Fig. 1:** Intraoral photographs showing: A: Pre-operative; B: Composite build up; C: Crown lengthening using diode laser; D: Crown preparation for composite veneer; E: Placement of Composite veneer

### 3. Discussion

Apexification is a process of forming a mineralized apical barrier in immature non-vital young permanent teeth.<sup>7</sup> Till 1966, surgical approach was used in the clinical management of the “Blunder buss” canal for achieving of an apical seal using retrograde barrier formation technique for fragile and flaring apex. However, this approach further used to reduce the root length resulting in an unfavorable crown-root ratio.<sup>1,8</sup> Thus, apexification is the treatment of choice for necrotic young permanent teeth. The goal of apexification is to obtain an apical barrier to prevent the



**Fig. 2:** A: Pre-operative radiograph; B: Radiograph after removal of GP; C: Radiograph showing Placement of MTA on apex and lateral walls of canal; D: Radiograph showing obturation using rolled-cone technique

passage of toxins and bacteria into periapical tissues from root canal.<sup>1,5</sup> A failure to do so may result in failure of treatment.

Literature reports the use of various materials for apexification, such as calcium hydroxide in combination with sterile water, saline, local anesthetic, CMCP,<sup>9</sup> zinc oxide paste with cresol and iodoform,<sup>10</sup> polyantibiotic paste and tricalcium phosphate,<sup>11</sup> biodentine and MTA. Amongst these, the Most commonly used are calcium hydroxide, and MTA.

MTA as a one-step technique is gradually replacing the traditional use of calcium hydroxide to achieve apexification. Calcium hydroxide can alter the mechanical properties of dentin thus making the tooth more susceptible to root fracture.<sup>3,12</sup> MTA is a biocompatible material and also helps in the formation of bone and periodontium around its interface.<sup>4,13</sup> A case series by Güneş B et al. (2012) reported supreme healing of the apical lesions and the regeneration of peri-radicular tissues after 1 year and 18 months follow up of MTA apexification.<sup>14</sup>

MTA has advantages over other materials owing to less leakage, better antibacterial properties, high marginal adaptation and short setting time (4 h). MTA provides scaffold for hard tissue formation by stimulating the release of interleukins and cytokines.<sup>14</sup> In the present case very thin dentinal walls were present, thus, MTA was chosen as the choice of material as it promotes hard tissue formation, which increases the fracture resistance of the teeth.

The aim of the root canal filling is to achieve a hermetic seal. In cases of wide canals, instead of the lateral

condensation other methods of obturation may have to be employed. These include, constructing a custom guttapercha point or use of one of the heated guttapercha techniques.<sup>15</sup> Custom made roll cone technique is advised in case of blunder buss canal. A large master cane was prepared by heating several large gutta percha cones and rolling the mass between two glass slabs. The complete sealing of root canal is ensured through a radiograph. Uneventful healing was observed after a period of 1 year.

#### 4. Conclusion

Apical seal using mineral trioxide aggregate resulted in apical plug formation and reinforcement of the thin dentinal walls at the apex. Thus, increasing the prognosis of the tooth. The treatment of young permanent tooth poses a challenge for dentist. The success of the treatment depends upon an appropriate diagnosis and treatment planning.

#### 5. Source of Funding

None.

#### 6. Conflict of Interest

None.

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