

SINGLE STEP MTA APEXIFICATION WITH COLLAGEN BARRIER – A CASE REPORT

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ABSTRACT

A tooth with an immature open apex presents a special challenge to dentists all over because of large open apices, divergent root walls, thin dentinal walls that are susceptible to fracture and frequent periapical lesions. They often pose a threat for iatrogenic errors like over filling or poor apical seal after obturation. This report demonstrates the use of single step apexification with an MTA (Mineral trioxide aggregate) plug in immature open apex where an apical seal was created using collagen matrix.

INTRODUCTION

The fundamental rule in endodontics is to debride and obturate the root canals as efficiently and effectively in the amount of time reasonable to both the patient and the dentist [1]. The success of an endodontic treatment depends significantly on a proper apical and coronal seal [2]. Teeth with open apex often pose a challenge to the dentist because of the lack of an apical seal for obturation and higher risk of over filling.

Case Report

A 28 year old female patient reported to the Department of Conservative Dentistry and Endodontics, A.B Shetty Memorial Institute of Dental Sciences, Mangalore with the chief complaint of discoloured upper front teeth since childhood. Patient gave a history of trauma when she was a child.

The patient mentioned that the discoloured teeth were root canal treated and a surgery was performed for the two discoloured teeth 5 years back. Medical history was non-significant. Clinical examination revealed discoloured tooth number 11 and 12 (Fig.1). Gingival recession was seen with respect to tooth number 11

Grade I mobility was noticed with respect to both the teeth. Gingiva around the two teeth was mildly inflamed. Periodontal probing revealed localized bone loss.

Radiographic examination (Fig.2) revealed radiopaque material in the root canals extruding beyond the apex in teeth no 11, 12 and widening of lamina dura surrounding the apex. The apical seal was inadequate. The adjacent teeth responded normally to pulp sensitivity testing (Cold testing and EPT). A diagnosis of non-vital immature teeth with periapical lesion was made. The patient insisted on saving the teeth and wanted a procedure that would be done in minimum appointments, therefore the MTA plug method was chosen. Patient was informed of the risks and long term prognosis of the procedure and informed consent was taken.

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Clinical Procedure

Before the start of the the endodontic treatment, oral prophylaxis was performed on the teeth and root planning was done along the roots of 11, 12. At the first appointment for endodontic procedure, with no anaesthesia, under the rubber dam the entire root-canal fillings (sealer and obturating material) was removed using endodontic H files, Protaper retreatment files (Dentsply Maillfer) and xylene as a gutta percha solvent (Fig.3). The root-canal working length was established radiographically. The root canal was gently cleaned with manual instruments using 2.5 % NaOCl alternating with normal saline and 2% chlorhexidine. Calcium hydroxide dressing was placed in the root canals for a period of 1 month during which it was changed once after two weeks. After a month the dressing was removed, the canal was irrigated thoroughly and dried with sterilized paper points. Since apical closure was not present, it was decided to use a resorbable collagen sponge to limit the MTA and prevent it from extrusion. The collagen sponge (Kolspon, Eucare pharmaceuticals Pvt. LMT., India.) (Fig.4) was cut into small pieces and it was then condensed beyond the canal apex using endodontic pluggers, until the periapical space was full in order to create a barrier for the MTA.

The collagen pieces were condensed using a plugger with a rubber stopper at the working length. Proroot MTA (Dentsply Maillfer) was mixed according to the manufacturer's instructions and inserted into the canal with a messing gun. To condense the MTA, a plugger was used and its length adjusted 5 mm shorter than the working length so that an MTA barrier of sufficient thickness (3-5mm) could be placed. Correct placement of MTA was confirmed radiographically (Fig.5). A sterile cotton pellet moistened with sterile water was placed over the canal orifice and the access cavity was sealed temporarily with intermediate restorative material Zinc oxide eugenol cement. The patient was recalled the next day. The root canal was re-entered. The setting of the MTA was confirmed by gentle probing with a file. The rest of the canal space was then obturated by thermoplasticized gutta-percha (Calamus, Dentsply) and AH Plus sealer (Dentsply DeTrey, Konstanz, Germany) (Fig.6). At the same appointment, the access cavities were adhesively restored with Composite (Filtek™ Z350 XT Universal Restorative). Patient was followed up for a week for any postoperative symptoms. Porcelain fused to metal full coverage crowns were then placed on the two teeth (Fig 7,8) .

Figure 1. Discoloured 11,12



Figure 2. Preoperative radiograph Radiopaque material extruding beyond apex of 11, 12

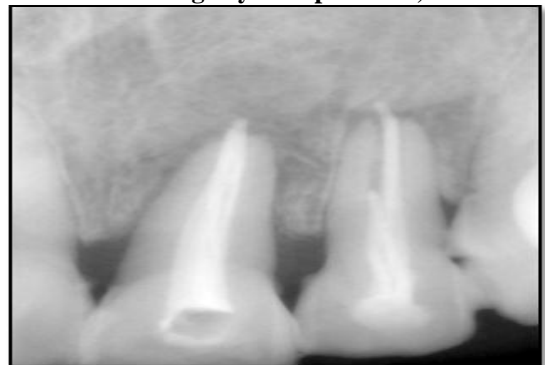


Figure 3. Removal of previous obturating material

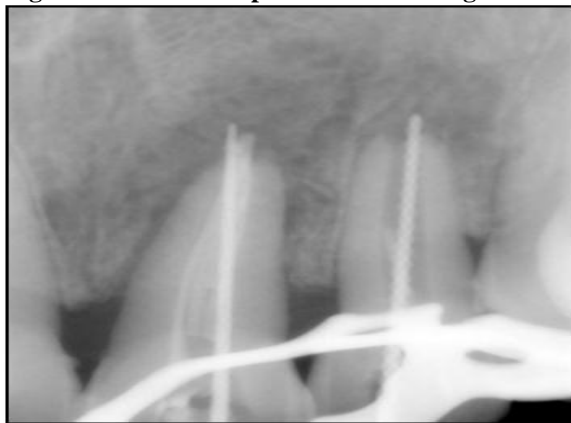


Figure 4. Collagen matrix as apical barrier

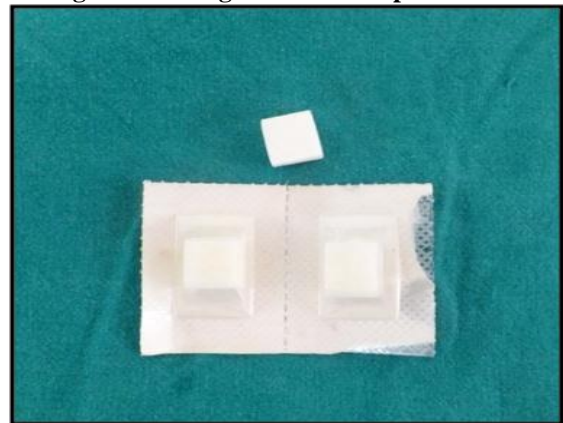


Figure 5. MTA barrier



Figure 6. Back fill of root canal with Thermoplastic G.P



Figure 6. Crown preparation wrt 11, 12



Figure 7. Crown cementation wrt 11, 12



DISCUSSION

The clinician has a number of options to treat a case of mature tooth with open apex. These include teeth extraction and subsequent replacement with fixed, removable or implant prosthesis, multiple visits with calcium hydroxide apexification, revascularization with subsequent follow up for apical closure and permanent prosthetic restoration of the tooth or MTA plug and subsequent restoration[3]. Several studies have shown a positive outcome using MTA as a barrier for apical plug formation[4,5]. Also studies have shown that MTA plug reinforces the root structure unlike long term calcium hydroxide that is shown to weaken the radicular dentine [6,7]. Most dental materials when extruded beyond the apex are known to cause foreign body reactions that may range from mild to severe inflammatory allergic response and neurotoxic effects [8]. MTA is a biomimetic, biocompatible material and has extensively been used in various dental application, however certain components of

its composition are known to be cytotoxic. Using a matrix prior plugging MTA reduces the chances of overfill and extrusion of the material [8]. This concept is not new Lemon et al proposed the internal matrix concept for perforation repair [9]. Using a matrix in an open apex case is an extension of the same principle. In this case we used a collagen sponge (Kolspon Eucare pharmaceuticals) membrane. The rationale of using collagen is that collagen has hemostatic properties [10] many shapes and can easily be manipulated and adapted to the root surface. It is a weak immunogen which is bioabsorbable, eliminating the need for re-entry surgery to remove it [10].

CONCLUSION

The use of collagen as a barrier prior material prior to apexification with MTA showed a positive clinical outcome for management of tooth with open apex. Further long term follow up is needed to ensure success.

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