

Management of Iatrogenic Internal Root Resorption: A Case Report

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Abstract

Aim : To report the treatment and follow-up of a mandibular first premolar with internal resorption managed by root canal treatment & cold ceramic repair.

Summary: This study presents a case of extensive internal root resorption affecting tooth 34 (FDI) in a 63-year-old male patient, without a history of trauma in that region. Despite a guarded prognosis but encouraged by a healthy periodontal condition, treatment based on reconstructing the tooth with cold ceramic and composite restoration was carried out. Follow-up radiographs over 12 months demonstrated the maintenance of a functional tooth.

Keywords: internal root resorption, Endodontics treatment, case report

Introduction

Internal root resorption (IRR) is a pathologic condition that involves the destruction of the inner aspect of a tooth root, primarily driven by odontoclast activity. This activity typically arises from chronic inflammation of the pulp tissue or trauma to the tooth. The condition is characterized by the progressive resorption of intraradicular dentin, which can occur along the middle and apical thirds of the root canal. (1-3)

Diagnosing IRR can be challenging due to its subtle clinical presentation. Early stages of the condition may not be visible on conventional radiographs, as they may be too small or obscured by the limitations of two-dimensional imaging.(2) In some cases, if the resorption occurs near the crown and involves the pulp, a "pink spot" may be

visible. This spot is indicative of the highly vascularized granulation tissue within the resorptive defect. As the condition progresses and the pulp becomes necrotic, this pink color can darken to grey or dark grey. Given the potential for IRR to lead to significant tooth damage and the risks of perforation and fracture, early diagnosis and treatment are crucial. (4-6)

Cone Beam Computerized Tomography (CBCT) is a powerful diagnostic tool that allows for a more accurate and earlier detection of IRR lesions compared to conventional radiographs. CBCT provides three-dimensional imaging, which helps in identifying the precise location and extent of the resorption. (7)

Treatment of IRR often involves removing the diseased pulp tissue, cleaning and shaping the

resorptive defect, and then filling the canal with a suitable material to induce healing and remineralization. Recent advances in biomaterials have provided new options for this step, including bioceramics and other bioactive materials that promote healing and hard tissue formation. (2, 5, 8)

The prognosis of IRR treatment is significantly influenced by the presence of root perforation. As the resorption progresses, it can weaken the tooth structure, making it more susceptible to fracture. (7, 9) Yildirim and Elbay highlight the importance of recognizing and managing perforations as a key factor in the successful treatment of IRR. (10) The presence and extent of such complications should guide the treatment approach and prognosis. In summary, internal root resorption is a rare condition that can lead to significant tooth damage if not diagnosed and treated early. (5) CBCT is an invaluable tool for early detection, and advances in biomaterial science have improved treatment options. (6) The presence of perforation is a critical factor in determining the prognosis, with early and appropriate management essential for preserving the affected tooth. (11)

CASE REPORT

A 63-year-old man with a history of severe pain on the mandibular (left) regions was referred to the endodontic department of Baqiyatullah Faculty of Dentistry from a private clinic. Medical history showed no evidence of systemic disease and The patient fell into the ASA1 group and oral hygiene was fair.

In Intraoral examination #34 has a painful response to percussion and palpation, and in sensibility test #34 & #35 no response to cold, heat, and electric pulp tests. An oval shaped radiolu-

ency within the root periphery of tooth number 34 at the junction of coronal and middle one-third of the root was observed, suggestive of internal root resorption, which was confirmed by CBCT.

Control tooth #14, #15 had a normal response in percussion and palpation and gave a response in the normal range to the Sensibility tests. According to the obtained data, the tooth is diagnosed as pulp necrosis with symptomatic apical periodontitis. After obtaining informed consent, injection of mental block anesthesia using 2% lidocaine with 1/100,000 epinephrine (Persocaine-E; Darou Pakhsh). Isolation was established with a clamp and rubber dam, after Composite restoration removed the Access cavity was prepared with the help of high-speed Fissure bur. The working length of the canals was determined with apex locator Root ZX apex locator (J. Morita Mfg. corp., Kyoto, Japan) and confirmed with the radiographically. Canal preparation with ProTaper nickel-titanium rotary instruments (Dentsply Maillefer) in a crown-down technique till F3 file And chemical preparation was done with passive ultrasonic Irrigation with Ultra X Ultrasonic activator device (Eighteeth, Changzhou Sifary Medical Technology, China) and NaOCl 5.25%, Calcium hydroxide paste (Golchai) was placed in the canals. A small cotton pallet was placed and the access cavity was temporarily sealed with Cavit (3M ESPE, Saint Paul, MN).

Two weeks later, In second appointment, after mental block injection, The tooth was isolated with rubber dam & Clamp. Ca(OH)_2 was removed from the canal with 5.25% sodium hypochlorite and passive ultrasonic irrigation with Ultra X Ultrasonic activator device and using 17% EDTA for 1 min Smear layer removal.

drying of the canal with sterile paper tips

obturation of the entire length of the canals began with calcium silicate sealers and Thermoplastic gutta-percha technique. Obturation was done with a down pack of gutta-percha fast fill (Eighteeth, Changzhou Sifary Medical Technology, China). Warm gutta-percha at the orifice was vertically compacted by using appropriate sized pluggers. After completion of root canal treatment, the tooth was restored using resin composite (P60; 3M Dental Products, Saint Paul, MN). At 12 month follow-up, the patient was asymptomatic demonstrating a functional tooth number 21. Radiographic examination revealed stoppage of resorptive process with intact dense obturation.

DISCUSSION

Resorption, a condition involving the loss of dentin, cementum, and/or bone, can arise from physiological or pathological processes.(1) This condition can be triggered by various injuries, including mechanical, chemical, or thermal damage. Specifically, internal resorption occurs following the necrosis of odontoblasts and is often linked to chronic partial pulp inflammation and partial pulp necrosis.(1, 2)

Diagnosing resorption defects accurately is crucial for devising an appropriate treatment plan, as misdiagnosis can lead to inappropriate treatments. The advent of three-dimensional imaging, particularly CBCT, has significantly enhanced the accuracy of diagnosing internal root resorption.(3, 7) The superior diagnostic capabilities of CBCT have led to improved management and better outcomes for conservative treatments of teeth affected by internal resorption. Modern endodontic techniques

should be employed in the treatment of internally resorbed teeth.(7)

These techniques include the use of optical aids, ultrasonic enhancement of chemical debridement, and thermoplastic filling methods. Additionally, alternative materials such as calcium silicate cements present new opportunities for rehabilitating resorbed teeth. These advanced methods and materials have shown that even in cases where the root walls are perforated, the prognosis for treating internal resorptions is favorable. (2, 6)

During treatment planning, it is essential to weigh the decision between extracting the tooth and placing an implant versus endodontically treating the tooth.Extraction and implantation may be the final treatment option offered to the patient, but endodontic treatment with biomaterials such as Mineral Trioxide Aggregate (MTA) has shown optimal results.(8, 12) Clinical and radiographic examinations after a follow-up period of over 12 months have demonstrated the effectiveness of MTA in treating teeth with perforating internal root resorption, suggesting it as an excellent alternative to implant placement.

CONCLUSION

the early diagnosis and therapy are very important in order to stop the resorption process. It is imperative to initiate endodontic treatment as soon as possible to arrest the progression of the resorptive process and to prevent further weakening of tooth structure.

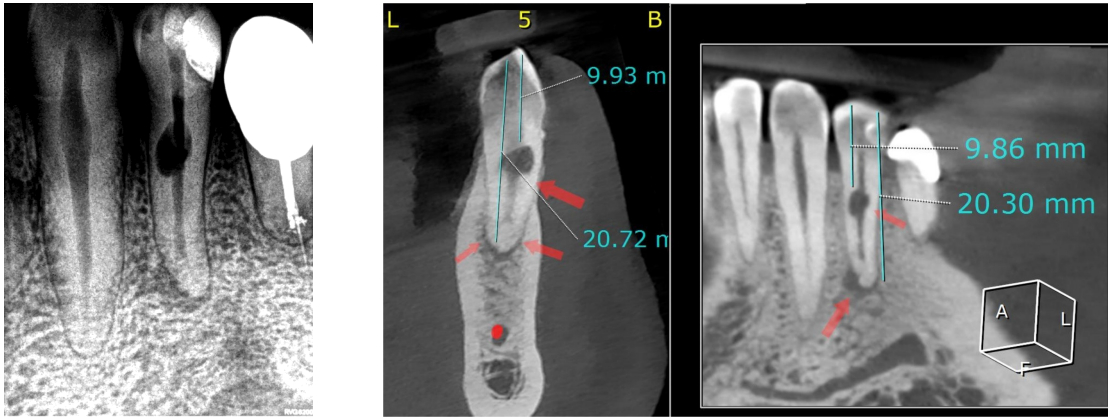


Figure 1. A) Preoperative periapical radiography and B) CBCT image of the tooth

A

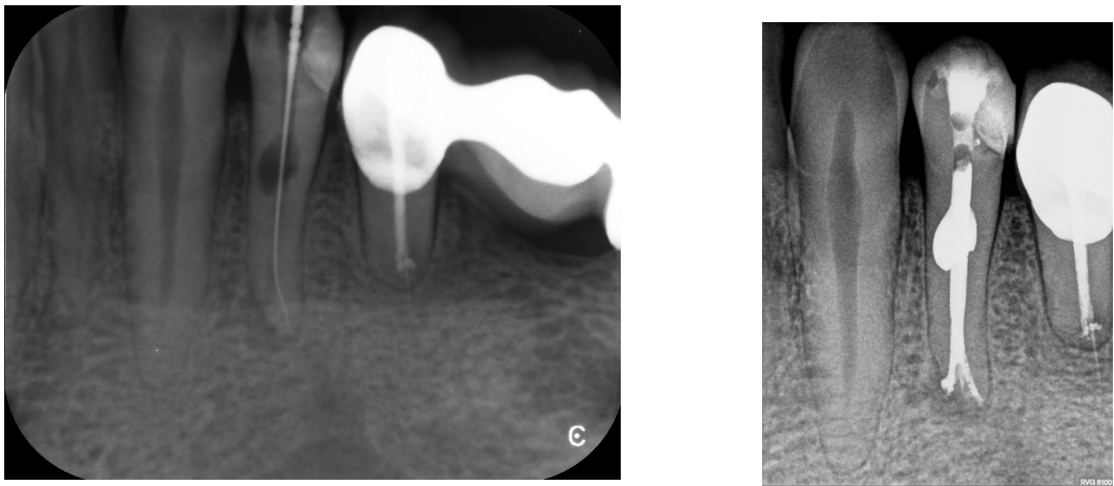


Figure 2. A) Working length determination & B) Obturation radiography



Figure 3. periapical radiography of the tooth after A) six and B) one-year follow-up

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