



**ENDODONTIC TREATMENT OF A TOOTH WITH OPEN APEX USING TRIPLE ANTIBIOTIC PASTE AND MTA AS APICAL PLUG: A CASE REPORT WITH 2-YEAR FOLLOW-UP**

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**ABSTRACT**

The non-surgical endodontic treatment approach for tooth with open apex is always a challenging one. To get a perfect seal of the apical region under a complete asepsis of the canals can't be done by single antibiotics. So come the combination of triple antibiotics (metronidazole, ciprofloxacin, and minocycline) effectively against aerobic and anaerobic bacteria. Mineral trioxide aggregate (MTA) has the advantage of achieving optimal seal of the canals. This case report shows the success of the endodontic treatment of open apex tooth using Triple antibiotic paste in combination with MTA as the apical plug following 2 years of follow up.

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**INTRODUCTION**

Now a days the fracture of anterior tooth in young patients are becoming a common scenario due to their position in the arch. In case if trauma occurs during root development it leads to open apex. The effect of microorganisms into the root canals of untreated teeth may cause this intervention process to move apically, which leads to immunological reaction and finally periapical lesions may occur<sup>1</sup>.

The periapical lesion can be treated with or out the surgical procedure. According to the recent modalities, its better to approach with the endodontic management combined with the regenerative concepts. In case of failure in resolving the lesion, then other surgical treatment should be followed.

There are both aerobic and anaerobic bacteria present in the periapical region. So treating it with single antibiotic will be not sufficient to attain complete asepsis. There comes triple antibiotic paste (metronidazole, ciprofloxacin, and minocycline) which has been reported to be a successful regimen in controlling the root canal pathogens and managing non-vital fractured young permanent tooth. There were studies to observe the potential of combinations [(Amoxicillin+ Metronidazole, Amoxicillin Clavulanic Acid + Metronidazole; Amoxicillin and Cloxacillin + Metronidazole)] over Triple Antibiotic Paste. The results suggest that Triple antibiotic showed the maximum inhibition followed by Amoxicillin and Clavulanic acid combination along with Metronidazole<sup>2</sup>.

Several procedures utilizing different materials have been recommended to induce root end barrier formation that include calcium hydroxide, freeze-dried allogenic dentin powder, bone ceramic, Tricalcium phosphate, osteogenic protein, collagen and Mineral trioxide aggregate (MTA)<sub>3</sub>. Apexification using MTA has several advantages as it neither gets resorbed nor weakens the root canal dentin and also sets in wet environment. Satisfactory compaction of filling material can be achieved as MTA forms hard and non - resorbable apical barrier<sup>4</sup>.

Therefore combination of triple antibiotic paste with MTA has shown excellent results in treating Non vital young permanent tooth.

**CASE REPORT**

A 9 year old male patient reported to our department, with a chief complaint of fractured upper front tooth. Patient has given a history of trauma 1 month back, he had visited a private clinic one day after trauma since he had pain. IOPA was taken there (figure1A), root canal treatment was initiated and analgesics prescribed for 3 days. On clinical examination, no Extraoral abnormalities detected. Intraoral examination revealed Ellis class II fracture in 11 & 21 (figure1B). On palpation there was no pain or mobility. Pulp sensibility tests were performed from 13 to 23. There was no response in 11&21. Preoperative IOPA showed open apex, without root fracture. The canals were re-entered, working length was measured with RVG (figure1C), circumferential filing was done with hand files and canals were irrigated with 3% sodium hypochlorite and saline.

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**Figs 1A,1B and 1C** A) Pre-operative IOPA; B) Pre-operative photo and C) Working length determination with RVG.



**Figs 2A,2B,2C,2D and 2E** A) Calcium hydroxide placed ; B) 2 months followup after calcium hydroxide placement ; C) After placement of Triple antibiotic paste and orifice sealed with GIC; D) 8months followup; E) 12 months follow up.

The canals were dried and filled with calcium hydroxide paste, and access was sealed with Zinc oxide eugenol (figure2A). The patient was recalled after 2 weeks and calcium hydroxide was replaced. The patient was recalled after a month, there was no symptoms, RVG revealed no change the root length or dentine thickness (figure2B).

The canals were re-entered, the calcium hydroxide was removed completely with hand files and irrigation with 3% sodium hypochlorite and saline, the canals were dried and filled with Triple Antibiotic Paste (metronidazole, ciprofloxacin, and minocycline were mixed in equal proportions with polyethylene glycol), and orifice was filled with Glass ionomer cement (figure2C).

The patient was recalled every 2 months and RVG was taken. After 8 months, there was an increase in root length and dentine thickness seen in RVG (figure2D). By the end of 12 months the root growth was complete with apical closure seen in both the teeth (figure2E).

Obturation was done with MTA apical plug and gutta percha points with zinc oxide eugenol sealer coronal to the apical plug. The orifice was sealed with glass ionomer cement (figure3A). Two year follow up RVG also showed complete root formation and clinically there was no discoloration in both 11 & 21 (figure3B)



**Figs 3A and 3B:** A) obturation done with MTA as apical plug and Gutta percha; B) 2 years followup.

## DISCUSSION

Traumatized immature permanent teeth always poses a challenge for treatment. Apexification / Apexogenesis were the treatment options available<sup>5</sup>. Apexification results in a calcific barrier, which may compromise the crown root ratio. Whereas Apexogenesis allows for complete root formation and maintains the crown root ratio<sup>6</sup>. Triple antibiotic paste and MTA combination have shown successful longterm prognosis in the literature<sup>7</sup>. In our case also, this combination have shown excellent prognosis in 2 year follow up. Discoloration is the major drawback while using calcium hydroxide and Triple

antibiotic paste<sub>8</sub>. But in our case even after two years there is no colour change observed clinically.

## CONCLUSION

Recently traumatized young permanent teeth with open apex is a condition more commonly seen in our practice. The combination of Triple antibiotic paste with MTA apical plug will be a more reliable treatment option for longterm prognosis with maintaining the natural colour of the tooth.

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