

Case Report

Management of Anterior Young Permanent Teeth with Apical Periodontitis by Apexification: A Case Report

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Abstract

Aim: The purpose of this study is to describe the treatment of immature permanent incisors with apical periodontitis, based on the placement of an apical mineral trioxide aggregate (MTA) plug for apexification. **Materials and Methods:** A 9 years old boy was referred to the restorative and dental material department at National Research Center in Egypt, with a chief complaint of recurrent abscess and pain associated with the fractured central incisors. The first visit was accomplished by using Sodium Hypochloride (NaOCL) irrigation and intra-canal medication with tri-antibiotic paste (TAP) without instrumentation. Follow-up was done up to 18 months using standardized digital radiographs **Results:** After 6 month, the patient was asymptomatic and the radiographic examination showed rounding of root ending and peri-apical tissue repair. **Conclusion:** It was concluded that use of MTA as an apical plug in necrotized teeth with open apices is a valuable option and may replace long-term apexification, thus reducing the treatment time with regard to the healing of the periapical lesions and the apical closure.

Keywords: Mineral trioxide aggregate (MTA), Apexification, Permanent immature tooth and tri-antibiotic paste (TAP).

1.Introduction

Treatment of necrotic immature teeth has always been a challenge in endodontics⁽¹⁾. Pulp necrosis of immature tooth as a result of trauma or caries could arrest further root development, leaving the tooth with thin dentinal root canal walls and blunderbuss apices⁽²⁾. Hence, it is difficult to provide proper instrumentation for these canals and to have appropriate apical seal in teeth with open apices by using the conventional endodontic treatment methods^(1, 3). MTA is used for apexification as an alternative to multiple visit calcium hydroxide apexification for its osteogenic and cementogenic action with low solubility which can create an

apical plug at the root end and allow the peri-radicular tissue healing^(4,7). The advantages of MTA apexification are the reduction in treatment time, lower chance of tooth fracture or reinfection and fewer visits to the dental office⁽⁸⁾. But even MTA may not result in continued root formation or strengthen the remaining root structure, and may leave the root susceptible to fracture⁽⁹⁾.

2.Material and methods:

The patient's teeth were anesthetized by 1.8-3.6 ml of mepivacaine without vasoconstrictor (Mepivacaine HCl 3%). After the access preparation, the working length

determination was done radiographically using k-file size 15 to limit any damage to the canal walls. Then each canal was irrigated with 20 ml of 5.25% sodium hypochlorite using irrigation needles¹ 2 mm from the working length. The inner surface of the coronal access cavity was covered by acid-etched flowable resin bonded composite of 1mm layer thickness. Then the canal was dried with paper points and the TAP which consists of metronidazole, ciprofloxacin and doxycycline was prepared as a creamy paste then carefully introduced into the canal 2mm shorter than the working length with a suitable condenser and then further condensed by a finger plugger to the level just below the CEJ. The access cavity was sealed with 4 mm of temporary filling material and 2mm of glass ionomer filling material² applied by glass ionomer capsule applicator.

The patient received the pain diary (VAS) and was instructed to fill in the required intervals (4, 12, 24, and 48 hours after the procedure). Then the patient was recalled 20 days later; showing relief in pain and inflammation.

At the second visit, the patient was anesthetized and each canal was irrigated with 20 ml of 5.25% NaOCl. The canal was then dried with paper points; the grey MTA was mixed according to manufacturer's instructions and placed to the apex with a 3-5 mm thickness using hand plugger size 25; the MTA plug was verified radiographically using a periapical radiograph. Then the tooth was restored immediately with glass ionomer material placed over the apically compacted MTA. Then the final restoration of each tooth was done by a composite resin bonded restoration beginning at the level of the MTA and ending at the access cavity⁽⁸⁾. The postoperative radiograph was taken at the end of the second visit by paralleling technique using an XCP, the prefabricated acrylic stent and an image plate (that was interpreted by Digora) which is considered as a baseline radiograph (figure 1)⁽¹⁰⁾. The patient received the pain diary and was instructed to fill in the required intervals (4, 12, 24, and 48 hours after the procedure) then the patient was recalled after 1, 3, 6, 9, 12 and 18 months for clinical and radiographic follow up.

3. Results

The radiographic examination after 6 months, showed apical repair to be complete, with rounding of the apex of the left incisor and the formation of hard tissue above the gray MTA Angellus (Angelus industris de produtosodontologicos S/A, ruawalderlandgraf, 101-Barrio Lindoia, CEP 86031 - 218 - Londrina - PR / Brazil). The clinical examination showed the

absence of infection. At evaluation at 18 months, the patient was asymptomatic and showed good periodontal health (Figure 2).

4. Discussion

The apexification with MTA offers an alternative to conventional treatment with calcium hydroxide⁽¹¹⁾. When treating a tooth with necrotic pulp, the main objective is to eliminate bacteria from the root canal system. Since instruments cannot be properly used in teeth with open apices, disinfection and cleaning of the root canal depends on the chemical action of the sodium hypochlorite used as irrigant and the tri-antibiotic paste. In order to prevent infection of the root canal system, it is essential to seal the crown with material affording perfect sealing with glass ionomer and composite. The excellent biological properties of MTA and its capacity to offer good sealing, has been recommended for creating an artificial apical barrier in teeth with an open apex⁽¹²⁾. On the other hand, in order to reduce fracture risk, different investigators^(12,13) have proposed apexification in a single visit, placing an MTA apical plug in the last 5 mm of the root canal. Filling of the canal with composite restoration on an immediate basis is therefore possible and is regarded as a key factor for the long-term preservation of the treated tooth. The subsequent follow-up evaluations showed the patient to remain asymptomatic, and the X-ray study confirmed repair of the periapical lesion.



Figure (1):
(A) Occlusal stent on a study cast,
(B) Paralleling technique using XCP.

¹Endo-Eze® Irrigator Tip, Ultradent, 505 West 10200 South, South Jordan, Ut 84095 / Usa.

²Gc Fuji Ix Gp Capsule, Gc Corporation, 76-1 Hasunuma-Cho, Itabashi-Ku, Tokyo, Japan.

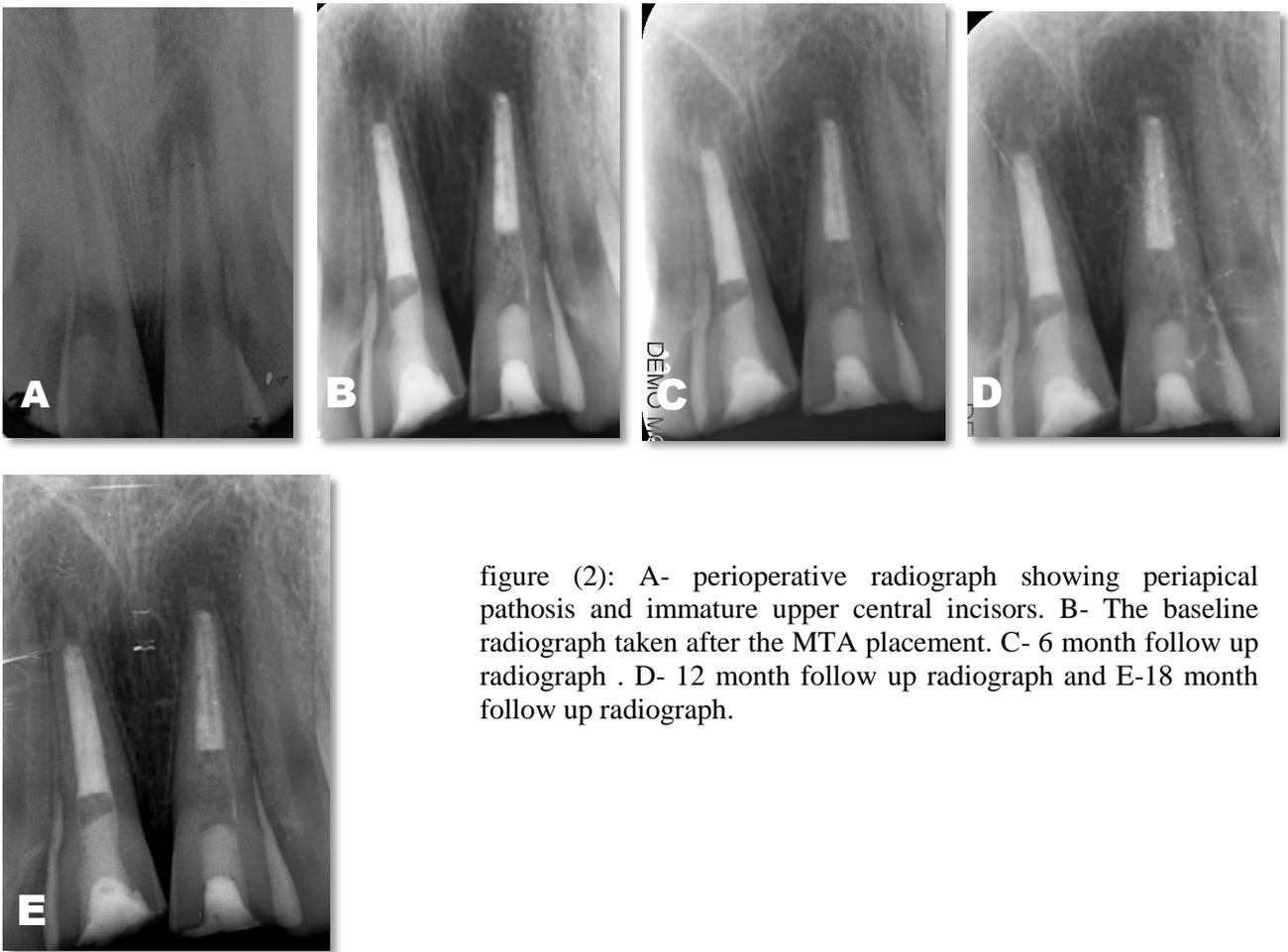


figure (2): A- perioperative radiograph showing periapical pathosis and immature upper central incisors. B- The baseline radiograph taken after the MTA placement. C- 6 month follow up radiograph . D- 12 month follow up radiograph and E-18 month follow up radiograph.

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