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Case Report **Conservative Dentistry and Endodontics**

Non-Surgical Management of Internal Root Resorption in a Mandibular Molar with MTA: A 12 Month Follow-Up

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Abstract

Internal root resorption (IRR) is an uncommon but potentially destructive pathological condition characterized by progressive loss of dentin from within the pulp space as a result of odontoclastic activity. It is frequently asymptomatic and often detected incidentally during radiographic examination, underscoring the importance of early diagnosis and timely intervention to prevent structural compromise and tooth loss. This case report describes the successful nonsurgical management of a non-perforating internal root resorption lesion in a mandibular first molar. A 32-year-old male patient presented with pain in the lower left posterior region, and radiographic evaluation revealed a well-defined radiolucent defect in the cervical third of the distal root, consistent with internal root resorption, along with associated periapical pathology. Nonsurgical endodontic therapy was performed, involving thorough chemomechanical debridement, intracanal medication with calcium hydroxide, and obturation using gutta-percha with a bioceramic sealer. The resorptive defect was sealed with mineral trioxide aggregate (MTA) to achieve an effective three-dimensional seal and promote periradicular healing. Clinical and radiographic follow-up at six and twelve months demonstrated resolution of symptoms, healing of periapical lesions, and arrest of the resorptive process. This case highlights the significance of early diagnosis, appropriate case selection, and the use of bioactive materials such as MTA in achieving favorable outcomes in the nonsurgical management of internal root resorption.

Keywords: Internal root resorption, mineral trioxide aggregate, nonsurgical endodontic therapy, bioceramic sealer, mandibular molar.

INTRODUCTION

Resorption is a physiological or pathological process that results in the progressive loss of mineralized tissues, including dentin, cementum, and/or alveolar bone.[1] In dentistry, root resorption may occur following various forms of insult such as mechanical, chemical, or thermal injury and is broadly classified into internal and external types based on its site of origin.[2] Internal root resorption (IRR) is an inflammatory condition that originates within the pulp space and leads to progressive dentin destruction, with or without involvement of the surrounding cementum.[3]

Internal resorption is initiated by the loss or necrosis of odontoblasts and is commonly associated with chronic partial pulpal inflammation or partial pulp necrosis. Histopathologically, it is characterized by the presence of clastic cells, including odontoclasts, which actively resorb dentin from the internal surface of the pulp chamber or root canal. The resorptive area is often lined by highly vascular granulation tissue that sustains the resorptive process, emphasizing the importance of early diagnosis and timely intervention. [4] Depending on the tissue response, internal resorption is categorized into internal inflammatory resorption, which results in progressive loss of tooth structure, and internal replacement resorption, where resorbed dentin is replaced by bone- or cementum-like tissue.[3]

The exact etiology of internal resorption remains unclear; however, it has been linked to several predisposing factors, including chronic pulpal inflammation, dental trauma, orthodontic treatment, excessive heat generation during restorative procedures, intracoronal bleaching, cracked teeth, and previous dental interventions. [3]

Diagnosis of internal root resorption can be challenging, as clinically, internal resorption may remain asymptomatic for extended periods and is often detected incidentally on radiographic examination. In advanced cases, the presence of highly vascular resorptive tissue beneath thin residual enamel may impart a characteristic “pink spot” appearance, particularly in cervical lesions. [1]

Management of internal root resorption primarily aims to eliminate the vital or inflamed pulp tissue responsible for sustaining clastic activity and to provide an effective seal of the resorptive defect. Nonsurgical root canal therapy remains the treatment of choice for non-perforating internal resorption cases. Various restorative and obturating materials have been advocated for defect management, including zinc oxide–based cements, amalgam, composite resins, thermoplasticized gutta-percha, and bioactive materials. Among these, mineral trioxide aggregate (MTA) has gained widespread acceptance due to its excellent biocompatibility, superior sealing ability, and capacity to promote cementogenesis and osteogenesis. [5]

This case report highlights the successful nonsurgical management of a non-perforating internal root resorption lesion using mineral trioxide aggregate, emphasizing the importance of early diagnosis, appropriate material selection, and meticulous endodontic therapy in achieving favorable clinical outcomes.

CASE REPORT

A 32-year-old male patient reported to the Department of Conservative Dentistry and Endodontics at K.D. Dental College and Hospital with a chief complaint of pain in the lower left posterior region of the jaw for the past one month. The patient’s medical history was non-contributory.

Clinical examination revealed deep occlusal caries in relation to the mandibular left first molar (tooth 36), which was tender on percussion and exhibited Grade I mobility. Pulp vitality testing using a cold test elicited a negative response, suggestive of a non-vital pulp.

Radiographic evaluation of the preoperative intraoral periapical radiograph demonstrated an extensive coronal radiolucency corresponding to deep occlusal caries. A well-defined radiolucent area was observed in the cervical third of the distal root of tooth 36, suggestive of internal root resorption. [Figure 1] In addition, radiolucencies were noted in the periapical and furcation regions, along with evidence of surrounding alveolar bone loss. [Figure 2] showed clinical image of interna resorption.

Local anesthesia was achieved using 2% lignocaine with 1:100,000 epinephrine, following which the tooth was isolated with a rubber dam. Endodontic access was established using a high-speed round bur. All root canals were located and initially negotiated with #10 K-files. Working length determination was performed using an electronic apex locator and subsequently verified with a radiograph [Figure 3].

Cleaning and shaping were carried out using rotary nickel–titanium instruments (ProTaper Gold; Dentsply Sirona Inc., Charlotte, NC, USA). During instrumentation, an irregularity of the canal wall was noted in the coronal third of the distal root, confirming the presence of an internal resorptive defect. The resorptive area was carefully debrided using mechanical instrumentation. Irrigation was performed with 3% sodium hypochlorite, followed by 17% ethylenediaminetetraacetic acid (EDTA) to remove the smear layer, and a final rinse with normal saline.

Calcium hydroxide was placed as an intracanal medicament to achieve disinfection of the root canals and the resorptive defect. The access cavity was temporarily sealed with Cavit G, and the patient was recalled after one week.

At the subsequent visit, the patient was asymptomatic. The temporary restoration was removed, and the canals were irrigated with 10 mL of normal saline, followed by a final rinse with 5 mL of 2% chlorhexidine and an additional 10 mL of saline. The canals were dried using absorbent paper points. A master apical gutta-percha cone was selected, and its fit was confirmed radiographically [Figure 4].

The apical portion of the distal canal beyond the resorptive defect, along with the mesial canals, was obturated using corresponding gutta-percha cones and a

bioceramic sealer (Rootfyx; Prevest DenPro Ltd., Jammu, India) [Figure 5]. Subsequently, mineral trioxide aggregate (MTA) (ProRoot MTA; Dentsply Sirona, Tulsa, OK, USA) was mixed according to the manufacturer's instructions and carefully placed into the resorptive defect. [Figure 6] Gentle condensation was performed to ensure adequate adaptation and thickness, which was confirmed radiographically [Figure 7]. A moist cotton pellet was placed over the MTA, and the access cavity was temporarily sealed. The patient was recalled after 48 hours.

At the following appointment, the access cavity was restored with glass ionomer cement (Type II, GC Gold Label; GC Corporation, Tokyo, Japan). Definitive coronal restoration was completed using composite resin (Ivoclar Vivadent, Schaan, Liechtenstein) [Figure 8], followed by placement of a porcelain-fused-to-metal crown. [Figure 9,10]

Clinical and radiographic follow-up examinations were performed at six months [Figure 11] and twelve months [Figure 12]. The tooth remained asymptomatic at both follow-up visits, with no evidence of mobility and normal periodontal probing depths. Radiographic evaluation revealed progressive healing of the resorptive defect along with complete resolution of the periapical pathology.

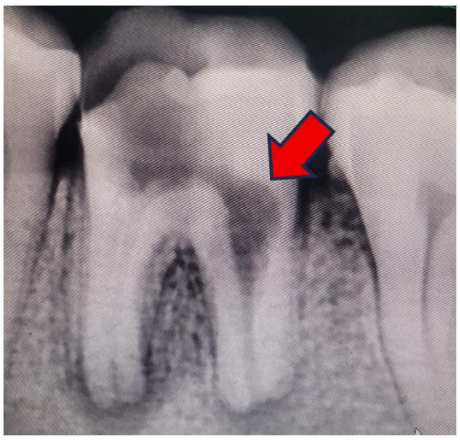

Fig-1: Preoperative radiograph

Fig-2: Showing Clinically internal resorption

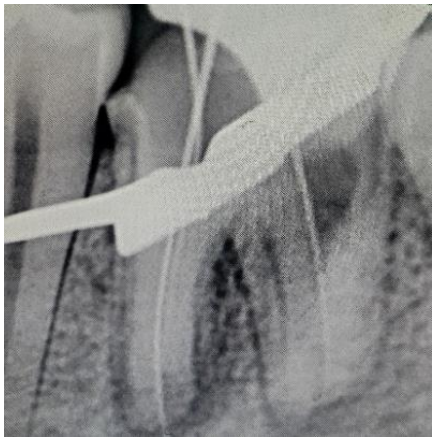

Fig-3: Working length radiograph

Fig-4: Master cone radiograph

Fig-5: radiograph after Obturation

Fig-6: Showing Clinically MTA placement

Fig-7: Radiograph after MTA placement

Fig-8: Radiograph of Post endo restoration

Fig-9: Showing Clinically after crown preparation

Fig-10: Showing clinically after crown placement

Fig-11: Six month follow up radiograph

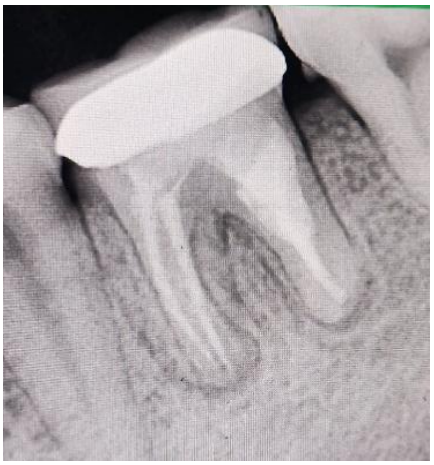

Fig-12: Twelve month follow up radiograph

DISCUSSION

Internal root resorption is a pathological condition characterized by progressive loss of dentin and, in some cases, cementum from within the pulp space due to odontoclastic activity.[6] The condition is often asymptomatic and is frequently detected incidentally during routine radiographic examination. Reported etiological factors include dental trauma, chronic pulpal inflammation, previous restorative procedures, and idiopathic causes. Management of internal resorption in mandibular molars presents a clinical challenge owing to their complex root canal morphology and restricted access.[7] Early diagnosis and prompt intervention are therefore critical to halt disease progression and preserve the affected tooth. Radiographically, internal root resorption typically appears as a well-defined, symmetrical radiolucent enlargement of the root canal space.

In the present case, nonsurgical endodontic therapy was chosen as the treatment modality. The primary objectives included complete removal of inflamed or necrotic pulpal tissue, thorough debridement of the resorptive area, effective disinfection of the root canal system, and three-dimensional sealing of the defect to prevent reinfection. Calcium hydroxide was used as an intracanal medicament due to its well-documented antimicrobial properties and its ability to promote hard tissue formation.[8]

For obturation, a bioceramic sealer was selected because of its excellent biocompatibility and bioactive behavior, which allow effective adaptation to the irregular canal anatomy associated with internal root resorption, thereby minimizing microleakage. Its hydrophilic nature and sustained alkaline pH create a favorable environment for periapical healing, while minimal shrinkage and chemical bonding to dentin contribute to long-term sealing ability and improved treatment outcomes.[9]

Mineral trioxide aggregate (MTA) has been widely advocated for the management of resorptive defects owing to its superior sealing ability, biocompatibility, and capacity to promote cementogenesis and periradicular healing. Its alkaline pH further enhances its antimicrobial potential, making it particularly suitable for use in resorptive lesions extending toward periodontal tissues. In this case, MTA was successfully used to fill and seal the resorptive cavity under strict isolation. [10,11] Clinical and radiographic follow-up demonstrated satisfactory

healing, with no evidence of pain, mobility, or persistent periapical pathology

CONCLUSION

Within the limitations of this single case report, internal root resorption was successfully managed using nonsurgical endodontic therapy with sealing of the resorptive defect using mineral trioxide aggregate. Favorable clinical and radiographic outcomes observed at the 12-month follow-up highlight the effectiveness of MTA, owing to its excellent biocompatibility and sealing ability. Further well-designed clinical studies and case series are necessary to establish long-term prognostic predictability and validate the use of bioactive materials in the management of internal root resorption.

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