

Interdisciplinary Management of Maxillary Anterior Teeth with External Root Resorption: A Case Report

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Abstract

Introduction: This is a case report showing interdisciplinary management of a tooth with external and cervical root resorption using mineral trioxide aggregate (MTA).

Case Report: A 35-year-old female with a complaint of pain in upper jaw with a history road traffic accident 8 year back. Non-surgical root canal therapy was performed with the use of calcium hydroxide and triple antibiotic paste as intracanal medicament. About 2% chlorhexidine solution was used as the final irrigant. MTA obturation was done in both central incisors; external cervical resorption in the left central incisor was repaired by reflecting the mucoperiosteal flap and sealing with MTA. The 3-month follow-up of the present case shows satisfactory results both clinically and radiographically.

Conclusion: Resorption cases has to be ruled out radiographically and clinically for successful management of these cases. Non-surgical and surgical treatment has been done hand in hand for management of this case.

Key words: Cervical root resorption, External root resorption, Mineral trioxide aggregate

INTRODUCTION

External root resorption occurs on the outer surface of the root, and the causes for this may vary. There are several types of external root resorption with the most common being external inflammatory root resorption. It may arise as a sequela of traumatic injury, orthodontic tooth movement, or chronic infection of the pulp or periodontal structures.^[1] Root resorption is a pathological process initiated by specific clastic cells which remove the organic and mineral components of dental hard tissues.^[2]

The major challenges associated with endodontic treatment of teeth with open apices due to resorption are achieving complete debridement, canal disinfection, and optimal sealing.^[3]

Recently, mineral trioxide aggregate (MTA) has emerged as a reliable material due to its biocompatibility, good sealing

property, and it encourages regeneration of periradicular tissues such as periodontal ligament bone and cementum.^[4] This is a case report showing management of maxillary central incisor with both cervical and external apical resorption with MTA obturation.

CASE REPORT

A 35-year-old female patient reported to the Department of Conservative Dentistry and Endodontics, Kannur Dental College, with a chief complaint of pain in the right upper front tooth. The patient had a history of trauma 8 years back in a road traffic accident. There was no relevant medical history.

On clinical examination, there was an Ellis Class II fracture on 11 and discoloration with respect to 21 [Figure 1].

Sinus tract was present in relation to 11. There was no mobility erythema, but tenderness on percussion was present. Both 11 and 21 negative responses (as compared to control tooth) were observed on thermal and electric pulp testing.

Intraoral periapical radiograph revealed a small, ill-defined radiolucent area involving the apical portion of the root of

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11 and 21 with blunt border and also radiolucency involving cervical third of 11 [Figure 2]. Based on the clinical and radiographic examination, we came to a diagnosis as follows:

- Chronic periradicular abscess and external apical root resorption of 11 and 21
- Ellis Class IV fracture with Heithersay's Class III cervical resorption of 11.

Taking into consideration the extent and severity of lesion, the treatment plan was decided as non-surgical root canal therapy with MTA obturation in both 11 and 21 and flap elevation and sealing of cervical resorption with the same.

The access cavity was prepared and working length of the tooth was determined [Figure 3]. Canals were cleaned and shaped with copious amount of percentage of sodium hypochlorite and vasoactive intestinal peptide. This was followed by irrigation with normal saline to remove any remnants of hypochlorite, and 0.2% chlorhexidine, latter canals were dried with absorbents points and calcium

hydroxide (R C Cal, Prime Dental Products, Kalher, Thane) as an intracanal medicament was placed in canals followed by a temporary restoration for 1 week. After 1-week, the patient was recalled and triple antibiotic paste was prepared by mixing ciprofloxacin 500 mg (Ciplox-500, Cipla Ltd., Sikkim, India), metronidazole 400 mg (Aristogyl, Aristo Pharmaceuticals Pvt. Ltd., Mumbai, India), and minocycline 100 mg (Minoz 100, Ranbaxy Laboratories Ltd., Solan, India), in tooth no. 11 and 12.

After 3 weeks, the patient was recalled, temporary filling was removed and canals were cleaned and dried. MTA, ProRoot MTA (Dentsply, Tulsa, Switzerland) was manipulated according to the manufacturer instructions. Both the central incisors were obturated with MTA; material was placed in the canals with amalgam carrier and was condensed vertically with hand pluggers [Figure 4].

For the management of cervical resorption, conventional full-thickness mucoperiosteal flap was elevated on 11



Figure 1: Pre-operative photograph



Figure 3: Working length determination

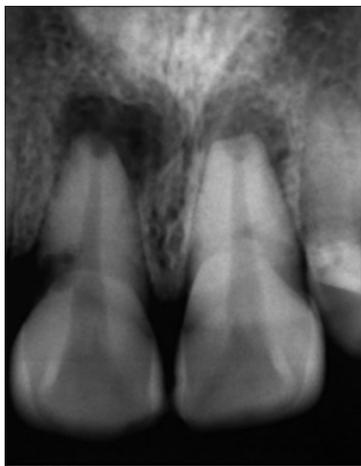


Figure 2: Pre-operative radiograph



Figure 4: MTA obturation

under local anesthesia and MTA was placed and sutured [Figure 5-8].

Post-operative radiographs after 2 weeks [Figure 9] and 3 months [Figure 10] showed satisfactory healing.

DISCUSSION

External root resorption is one of the most difficult dental conditions to treat; attempting to perform endodontic therapy for every condition of external resorption is futile.^[5]

Cervical external resorption also called as invasive cervical resorption is a clinical term used to describe a relatively uncommon, insidious, and often aggressive form of external tooth resorption, which may occur in any tooth of permanent dentition. Invasive cervical resorption is defined as “a localized resorptive process that commences on the surface of root below the

epithelial attachment and the coronal aspect of the supporting alveolar process, namely, the zone of the connective tissue attachment.”^[6] If the defect is inaccessible in oral cavity but present in cervical third of tooth then orthodontic extrusion of tooth or apically positioned flap can be used, but this might give esthetically compromised results.^[7]

When the pathway of communication is opened between the root canal and the periodontium, it must be sealed with materials that preserve bacterial leakage, this material should be biocompatible and should favor regeneration of supporting structure.^[8]

A current trend in endodontic research is to explore various alternatives to gutta-percha to identify suitable filling materials that can provide greater resistance against coronal and apical leakage and thus protection from bacterial contamination.^[9] Development of new bioactive material such as MTA makes possible other therapeutic approaches including the obturation of root canal space



Figure 5: Local anesthesia



Figure 7: Placement of MTA



Figure 6: Elevation of flap



Figure 8: Suture placed

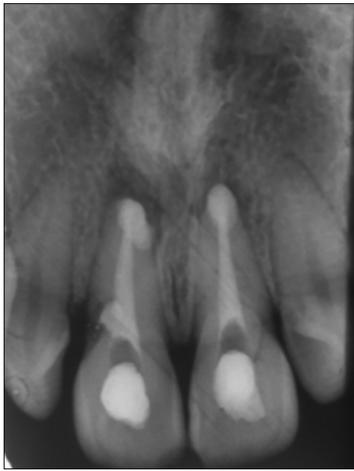


Figure 9: Follow up radiograph at 2 weeks

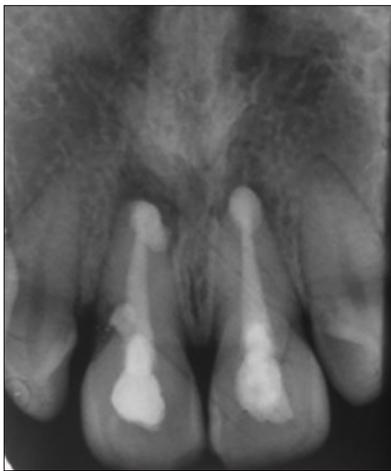


Figure 10: Follow up radiograph at 3 months

in complex cases of pathologic root resorption.^[10] One of the characteristics of bioactive material is its ability to form an apatite-like layer on its surface when it comes in contact with physiologic fluids *in vivo* or with stimulated body fluid *in vitro*, is MTA a bioactive material that is mainly composed of tricalcium and silicate. Investigation has shown that it can conduct and induct hard tissue formation; studies have illustrated the release of various ions from MTA.^[11] Antibacterial/antimicrobial activity of MTA seems to be associated with elevated pH. Tanomaru-Filho M *et al.* observed an initial pH of 10.2 for MTA rising to 12.5 in 3 h, it is known that pH level of 12.0 can inhibit most microorganisms including resistant bacteria such as *Enterococcus faecalis*.^[12]

Calcium hydroxide has been used for the management of external inflammatory root resorption due to its high alkalinity, which increases the pH of dentin by the diffusion of hydroxyl ions through the dentinal tubules.^[13] Conventionally, long-term calcium hydroxide has been recommended ranging from 6 to 24 months to allow the

formation of a hard tissue barrier.^[14] Calcium hydroxide has also been traditionally used for apexification of non-vital immature teeth.^[15]

Various studies have shown that triple antibiotic paste is beneficial in eliminating bacteria from infected dental tissues;^[16] metronidazole has a wide bactericidal spectrum against anaerobes while ciprofloxacin and minocycline are effective against bacteria resistant to metronidazole.^[17]

CONCLUSION

The present case was thus effectively managed using calcium hydroxide, triple antibiotic paste, and MTA. Calcium hydroxide inhibited the resorptive activity of the clastic cells and MTA formed the apical barrier, facilitating a three-dimensional obturation of the canal space.

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