

Case Report

Non-surgical Management Of External Inflammatory Root Resorption Using Mineral Trioxide Aggregate

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Abstract

This case report presents management of a severe Inflammatory External root resorption in a mandibular molar tooth. The condition developed as a sequelae to pulpal infection. Treatment comprised of endodontic therapy with interim dressing of Calcium hydroxide paste followed by obturation of the affected root canal with Mineral Trioxide Aggregate. A six-month follow-up clearly showed that the resorptive process had ceased and the patient was asymptomatic. This case was thus a clinical and radiographic success.

Key Words

Root Resorption, External Root Resorption, Apical root resorption, Mineral Trioxide Aggregate.

Introduction:

Root resorption can either be a physiologic or a pathologic process, mainly occurring due to the action of activated clast cells and is characterized by progressive or transitory loss of cementum or cementum/dentin^[1].

Andreasen^[2] in 1985 classified Pathologic Root Resorption into External and Internal Root Resorption. Internal Resorption was further subclassified into replacement and Inflammatory Internal resorption. External root resorption was subdivided into three classes; namely Superficial, Replacement and Inflammatory.

External resorption is a process that leads to an (ir) reversible loss of cementum, dentin and bone^[3]. The frequency of occurrence is more in patients aged between 21 and 30 years and the condition is more common in females than males^[4].

In contrast to Replacement External root resorption; wherein lost cementum and dentin is eventually replaced by osseous tissue, an Inflammatory External root resorption must undergo an endodontic therapy for removal of necrotic pulp and stabilization of resorptive process^[5].

In treating teeth with open apices, obtaining an optimum root canal sealing following complete debridement and disinfection of root canal system is a challenging task^[6]. In recent times, Mineral Trioxide Aggregate (MTA) has gained popularity in treating teeth with open apex^[7]. Though several cases of MTA apexification^{[8],[9],[10]} have been reported, obturation of entire canal with MTA is relatively uncommon. This case reports successful management of a case of External Inflammatory root resorption in a mandibular molar tooth

wherein the affected root was obturated with MTA to promote periapical healing.

Case Report:

An 18 year old female patient reported with a chief complaint of pain in her lower right back tooth since 6 months. The medical history was non-contributory.

Clinical Examination revealed deep mesioproximal caries with tooth #47. The tooth was tender on vertical percussion. No signs of mobility or periodontal pockets were present in relation to tooth #47.

Pulp testing with an electric pulp tester (Parkell Inc. Edgewood, NY, USA) and thermal test using hot gutta percha elicited non-responsiveness from the suspect tooth when compared to the control teeth.

Intraoral periapical radiograph using radiovisiography (Kodak 5100, Trophy, France) revealed short distal root with external resorption in relation to tooth # 47. Small areas of periradicular radiolucency associated with both mesial and distal roots were also evident (Fig.1)

Corroborating the clinical and radiographic findings, a



Figure.1 Preoperative Radiograph

Quick Response Code



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diagnosis of inflammatory external root resorption secondary to chronic apical periodontitis with tooth #47 was made. The options for root-end management included the placement of an artificial apical plug or barrier of MTA or periapical surgery with placement of a root-end filling. Considering the extent and severity of root resorption, orthograde obturation of root canal space with MTA was planned in order to arrest the process of resorption. Informed consent was obtained from the patient and Conventional Endodontic therapy initiated.

Following isolation with rubber dam, an endodontic access opening was made under magnification of an operating microscope (20x Seiler precision microscopes, St.Louis, MO, USA) using an Endo-Access bur (Dentsply Maillefer, Ballaigues, Switzerland). The contents of the pulp chamber were removed with long shank spoon excavator. The root canal was copiously irrigated with 3% sodium hypochlorite and 17% EDTA solution. Working length was determined by Root ZX (J. Morita Corporation, Kyoto, Japan). The electronically determined working length was confirmed radiographically using a size 15 K-file (Sybron Endo Glendora CA, USA) in the intact mesial root and by using paper point method in distal root affected by resorptive process. The root canal was cleaned and shaped by rotary nickel-titanium ProTaper instruments to the size F5 (Dentsply Maillefer) using Glyde (Dentsply Maillefer) as a lubricant. An X-smart™ dual endodontic motor (Dentsply Maillefer) was used to control the speed and torque of rotary files. The root canal was again irrigated with 3% sodium hypochlorite followed by a final saline rinse and dried using sterile absorbent paper points (Dentsply Maillefer). Calcium hydroxide paste (Calcigel, Prevest Denpro Limited, India) was placed as an intra-canal medicament and the access cavity was temporized (Cavit GTM, 3M ESPE, Seefeld, Germany). The patient was recalled 1 week later. On recall visit, the tooth was asymptomatic. The temporary restoration was removed, canals were cleaned and dried and mesial canal was obturated using Gutta-percha and sealer. For distal canal which exhibited apical root resorption, MTA PLUS (Prevest Denpro Limited, India) was used as an obturation material. The material was mixed according to manufacturer's instructions and delivered in situ using a 20 gauge spinal tap needle and condensed using ultrasonic endodontic tip (Satelec, Acteon, France). Care was taken to prevent extrusion of the material in to the peri-radicular area. The final adjustment was done with the light force using the butt end of sterilized greater taper paper points (Dentsply Maillefer). With the aid of the radiograph, the access cavity was then restored with Glass Ionomer Cement (Micron Superior, Prevest Denpro Limited, India) (Fig.2). The patient was then scheduled on a 3-month regular recall. The tooth remained asymptomatic and functional. Follow up radiograph after 6 months showed that apical root resorption had stabilized and periapical healing ensued. (Fig.3)

Discussion:

External inflammatory resorption is a progressive condition and the major culprit is usually a necrosed pulp. To avoid compromising the longevity of tooth, the clinician intervention is must to halt the process through elimination or reduction of the maintenance factor i.e. necrosed pulp^[11].

The treatment protocol suggested for such a condition should



Figure.2 Post Operative Radiograph



Figure 3. Follow up Radiograph after 6 months

involve removal of bacteria and their by-products from the root canal system to arrest the inflammatory processes involving the root surface and hence to allow the regeneration of periodontium^[12].

Since its first description in the dental literature by Lee and colleagues^[13] in 1993, and its first use as root end filling material,^[14] the development of Mineral Trioxide Aggregate (MTA) material has truly been a landmark event in dentistry and in Endodontics in particular. This event dramatically increased the success rate of many complex cases that used to have high failure rates. The superior physicochemical and bioactive properties of MTA may be an advantage when used as an obturation material^[15]. In addition to being sterile, dimensionally stable, radio-opaque, moisture insensitive, it also provides an effective seal against dentin and cementum and promotes biologic repair and regeneration of the periapical tissues.^{[13],[14],[16]}

In the present case, calcium hydroxide was applied as an interim dressing before the placement of MTA because calcium hydroxide is the intracanal medicament preferred in cases of inflammatory resorption^[17]. Its alkaline pH (12.2) neutralizes the action of the clastic cells, hence inhibiting the resorption process.^{[15],[18],[19]}

A decision to obturate the entire canal affected with apical root resorption with MTA instead of just using an apical plug was made. This was in accordance with the literature^{[6],[15],[20],[21]} reporting several successful cases of MTA being used as a root canal filling material.

It has been suggested that the root canal treated teeth, obturated

with MTA exhibit higher fracture resistance^[22]. It has been proposed that MTA as a root canal filling material can induce biologic repair mechanisms in a more consistent and predictable manner than other traditional obturation materials like gutta-percha.¹⁵ Further the antiwashout MTA (MTA plus) used in this case improved the handling properties and condensability.

Orthograde obturation of the root affected with apical root resorption with MTA in present case proved to be very conservative approach with predictable outcome.

Conclusion:

Undertended by the substantial root damage caused by resorptive process, non-surgical root canal therapy with MTA obturation of the affected root stabilized the external root resorption and regenerated the periapical tissue. Owing to its superior properties, MTA appears to be a viable alternative as a root canal filling material in teeth requiring complex endodontic treatment which might be otherwise doomed to extraction.

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