

Apexification with MTA placement – a case report

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Abstracts:

Aim: To present a case in which clinical and radiographic signs of healing were obtained after apical plugging of an immature open apex with MTA.

Case: A discolored tooth was subjected to radiographic examination revealing an open apex and a periapical radiolucency. The canal was cleaned using intracanal instruments and 5.25% of NaOCl irrigation. To obtain canal disinfection, slurry of calcium hydroxide mixed with sterile saline was temporized in the canal. The patient was asked to return after two weeks for the MTA apical plug placement. .

The tooth was opened, instrumented and irrigated. Around 4 mm of MTA plug was compacted apically and allowed to set. Thereafter, the remainder of canal system was filled with thermoplasticised gutta-percha. A corono-radicular composite restoration sealed the access. A six-month follow up demonstrated clinically asymptomatic and adequately functional tooth, with radiographic signs of healing.

I. Introduction

A tooth with an immature open apex presents the problems of overfilling and poor apical seal of obturation. An apical barrier is much desired to enable optimal obturation of the root canal system. Calcium hydroxide has been used successfully(1-2) to effect an apical barrier formation i.e. apexification in these teeth. However, the length of time required for this is variable, ranging from 3-18 months(3). This presents problems with patient compliance, re-infection due to loss of temporary restoration and also predisposes the tooth to fracture(4-6).

A one step apexification procedure eliminates these problems. It implies the non-surgical compaction of a biocompatible material into the apical end of the root canal, thus, creating an apical stop and enabling immediate filling of the root canal.(7)

MTA has been described as a good material for this procedure owing to its good canal sealing property, biocompatibility and ability to promote dental pulp and periradicular tissue regeneration(8-11). It has been reported that MTA root fillings placed at the cemental canal limit showed better results than overfillings.(12,13)

This report demonstrates the use of MTA apical plug in immature open apex where, an apical matrix was inadvertently created by calcium hydroxide use.

II. Case Report

A 21 year- old female presented to the department of conservative dentistry and endodontics, with discolored upper left central incisor that is tooth number 21. On asking leading questions patient gave no history of pain or discomfort associated with 21. Patient had noticed the discoloration since two years. The patient had history of trauma ten years before.

Clinical examination revealed a discolored central incisor and radiographic examination shown a wide open apex and a radiolucency area (**fig.1**) A diagnosis of immature nonvital tooth with periapical radiolucency was made.

A one step apexification preceded by canal disinfection for two weeks with calcium hydroxide was planned for this tooth.

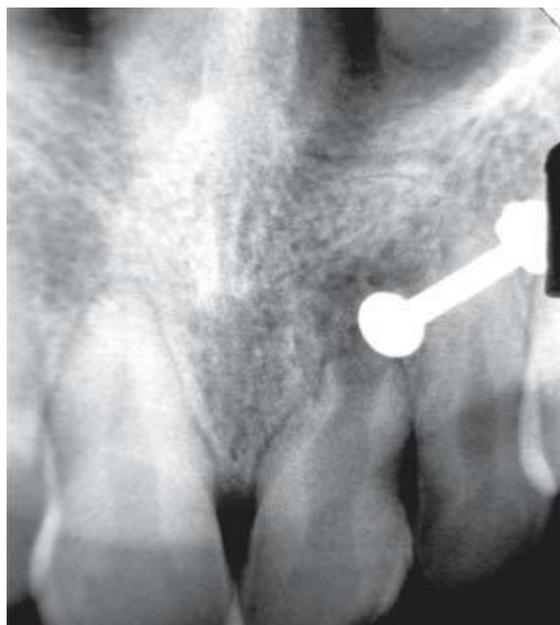


fig. 1

After application of rubber dam and access cavity preparation , working length was obtained with 80 k file which was 14 mm. At this stage, the number 80 file was found loose and easily passing beyond the apical limit of the canal. The canal was thoroughly cleaned using intracanal instruments and 5.25% hypochlorite irrigation. To obtain canal disinfection prior to MTA placement , a slurry of calcium hydroxide mixed with sterile water was placed in the canal and temporized.

The patient was asked to return after two weeks.

After two weeks the tooth was opened , instrumented and irrigated (fig.2)

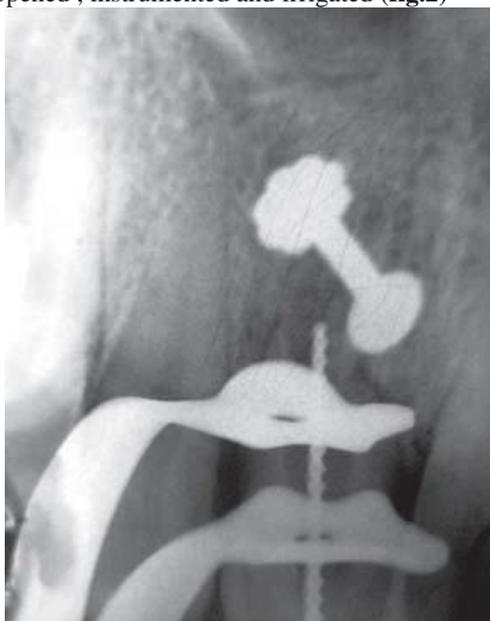


fig. 2

The white MTA was mixed to a paste consistency with sterile water and delivered to the canal using an amalgam carrier in about 4mm thickness. A plugger was tailor made by heating and rolling cones of gutta-percha to condense the MTA at the apex. After placement, a tulospiral was used to get a homogenous well sealed apical plug (fig.3). A moist cotton pellet was sealed inside for setting of MTA.

The next day, remainder of the canal was sealed with thermoplasticised gutta-percha. A coronoradicular composite restoration sealed the access preparation, after non vital bleaching.

Six months follow up demonstrated a radiographic decrease in the periapical radiolucency (fig4). The tooth was asymptomatic, and clinically functional.



fig. 3

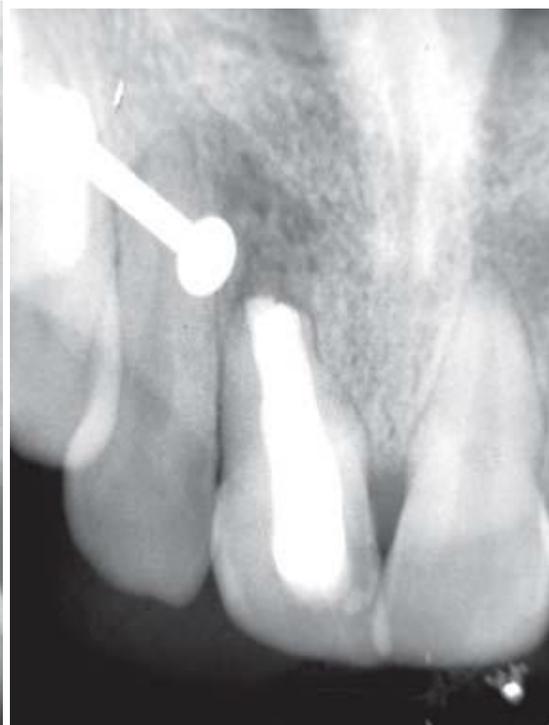


fig. 4

III. Discussion

Calcium hydroxide has been used with great success to effect an apical hard tissue barrier in immature open apices. The time interval for calcium hydroxide apexification has been reported to be variable, ranging from 3-24 months(4). In this case, the speedy barrier formation could be attributed to the frequent calcium hydroxide dressing replacement (14). The barrier produced by calcium hydroxide apexification has been reported to be incomplete having swiss cheese appearance, and can allow apical microleakage. Thus a permanent root canal filling is still mandatory. Pulp revascularization remains a good treatment option for such cases but the patient was not agreeable to the time constraints. So, one step apexification with MTA was decided for this case.

MTA has been widely recommended for plugging open apices(15-17). It has good apical seal, biocompatibility, pulpal and periodontal tissue regenerating capabilities(8-11). Authors have reported that MTA root fillings placed at the cemental canal limit showed better results than overfillings(12-13). Various materials have been used to prevent MTA extrusion into the periodontal tissues, including hydroxyapatite, collagen, calcium phosphate cement and calcium sulphate. In this case, the apical stop gained by calcium hydroxide use was used to obtain a dense MTA plug contained within the apical limit of the tooth.

The anatomy of the canal dictated the use of a plastic filling material. Access was sealed with composite restoration starting from 3mm below the cervical line to reinforce this tooth against fracture. The six-month follow up showed clinical and radiographic signs of healing. Long term follow up is however necessary to ensure success, especially since this therapy would probably increase chances of tooth fracture.(6)

IV. Conclusion

The use of MTA apical plug after gaining a matrix with calcium hydroxide therapy showed a positive clinical outcome for the immature tooth.

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