



CASE REPORT

MANAGEMENT OF A NON-VITAL IMMATURE TOOTH USING MTA AS AN APICAL PLUG: TWO CASE REPORTS

S Wagle^{1*}, N Joshi¹, K Prajapati¹

¹ Department Of Conservative Dentistry And Endodontics, People's Dental College And Hospital, KTM.

*Correspondence to: Dr. Sharada Wagle, PG.Resident, Department Of Conservative Dentistry And Endodontics, People's Dental College And Hospital, KTM.
Email: sharadawagle@yahoo.com

ABSTRACT

MTA appears to be a valid option for apexification with its main advantage being, the speed at which the treatment can be completed. A major problem in performing endodontics in immature teeth with necrotic pulp and wide open apices is obtaining an optimal seal of the root-canal system. Mineral Trioxide Aggregate (MTA), has been proposed as a potential material to create an apical plug at the end of the root-canal system, thus preventing the extrusion of filling materials.

Key words: Apical barrier, External root resorption, Immature tooth, MTA

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INTRODUCTION

A major problem in performing endodontics in immature teeth with necrotic pulp and wide open apices is obtaining an optimal apical seal of the root-canal. Treatment options to manage large periapical lesion with open apex range from non surgical root canal treatment and/or apical surgery to extraction. In such cases, in order to allow condensation of the filling material and promote apical sealing, it is imperative to create an artificial apical barrier or induce closure of the apical foramen with calcified tissue the process known as apexification.

Mineral Trioxide Aggregate (MTA) started as material of choice for apexification procedure due to increased patient compliance and is a single visit procedure. Its excellent ability to set even in the presence of moisture makes possible to use MTA as apical barrier.^{1,2}

In this paper, two clinical cases in central incisors that had premature interruption of radicular development are presented. The immature central incisors with previous history of trauma had both clinical and radiographic signs of pulp necrosis and apical periodontitis. The second case also showed the presence of external root resorption.

CASE REPORT 1

A 28 year old female patient with non contributory medical history reported to the OPD of the Department of Conservative Dentistry and Endodontic, PDCH with a chief complaint of pain, discoloration in tooth in upper front region of jaw since 3 months. Patient gave history of trauma 16 years back and root canal treatment done 8 years back.

Intraoral examination revealed discoloration and

draining sinus in relation to 11. 11 was tender on percussion. Intraoral periapical radiograph revealed radiopacity in the root canal and associated periapical pathology (figure 1). Non surgical retreatment with MTA as an apical barrier was planned.

Gutta percha restoration in the canal was removed. Working length determination was done and debridement of the canal was carried out using irrigants; 2.5% sodium hypochlorite and normal saline. Calcium hydroxide dressing was given and patient was recalled after 2 weeks. On the subsequent visit evaluation draining sinus was healed and the tooth was not tender on percussion. Working length confirmation was done. Collagen material (Kolspon) was placed as a matrix material before placing MTA into the canal. MTA as apical barrier was placed under rubber dam in relation to 11. Approximately 4 mm of MTA was placed apically (figure 2). Wet cotton pellet was placed sealed with glass ionomer cement and recalled for obturation the following day. Thermoplastisized obturation was carried out using calamus obturation unit (figure 3) and access cavity was sealed with direct composite restoration. On evaluation after 6 months (figure4), tooth was asymptomatic; no any periapical radiolucency was evident. Intact lamina dura was evident at the root apex.



Fig:2

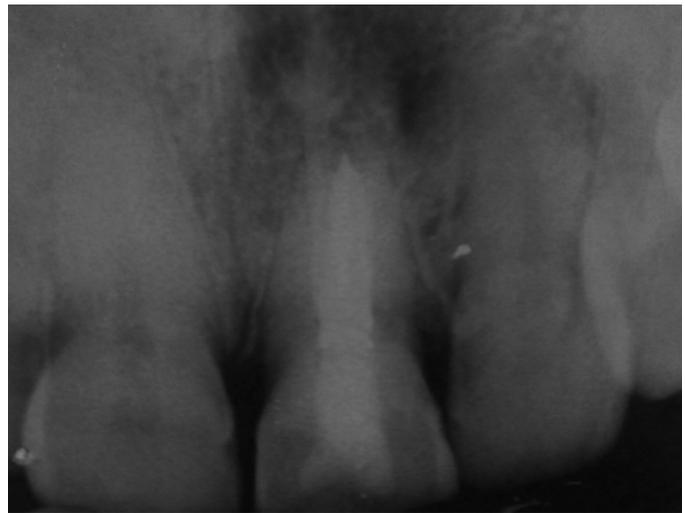


Fig : 3

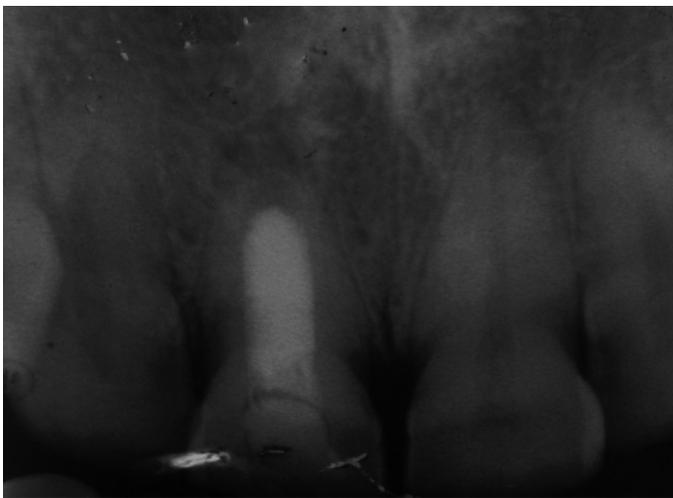


Fig: 1



Fig:4

CASE REPORT 2

A 19 years old male patient with non contributory medical history reported to the OPD of the Department of Conservative Dentistry and Endodontic, PDCH with the chief complaint of the discoloration of the tooth in right upper front region of jaw since 2-3 years. Patient gave history of fall trauma 7 years back.

Intraoral examination revealed discoloration and fractured incisal edge in relation to 11. 11 and 12 both were tender on percussion. Intraoral periapical radiograph revealed periapical radiolucency in relation to 11 and 12. External root resorption and open apex was evident in relation to 11. (figure 5).

Pulp vitality test showed no response in 12 and 11. Root canal treatment for 12 and root end closure using MTA followed by obturation in relation to 11 was planned.

Root canal treatment i.r.t 12 was completed. Working length determination (figure 6) and cleaning and shaping done i.r.t 11. On Evaluation after 2 weeks of calcium hydroxide dressing, 11 was asymptomatic. Reconfirmation of the working length was done. Apical 4-5 mm length of MTA plug was placed over the collagen (Kolspon) matrix (figure 7). Thermoplastisized gutta percha obturation (figure 8) and coronal seal with composite restoration was carried out on the following day.

Six months follow up evaluation (fig:9) showed the tooth to be asymptomatic and no periapical radiolucency with intact lamina dura.



Fig :5



Fig:6



Fig:7



Fig:8



Fig:9

DISCUSSION

Apexification is a method by which artificial barrier in the root apex is formed in such a way that obturating material can be filled in the canal space. MTA has been proposed as a material suitable for one visit apexification,^{2,3} as it combines biocompatibility^{4,5} and a bacteriostatic action⁶ with favorable sealing ability.⁷ The advantage of MTA is that it promotes the immediate formation of an artificial apical plug and maintains the capability to induce apexification with time means that the definitive root filling can be placed immediately after the material sets.^{6,7} There is reduced potential for fracture of immature teeth with thin roots, because of immediate placement

of bonded core within the root canal. In both the case reports presented, working length verification was done with radiograph and paper point method as apex locator can be misleading due to incomplete closure of the apices.⁸ Instrumentation was done to clean the canals without applying excessive pressure to the thin dentinal walls. Use of calcium hydroxide for such a short term does not adversely affect the fracture resistance of the tooth.⁹ The calcium hydroxide dressing can also help control infection, to limit the process of external root resorption.¹⁰

The major problem in cases of a wide open apex is the need to limit the material to the apex. Using a matrix avoids the extrusion of the material into the periodontal tissues, reduces leakage in the sealing material, and allows favorable response of the periodontal tissues. Small pieces of collagen membranes packed within the bone space to create a matrix against which MTA can be packed¹¹. In these cases 4-5 mm of MTA plug barrier was formed as 5-mm barrier is shown significantly stronger.¹⁰ Coronal leakage is also a key factor causing failure, thus, coronal seal was obtained with composite resin to avoid coronal leakage.

Various studies have been carried out with good prognostic results for the management of open apex cases using MTA as apical plug barrier. Floratos Spyros G et al 2013¹¹ reported two cases in which incomplete placement of 4 mm mineral trioxide aggregate (MTA) plug was performed unintentionally at the apical third of permanent immature teeth with open apex and apical periodontitis. At 6 to 16 months follow-up examinations, formation of dentin in contact with the MTA surface, as well as apical closure and periapical healing were verified radiographically for both cases. The results of these cases showed that apical barrier formation and complete periapical healing is possible despite the incomplete apical placement of the

MTA plug. This case report confirmed that an apical barrier formation can occur even in the presence of gaps between the MTA plug and the root canal walls. This observation is probably related to the ability of MTA to enhance cell migration.¹²

In present case report also first case showed incomplete MTA apical plug, however, follow-up evaluation has shown healed periapical region with intact lamina dura.

Güneş B and Aydinbelge A H. 2012¹³ reported three cases of maxillary incisors with open apices and periapical lesions treated with MTA apical plug. In these cases MTA was placed in the apical 3 millimeters of the root canal after cleaning and disinfection of root canal with calcium-hydroxide for two weeks. The remaining part of the root canal was filled with gutta-percha and the coronal restoration was finished with composite resin. After six months the radiographic examination showed a decrease of periapical lesions. 1 year and 18 months radiographic and clinical follow-ups revealed the supreme healing of the apical lesions and the regeneration of periradicular tissues. Authors have reported MTA apical plug method is effective because of the less requirement of treatment time, appointments and radiographs, and better fracture resistance after the treatment of nonvital immature permanent teeth.

Ajwani P, Saini N. 2011¹⁴ reported with a mutilated maxillary left central incisor with radiographic presentation of open apex and a large periapical lesion. The case was managed successfully by conservative means using intracanal calcium hydroxide and mineral trioxide aggregate (MTA) apical barrier followed by a fiber post and a core. The final crown restored back esthetics and function. A 6-month follow-up demonstrated a clinically asymptomatic and adequately functional tooth, with radiological signs

of healing.

CONCLUSION

MTA has numerous applications in endodontic therapy. The primary advantages of this material as an apical barrier include reduction in the number of appointments, development of proper apical seal and excellent biocompatibility. This article demonstrated one of the indications of MTA as apexification material. Single visit apexification with a biocompatible material like MTA is boon in the effective management of teeth with open apex. Despite the damage to the root by external root resorption the non surgical approach followed for the management seemed predictable, however, long term follow up is necessary.

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