

Nonsurgical Management of Blunderbuss Canals

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Abstract

Proper hermetic seal is difficult to achieve in cases of incompletely formed apex of the tooth. In present case reports, apexification procedure was performed with the help of Mineral Trioxide Aggregate (MTA). Case 1 is a 14-year-old female who presented with a chief complaint of discolored tooth and also revealed a history of trauma 5–6 years ago. Case 2 is a 14-year-old male patient who presented with a history of grossly decayed upper front teeth. Proper diagnosis was made with the help of radiographic investigation. Treatment options were discussed with the patient. MTA apical plug formation was done followed by root canal treatment.

Keywords: Apexification, apical plug, mineral trioxide aggregate

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INTRODUCTION

Thorough disinfection of the root canal with proper hermetic seal is important for the success of endodontic treatment. In case of a blunderbuss canal, maintaining the three dimensional seal is difficult.^[1] Due to the lack of an apical constriction, an alternative to standard root canal treatment, apexification has been advocated. Calcium hydroxide has been the material of choice for apexification.^[2] However, calcium hydroxide shows certain limitations like the length of time needed for apical barrier formation.^[3]

In 1999, Torabinejad and Chivian introduced the use of mineral trioxide aggregate (MTA) as a material of choice for apexification. MTA is a powder of hydrophilic particles that harden in <4 h when in contact with moisture. MTA naturally heals exposed pulps, which involves the proliferation and migration of progenitors followed by their differentiation into odontoblast-like cells.^[4]

CASE REPORTS

Case 1

A 14-year-old female patient reported to the Department of Conservative Dentistry and Endodontics, Adesh Institute of Dental Sciences and Research, Bathinda, with the chief complaint of an unesthetic smile with a history of trauma 5–6 years back. Clinical examination revealed discolored maxillary right central incisor. Intra-oral periapical radiograph revealed incompletely

formed apex in both central incisors [Figure 1]. Tooth elicited a negative response on thermal as well as electric pulp testing. On the first visit, root canal treatment was initiated, and cleaning and shaping were done with circumferential filing up to #90 K-file. The canal was irrigated with 2% chlorhexidine and normal saline followed by calcium hydroxide dressing for disinfection of root canal. Patient was recalled after 2 weeks. Irrigation was done and canals were then dried with paper points. A mixture of MTA powder (Dental Tulsa Dentsply) and distilled water was then applied to the root canals. This procedure was repeated a number of times until the thickness of the MTA reached almost 5 mm. Radiographically, the plug's position was checked in both canals. Crowns were then sealed temporarily after the placement of a wet paper point over the plug. Obturation of both canals was done after a week and follow-up was done after 3 and 6 months [Figures 2 and 3].

Case 2

A 14-year-old male patient reported to the Department of Conservative Dentistry and Endodontics, Adesh Institute of Dental Sciences and Research, Bathinda, with the complaint of grossly carious upper anterior teeth. The patient wanted esthetic

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management of anterior teeth. Clinical examination revealed decayed maxillary right and left central incisors [Figure 4]. Intra-oral periapical radiograph revealed a blunderbuss canal in relation to both maxillary central incisors [Figure5]. Tooth elicited

a negative response on thermal as well as electric pulp testing. On the first visit, root canal treatment was initiated, and cleaning and shaping were done with circumferential filing up to #100 K-file. The canal was irrigated with 2% chlorhexidine and normal saline. Moreover, calcium hydroxide dressing was placed for disinfection of the root canal. After 2-week irrigation, a mixture of MTA powder (Dental Tulsa Dentsply) and distilled water was then applied to the tooth canals. This procedure was repeated a number



Figure 1: Preoperative radiograph with incomplete apex involving both central incisors



Figure 3: Six-month follow-up



Figure 5: Preoperative radiograph

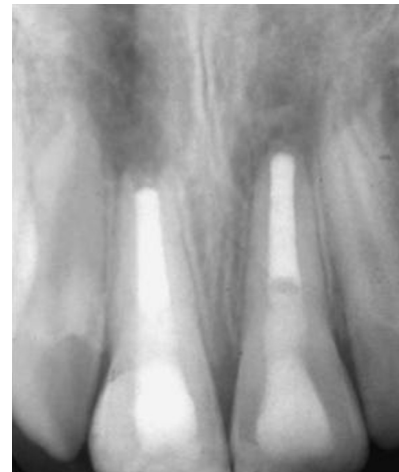


Figure 2: Three-month follow-up



Figure 4: Preoperative photograph with grossly carious central incisors



Figure 6: Postoperative photograph

of times until the thickness of the MTA reached almost 5 mm. The plug's position in both canals was checked radiographically. After placement of wet paper point over the plug, the crowns were sealed temporarily. Obturation of both canals was done after a week. Post operative photograph was taken [Figure 6] and follow up was done after 6 months [Figure 7].

DISCUSSION

The treatment of pulpal injury during this period provides a significant challenge for the clinician. Depending on the vitality of the affected pulp, two approaches are possible: apexogenesis or apexification.^[5]

The importance of coronal sealing was established by Tronstad *et al.* who demonstrated that if the canal sealed properly and restored perfectly, then the degree of success will improve dramatically. He also treated furcation perforations and osseous repair with MTA.^[6]

MTA was developed at Loma Linda University, California, USA, as a root-end filling material in surgical endodontic treatment. Over the years, further research on the material has resulted in MTA being applied in various clinical situations in addition to its use as a suitable root-end filling material. MTA has high sealing ability, excellent marginal adaptation and a high degree of biocompatibility. Setting time (about 4hr) and provision of a suitable coronal seal after the use of an apical plug of MTA is very important.^[4]

Ajwani and Saini have reported a case of successful treatment of mutilated maxillary central incisor with an open apex using intracanal calcium hydroxide and MTA, followed by fiber post and core. In the present case after placing the MTA apical plug, the subsequent increments were obturated using lateral condensation technique. The present case also produced similar results with no symptoms thereafter.^[7]



Figure 7: Six-month follow-up

Pelliccioni *et al.* evaluated osteoblast-like cell response to MTA, and the result showed that MTA has good interaction with periapical and periradicular tissues. MTA has a potential effect on cell viabilities and collagen release mechanism.^[8]

Kettering and Torabinejad compared MTA with super-Ethoxy Benzoic acid (EBA) and (Intermediate restorative material) IRM and found that MTA is not mutagenic and less cytotoxic.^[9]

Sumer *et al.* concluded that MTA is well tolerated by the tissues and biocompatible.^[10]

CONCLUSION

MTA is an excellent biocompatible material. MTA has various exciting clinical applications as it has numerous qualities mandatory for ideal dental materials.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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