

## A Challenging Case of External Root Resorption Managed with MTA Obturation

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### INTRODUCTION

External inflammatory resorption affects the surface of the root and is a relatively frequent sequela to dental luxation and avulsion injuries. It is a progressive condition with a potentially precipitous onset, and it is capable of advancing rapidly, such that an entire root surface may be resorbed within a few months. The situations in which endodontic treatment is recommended for tooth resorptions are those when there are: a) pulp necrosis with microbial contamination, b) aseptic pulp necrosis, c) developing calcific metamorphosis of the pulp and d) diagnosis of internal resorption. Mineral trioxide aggregate (MTA) has emerged as a reliable bioactive material with extended applications in endodontics that include the obturation of the root canal space.

Root resorption, a physiologic process in deciduous teeth, is a pathological condition if encountered in permanent teeth. This may result in loss of a tooth, if not diagnosed and treated correctly. The process of tooth resorption is a highly structured interaction amongst inflammatory cells, resorbing cells (osteoclasts, odontoclasts or dentinoclasts) and hard tissues, initiated by injury to the non-mineralized tissues covering the external surface of the root (precementum) or the internal surface of the root canal (predentin). The transformation of precursor cells into clastic cells is induced by cytokines, of which interleukin-1 plays a pivotal role.<sup>1</sup>

The clinical causes that lead to resorption are orthodontic movement, chronic periapical lesion, occlusal trauma and dental trauma of small magnitude. The most impaired region is the apical third. Root resorption is a process that starts from minor lesions of the periodontal ligament and / or cementum, due to trauma or contamination with bacteria that induce small root resorption cavities, reaching the dentinal tubules and the root canal.<sup>2</sup>

Inflammatory resorption occurs when the predentin or precementum becomes mineralized, mechanically damaged or scraped off.<sup>3</sup> Resorption is seen on the wall of the root canal (internal resorption) and on the external surface of the root (external resorption or cervical resorption) and it may be transient or progressive.<sup>4</sup> Treatment of root resorption can be achieved through the access cavity (intracanal repair) or by surgical intervention (extracanal repair). When the repair of a perforation fails after an intracanal approach or if the perforations are inaccessible through the access cavity, surgical repair of these incidents is indicated. The prognosis of resorption depends on the time of contamination, location and size of the lesion.<sup>5</sup>

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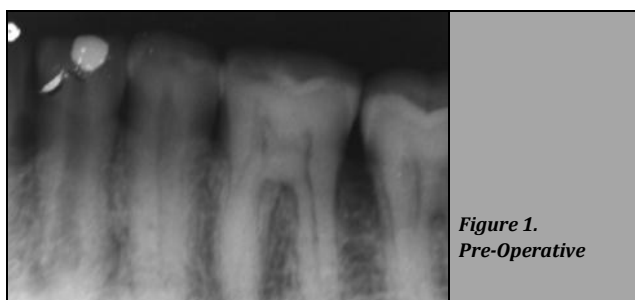
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Traditionally, various materials have been used in managing resorptions including zinc oxide eugenol, amalgam, calcium hydroxide, resin composite, glass ionomer and resin-modified glass ionomer.<sup>6</sup> Mineral trioxide aggregate (MTA) has been regarded as an ideal material for perforation repair. MTA is a bioactive silicate that consists of hydrophilic particles, whose principal components are tricalcium silicate, dicalcium silicate tricalcium aluminate, tricalcium oxide, bismuth and iron compounds.

The present paper reports a case of non-surgical repair of root resorption in mandibular premolar which was managed by obturating the canal with MTA. The case presented a dilemma in diagnosis through 2D radiograph as canal showed aberrant configuration at the apex resembling blunderbuss canal and was even confusing with root perforation. Thus cone-beam computed tomography (CBCT) proved a helpful tool in accurately diagnosing the case.

**PRESENTATION OF CASE**

A 35-year-old male patient reported to the Department of Conservative Dentistry & Endodontics with the chief complaint of pus discharge in lower left back tooth region for 2 months. His medical history was non-contributory. On clinical examination, fractured amalgam was present on tooth number 34 and sinus opening was present near the apex of the same tooth. On radiographic examination, root resorption was present in tooth No. 34 (Figure 1).



*Figure 1.  
Pre-Operative*

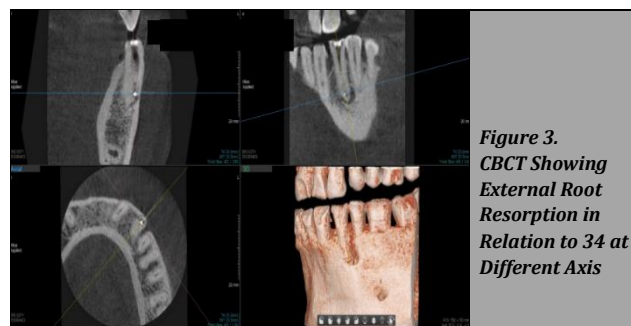
Sinus tracing was done with no. 20 gutta percha cone & radiograph was taken (Figure 2). The patient was advised for the CBCT examination to confirm the diagnosis. CBCT results confirmed the diagnosis of chronic apical abscess with root resorption in relation to 34 (Figure 3).

**DISCUSSION OF MANAGEMENT**

Access cavity was prepared with endo-access bur No. 2 (Dentsply Maillefer) under rubber dam (Gdc Dental Pvt. Ltd.) isolation & working length was determined with 10k file (Dentsply Maillefer, Switzerland) (Fig. 4). Biomechanical preparation was done with normal saline and 15 % EDTA (Glyde, Dentsply Maillefer). Cleaning and shaping were done till F2 (Protaper, Dentsply Maillefer). After cleaning and shaping was performed, an intracanal calcium hydroxide medicament (Ivoclar Vivadent ApexCal) was prescribed for 1 week.



*Figure 2.  
Sinus Tracing  
with No. 20 Gutta  
Percha*



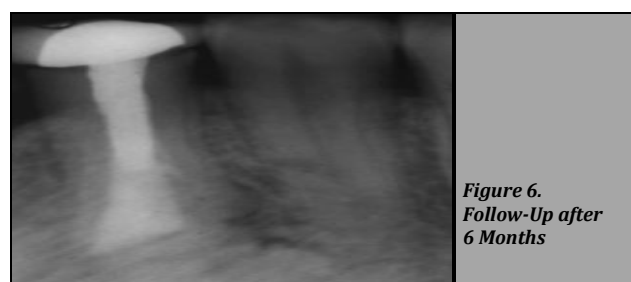
*Figure 3.  
CBCT Showing  
External Root  
Resorption in  
Relation to 34 at  
Different Axis*



*Figure 4.  
Working  
Length*



*Figure 5.  
Obturation with  
MTA*



*Figure 6.  
Follow-Up after  
6 Months*

On the next appointment, there were signs showing healing of sinus with no discharge of pus, 2.5 % sodium hypochlorite and 15 % EDTA (Glyde, Dentsply Maillefer) was used for efficient debridement. Finally, the canal was completely dried with paper points (Dentsply Maillefer, Ballaigues, Switzerland) and MTA (ProRoot MTA Dentsply Maillefer) in the ratio 3:1 was mixed and obturated throughout the canal with the help of MTA carrier (Gdc Curved-0.8mm-

Mta4869 (Figure 5). Wet cotton is placed on the MTA & was temporarily sealed with Cavit (Cavit G, 3M ESPE, Germany). The patient was recalled after 24 hours and access cavity was sealed with composite. Tooth preparation for PFM crown was done on the same visit. PFM prosthesis was delivered after 2 days. At 6 months recall, patient was asymptomatic with radiograph, showed healing of periapical lesion (Figure 6).

### DISCUSSION

In endodontic practice, root resorption is one of the commonly encountered challenges. Early detection and accurate diagnosis are important factors that determine the successful clinical outcome of cases with resorption. It is important for the clinician to differentiate internal resorption from external tooth resorption. With the development of technology and CBCT as diagnostic aids the accurate diagnosis and predictable treatment and prognosis.<sup>5</sup> root resorption diagnosis is one of the key points to determine the therapy plan. The treatment of external resorption consists of the removal of all granulation tissue present in the resorbed region and then filling of this region with a material that does not allow the penetration of clastic cells so that it does not injure the periodontal tissue. However, in clinical practice, when resorption is very close to the predentin, exposure of the pulp may occur during curettage. In cases of very extensive resorption, endodontic treatment may be chosen before the end of treatment for resorption.<sup>8</sup>

Earlier different material including amalgam, gutta-percha, zinc oxide and glass ionomer cements, calcium hydroxide, composites were used. Newer materials such as MTA, biodentine, dentin chips, bioceramics, calcium enriched material, with and without the use of barrier could be used to seal the resorption defects.<sup>9</sup>

MTA has expanded too many applications of root repair and bone healing. These applications include direct pulp capping, repair of root and furcation perforations, and apexification.<sup>7</sup> MTA might become a viable alternative treatment option compared with gutta percha based materials and sealers. MTA exhibits superior sealability against bacterial microleakage while demonstrating antibacterial and bioinductive properties that can improve treatment outcomes.<sup>5</sup>

The interaction of MTA with phosphate-buffered saline promotes the release of hydroxyl ions, hydroxyapatite deposition and a sustained high pH for extended periods. The interface between dentine and MTA has demonstrated superior marginal adaptation and sealing ability compared with amalgam, intermediate restorative material (IRM) and Super-EBA.<sup>10</sup>

The present case shows the arrest of root resorption after placement of MTA. Because of wider dentinal tubules in the present case, the alkaline pH of MTA may have deactivated the inflammatory process and retarded the odontoclastic activity. Recently Bogern and Kuttler have advocated MTA obturation

in complex and challenging endodontic conditions.<sup>11</sup>

### CONCLUSIONS

Despite serious damage to the root by external root resorption, nonsurgical pulp space therapy arrested the root resorption and regenerated the periapical tissue. Though the outcome cannot be predicted, it is worth an effort to try slow down the resorption process and maintain the tooth for the purposes of maintaining aesthetics, mastication and natural space.

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Disclosure forms provided by the authors are available with the full text of this article at jemds.com.

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