

An Unostentatious Approach for Management of Progressive External Root Resorption – A Case Report.

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ABSTRACT

The response of the dentoalveolar apparatus to infection is characterized by inflammation which may result in tooth resorption .External apical root resorption in permanent dentition is usually pathological. Local factors are the most frequent causes of resorption, especially excessive pressure and inflammation. Depending upon the type of resorption and etiology, different treatment regimens have been proposed. The risk of development of inflammatory or replacement root resorption is high if not timely managed. Endodontic intervention is required soon after the occurrence of trauma, in an attempt to prevent or delay inflammatory root resorption. The present case demonstrates external root resorption arrest and formation of an apical barrier by conventional endodontic therapy combined with calcium hydroxide dressing and a mineral trioxide aggregate (MTA) apical plug. The upper right central incisor and lateral incisor exhibited severe external root resorption, and a periapical radiolucent lesion received root canal treatment combined with calcium hydroxide dressing for over 1 month. The dressing was renewed every 15 days, and the coronal portion was sealed with composite resin. After detection of the apical barrier, a MTA apical plug backfilled with gutta-percha was performed and the access cavity was restored with composite resin. The patient has been regularly recalled every 6 months, and no symptoms or signs have been noted. Radiography showed the apical lesion healed and the external root resorption had been arrested after 18 month follow up.

Keywords: Apexification, Calcium hydroxide, External root resorption, MTA Apical plug.

INTRODUCTION

It is a surprising fact that a permanent tooth throughout life is placed in an environment of alveolar bone surrounded by very active osteoblasts and osteoclasts without being approached by any of these two cell lines under normal conditions.^[1] Physiological root resorption is a process involving resorptive activity followed by periods of attempted repair. This results in variable tooth mobility in deciduous teeth before exfoliation. In contrast, the

process of root resorption in the permanent dentition is usually pathological resulting in loss of dentin, cementum or bone.^[2] Invariably, tooth resorption results from injuries to or irritation of the periodontal ligament and/ or tooth pulp. It may arise as sequelae of traumatic luxation injuries, orthodontic tooth movement, or chronic infections of pulp or periodontal structures, neoplastic process, associated with systemic diseases and lesions of idiopathic origin. The process of tooth resorption involves an elaborate interaction among inflammatory cells, resorbing cells, and hard tissue structures. Frequently, this pathologic condition is difficult to predict, diagnose and treat.^[3]

Root resorption is of main concern to the endodontists. Dental clinicians can be faced with difficult diagnostic and treatment decisions with respect to tooth resorption. External root resorption occurs on the outer surface of the root and the causes for this may vary. There are several types of

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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.^[4] External inflammatory root resorption is considered a major resorptive condition without symptoms. The treatment of external inflammatory resorption is dependent on the etiology; nonsurgical root canal treatment combined with a calcium hydroxide dressing was recommended by Andreasen.^[5] The treatment goal in the external apical root resorption is to remove or destroy bacteria to allow healing to take place in the periradicular space. Calcium hydroxide as an intracanal medicament best destroys the bacteria. A side effect, however of using calcium hydroxide for long term is weakening of the root structure in immature teeth. In mature teeth, the problem apparently does not exist.

Mineral trioxide aggregate (MTA), well known for its great biocompatibility, has demonstrated excellent sealing ability in studies of dye penetration and bacterial leakage even under blood contamination conditions.^[6-8] MTA is widely applied in root-end filling, perforation repair, and pulp capping. It can induce regeneration of periradicular tissues, such as bone and cementum. The following case report demonstrated nonsurgical root canal treatment of severe external root resorption and the use of MTA as an apical plug to promote periapical healing of a mature tooth.

CASE REPORT

A 20-year-old male patient reported to the Department of Conservative Dentistry and Endodontics, with a chief complaint of fractured maxillary anterior teeth with discoloration. The patient gave history of trauma 3 years back. His medical history was noncontributory. Clinical examinations revealed no mobility of the upper left central incisor, and the pocket depths around the tooth were within a normal range, discoloration with 11, 12, 21 [Figure 1-a]. Palpation and percussion tests induced no discomfort or pain. Clinical examination revealed Ellis class III fracture was noticed in relation to 11, 12, and 21. Thermal and electric pulp test revealed that teeth 11,12, 21 were non vital. The periapical radiographic film showed several resorpted bowl-shaped lesions on the external surface of the root combined with a radiolucent lesion around the root apex, and the root revealed external root resorption with tooth 11,12. No periapical changes seen with 11, 12 [Figure 1-b]. Based on the patient's history, and the clinical and radiographic examinations, the diagnosis was chronic apical periodontitis combined with extensive inflammatory external root resorption with 11,12. Ellis class III fracture

with 21 was made. Nonsurgical root canal therapy was planned with 11,12, 21.

When extensive inflammatory root resorption is diagnosed, there are generally three choices for treatment: (1) No treatment with eventual extraction when the tooth becomes symptomatic; (2) immediate extraction; (3) access, debridement and restoration of the resorptive lesion.^[9]



Figure 1: a) Preoperative clinical photograph.



Figure 1: b) Intraoral Periapical radiograph showing periapical lesion and external root resorption with 11,12.

Conventional root canal treatment combined with calcium hydroxide dressing is the first choice of treatment. Tooth 11, 12, 21 was accessed and working length was determined by RootZX® and radiographic film. [Figure 2 a]. Hemorrhage and exudate from the apical region of 11, 12 was observed during the instrumentation. Microbrushes were used to scrub the calcium hydroxide paste in the lateral aspects of the root canal system. After 2 week, calcium hydroxide was removed with a combination of hand NiTi files (Dentsply Maillefer; Ballaigues, Switzerland), sodium hypochlorite irrigation and EDTA (Glyde™ File Prep, Dentsply Maillefer, Switzerland). Upon two more visits of calcium hydroxide dressing (Metapex, Meta Biomed Co. Ltd. Korea), The root

canal of 11,12 was then cleaned and dried with sterilized paper points. MTA (Proroot Angeleus) powder was mixed with distilled water and packed into 4 mm of the apical end as an apical plug. A wet cotton pellet was placed in the canal for over 24 hours to maintain a high humidity environment. After the MTA had set, the residual canal space filled with gutta-percha and Sealapex® [Figure 2b]. The access cavity was prepared and restored with composite resin. Obturation was done with flowable cold filling gutta-percha system (Roeko Gutta Flow®2, Coltène/ Whaledent GmbH + Co. KG, Germany) with 21. At 12-month recall [Figure 3] the intraoral periapical radiograph showed sufficient healing after which Metal ceramic crown was placed with 11,12 [Figure 2c]. A 1 year and 6 months recall [Figure 2 d] showed patient being asymptomatic with radiograph showing that the external root resorption had been arrested, and the periapical lesion had healed no evidence of any breach or any periapical changes.

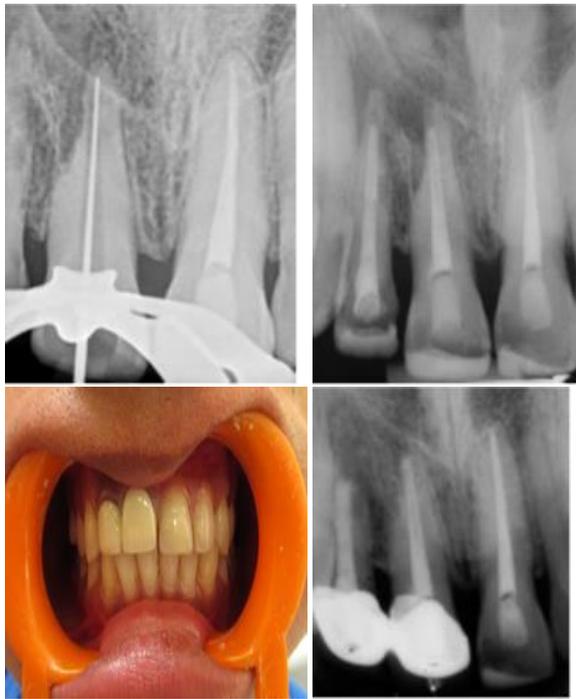


Figure 2: a) Working length IOPA with 11. b) MTA placement and obturation with 11,12,21. c) Metal Ceramic crown restored with 11,12. d) 18 month Follow up IOPA With 11,12,21.

DISCUSSION

There are various etiologies of external root resorption, and in this case, pulpal space infection. The most common cause of root resorption is trauma particularly in cases where the injury results in pulpal necrosis and damage to the root surface, leaving dentinal tubules exposed. Bacteria, bacterial byproducts and tissue breakdown products from within the root canal system stimulate

inflammation in the adjacent periodontal tissues and lead to aggressive and progressive inflammatory resorption of the root.^[10,11] Treatment of root resorption is dependent on the etiology. In case where the resorption is due to pulpal necrosis and periodontal injury, nonsurgical pulp space therapy is performed. Complete chemomechanical preparation is considered as an essential step in root canal disinfection. However, total elimination of bacteria is difficult to accomplish. Intracanal medicament may help to eliminate surviving bacteria placed between appointments.^[12] Nonsurgical pulp space therapy combined with a calcium hydroxide dressing was recommended by Andreasen.^[13,14] MTA is also often used as repair material due to superior sealing ability, biocompatibility and fibroblastic stimulation. As an obturating material cold filling gutta-percha system (GuttaFlow®2) combines two products in one: Gutta-percha in powder form with a particle size of less than 30 µm and sealer. Good flow properties, low solubility and tight seal of the root canal due to its slight expansion, hence, no forces exerted on the weakened tooth structure as in comparison to thermomechanical or cold lateral compaction.^[15] Despite the serious damage to the root by external root resorption, non-surgical root canal therapy arrested the external root resorption and regenerated the periapical tissue. This is a good result which would like to achieve in any case of External resorption. The outcome of treatment also depends on the diagnosis and the treatment procedures performed.

CONCLUSION

Traumatic injury to teeth presents a considerable challenge for the Dental practitioner. It is important that treatment provision is evidence based and holistic to ensure that the best possible dental and personal outcomes are achieved. Though the outcome cannot be predicted, it is worth an effort to try slow down the resorption process and maintain the tooth as long as possible in the arch for esthetics, mastication and natural space maintenance and above all psychological uplift of the young minds.

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