Treatment of external root resorption: A case report

D.D.S. Lina Mickevičienė¹ and D.D.S. Gintarė Povilaitytė²

¹,² Clinic of Dental and Oral Pathology, Odontology Faculty, Lithuanian University of Health Sciences, Kaunas, Lithuania

Corresponding author:
Lina Mickevičienė
Email: linamickeviciene25@gmail.com

ABSTRACT

Root resorption might result in the premature loss of the affected teeth. Most teeth with internal and external root resorption are symptom free and are first clinically recognized through routine radiographs. Calcium hydroxide is used as a temporary intracanal medicament in the management of root resorption followed by mineral trioxide aggregate (MTA) treatment. Lesions appears as a uniform, round-to-oval radiolucent enlargement of the root surface. This case report describes non-surgical external resorption treatment with MTA and a six-month follow-up of a maxillary lateral incisor. The tooth was asymptomatic, and radiographic examination showed that the resorbed region had been successfully repaired with new hard tissue deposition within the six-month follow-up.

Keywords: external root resorption, MTA, calcium hydroxide.
INTRODUCTION

Root resorption is the loss of dental hard tissues as a result of clastic activities. If untreated, this might result in the premature loss of the affected teeth [1]. It has been proposed that trauma, pulpotomy, a cracked tooth, internal bleaching, tooth transplantation, restorative procedures, invagination, orthodontic treatment, even herpes zoster viral infection and infection of the pulp because of vital pulp treatments, such as direct pulp capping and pulpotomy with calcium hydroxide, are all likely predisposing factors [2, 3, 4]. Possible complications of dental trauma are pulp necrosis, pulp canal obliteration and loss of marginal alveolar bone [11]. Other consequences of intrusive luxation include inflammatory external or internal root resorption, dento-alveolar ankylosis and gingival retraction [12]. The exact mechanisms responsible for root resorption are not fully understood. It could be shown that damage to the cementum layer exposes the root surface to osteoclasts that can resorb dentin [13].

Root resorption is a relatively rare occurrence, and its etiology and pathogenesis have not been completely elucidated [1]. The prevalence of root resorption in Middle Eastern population is almost 29% of teeth. The most affected tooth is always the lateral incisor (80.5% to 85.5%) followed by central incisor (9% to 12.7%) [14]. This can be explained by the fact that they are the most vulnerable teeth to accidents and injuries [5]. A hereditary influence has also been suggested as a possible etiology for internal resorption [2]. A recent study found no significant relationship between the occurrence of incisor resorption and gender [14]. However, it was stated that a total of 14.9% to 30.2% of all patients did not show any predisposing factors [13].

Most teeth with internal and external root resorption are symptom free and are first clinically recognized through routine radiographs [3]. Radiographically, the lesion appears as a uniform, round-to-oval radiolucent enlargement of the root surface. The margins are smooth and clearly defined [6]. Differential diagnosis is difficult using conventional radiography [4]. Conventional radiography is often unable to identify the true extent, location, or portal of entry of a resorptive lesion. The advent of cone beam computed tomographic (CBCT) imaging has enhanced radiographic diagnosis [7]. In endodontics, CBCT has become an important technique for studying the internal anatomy of the canal, detecting periapical lesions and dental trauma, planing endodontic surgery, and evaluating endodontic complications such as fractures, perforations, and root resorption [4].

In many instances, there are no clinical signs, and the teeth that exhibit root resorption are asymptomatic [1]. However, when resorption actively progresses, the tooth may present typical symptoms of pulpitis if the infected root canal system is causing pulpal inflammation [3, 10].

Tronstad advocated the use of calcium hydroxide as a temporary intracanal medicament in the management of root resorption [5, 9]. Mineraltrioxide aggregate (MTA) is a suitable material for the treatment of root perforations by inducing osteogenesis and cementogenesis [7]. MTA has been used for apical barriers, root-end fillings, perforation repairs, regenerative therapy, pulp capping and pulpotomies, treatment of cervical root resorption, internal resorption, as well as obturation and cementation [8]. MTA has been proven to be a material with several potential clinical applications because of its superior sealing property, ability to set up in the presence of blood, bactericidal effects, biocompatibility and radiopacity [2, 7].

This case presents a patient with an asymptomatic external root resorption caused by previous dental trauma history.
CASE REPORT

A 10-year-old boy was referred to endodontist because of the periradicular lesion and incomplete root formation with wide open apex, what have been seen on the orthopantomogram (Fig. 1). Patient had no complains about the teeth. The parents of the patient reported about the trauma 1.5 years ago. Clinical examination revealed that tooth number 12 was not sensitive to vertical percussion and palpation as well as to the cold test, no discoloration or cracks of the tooth crown was found. The gingiva and pockets were within the normal limits. A radiographic examination revealed the presence of external resorption in the medial portions of the root and the periradicular bone destruction.

![Fig. 1](image)

The aim of treatment was preservation of teeth 11 and 13 adjacent structures and antiresorptive treatment for the preservation of tooth number 12, as well as treatment of the periradicular inflammation. Because of the young patient age it was decided to keep tooth 12 functional as long as possible or at least skeletal growth end to maintain good osseous conditions for an implantation in case of tooth loss.

The root canal was accessed without local anesthetic because tooth was not vital (cold test was negative). The pulp chamber was removed by small excavator and gently irrigated several times with 2.5 % sodium hypochlorite solution to dissolve organic materials. K-file was inserted into the canal and a diagnostic radiograph was taken to establish the length of the root canal (Fig. 2). The canal was cleaned with K-files, irrigated several times with 2.5 % NaOCl and ultrasonic activation was used. The canal was dried with intracanal vacuum and sterile paper points, and filled with calcium hydroxide paste (AH Temp, DentsplyMaillefer, Switzerland) for 2 weeks to increase dentine pH (Fig. 3). After 2 weeks the root canal was filled with MTA (ProRoot MTA, DentsplyMaillefer, Switzerland) and the pulp chamber was packed with wet cotton pellet contacting the MTA before it was temporarily sealed with temporary filling (Intermediate Restorative Material (IRM), DentsplyMaillefer, Switzerland). (Fig. 4) At the next visit there was no report of pain or discomfort. The tooth was restored with the composite filling.

After the treatment, the patient returned to the department after 6 months, satisfactory healing was observed in the case. The patient was completely asymptomatic and the radiographic examinations showed healing of the periradicular radiolucency with indication of bone formation (Fig. 5).
DISCUSSION

Tooth resorptions are present in all clinical specialties. Its diagnosis and treatment plan require transdisciplinary knowledge in decision making about how to treat them: if they demand treatment or just monitoring after the cause is identified. When it comes to this type of tooth resorption (inflammatory external root resorption), if the cause is extinguished and this inflammation disappears, the process will be interrupted [15].

Regarding the treatment of external resorption, successful management of each case must be linked to the etiology. A radiographic evaluation is essential to the diagnosis and the difficulty in distinguishing this lesion from internal root resorption. Use of CBCT may be an important diagnostic tool in this regard. This imaging technique may confirm the real extent of resorption and its possibility of communication with the periodontal space [17].
One cannot control the resorption process that is taking place at the external part through the pulp, after all, the causes are acting upon the periodontal ligament. There is no evidence that justifies applying endodontic treatment, by means of canal, to control the external resorption processes when the pulp shows vitality [15]. This case represented the necrotic pulp and an endodontic treatment of the tooth was indicated in order to remove the periapical inflammation induced by microbial products.

External inflammatory resorption requires the following two things to occur:
1. The root canal system is infected or has been contaminated with bacteria, plus
2. There has been mechanical damage to the cementum during the trauma or cementum has been lost as a result of external surface resorption such that the dentinal tubules are exposed to the surrounding periodontal ligament and bone [10].

Treatment options vary according to the severity of root resorption involving the pulpal canal [16]. Calcium hydroxide was used in this case because it has been investigated to determine the pH changes in root dentine, especially when used for the management of external inflammatory resorption. However, whilst calcium hydroxide does lead to pH changes across the root dentine and it has some useful properties in that it is a powerful antibacterial agent [10]. In some cases, even if the pulp is affected, resorption can heal spontaneously. MTA has been shown to provide bio-inductive effects with creating an environment conducive to periodontal healing and allowing new cementum growth on its surface [16]. It was decided to perform non-surgical endodontic treatment to the severely resorbed maxillary lateral tooth using MTA.

CONCLUSIONS

Proper diagnosis, case selection, and its implementation can lead to the successful outcome and long-term retention of the tooth. This report shows that calcium hydroxide and MTA can be used in a non-surgical approach for the treatment of external resorption caused by previous dental trauma history.

REFERENCES

5. Jozef M, Daniel U, Silvia T. Clinical management of two rootresorption cases in endodonticpractice. Case Reports in Dentistry 2016; Article ID 9075363, 5 pages
11. Ulkü FE, Mesut E, Emine K, Alper S. Management of an intruded tooth and adjacent tooth showing external resorption as a late complication of dental injury: three-year follow-up. Case Reports in Dentistry 2015, Article ID 741687, 6 pages
15. Consolaro A, Bittencourt G. Why not to treat the tooth canal to solve external root resorptions? Here are the principles! Dental Press J Orthod 2016; 21(6): 20–5