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Navigating internal resorption: A clinical case report

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Abstract

Internal root resorption is the gradual destruction of intra-radicular dentin and dentinal tubules along the middle and apical thirds of the canal walls due to clastic activities. Various causes have been reported which include ongoing pulpal inflammation, after dental caries, or as a result of trauma from an unintentional impact. As anterior teeth are more prone to stress, they are the most common teeth to experience internal root resorption. On the other hand, posterior teeth may exhibit resorption due to the carious involvement of pulp. A successful treatment outcome requires early identification, eradication of the underlying cause, and appropriate management of the resorbed root. This work presents a summary of successful endodontic management of internal resorption.

Keywords: Resorption, MTA, internal resorption

Introduction

Resorption is defined as a condition associated with either a physiologic or a pathologic process resulting in loss of dentin, cementum, or bone [1]. Andreasen has classified tooth resorption as Internal and External root resorption [2] (fig.1). Internal root resorption is the progressive destruction of intraradicular dentin and dentinal tubules along the middle and apical thirds of the canal walls as a result of clastic activities [1]. It is seen as a radiolucent area around the pulpal cavity, usually of incisors and mandibular molars. The various etiological factors suggested for internal root resorption include traumatic injury; infection and orthodontic treatment [3]. Internal inflammatory resorption involves progressive loss of dentin, whereas root canal replacement resorption involves subsequent deposition of hard tissue that resembles bone or cementum but not dentin [2]. Internal inflammatory resorption can be perforating or non-perforating root resorption. Clinically, the condition is usually asymptomatic, however, it may include the presence of a reddish area–a pink spot, which represents the granulation tissue showing through the resorbed area [4]. Radiographs are mandatory for diagnosing internal resorption, which reveals a round-to-oval radiolucent enlargement of the pulp space [5]. The margins are smooth and clearly defined with distortion of the original root canal outline. Internal resorption can be detected by: Visual examination based on changed color in tooth crown, radiographic diagnosis, conventional and cone beam computed tomography, light microscopy, and electron microscopy [6]. This case report highlights the successful management of the internal resorption in mandibular first molar case with a 6 months follow-up period.

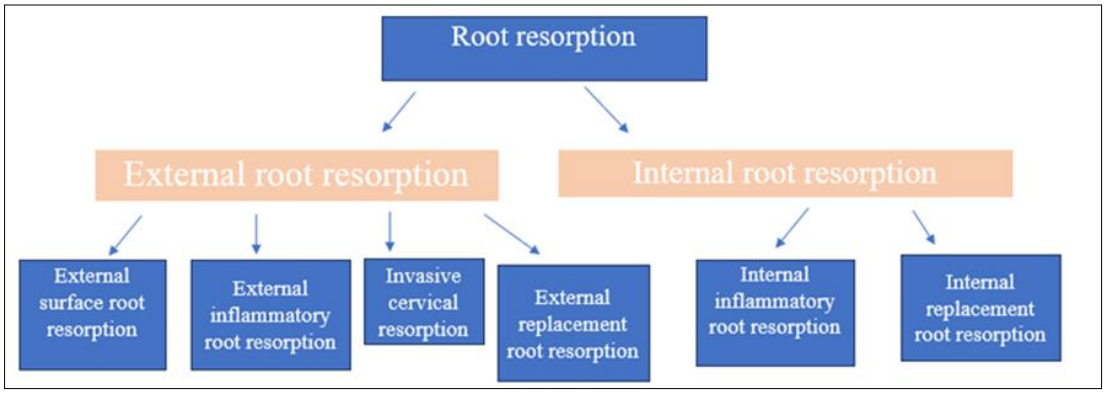

Fig 1: Andreason's Classification of root resorption

Case report

A 24-year-old female patient reported to the Department of Conservative Dentistry & Endodontics with a chief complaint of pain w.r.t lower left back tooth region. Clinical examination revealed tooth number 36 was tender on percussion with deep occlusal caries. On routine intraoral periapical (IOPA) radiographic examination, internal resorption was suspected and hence CBCT was advised (Fig 2). Radiographic interpretation revealed the presence of an oval-shaped radiolucency at coronal third of the roots of 36

suggestive of internal resorption (Fig 2). The treatment plan included endodontic treatment of tooth no.36 followed by post-endodontic restoration. An access cavity was prepared after the administration of local anesthesia (2% lignocaine with 1:80000 adrenaline) under rubber dam isolation. The working length was determined using an apex locator (J Morita Manufacturing Corp., Kyoto, Japan), and radiographically verified (fig 3a). Irrigation of the canal was done using 5.25% sodium hypochlorite and enhanced by laser photo-activated disinfection (diode laser, novolase, 980nm). The shaping was done using a Protaper gold rotary file system up to size F2 in mesial canals and Size F3 in the distal canal respectively. Using an electronic apex locator and sterile absorbent paper points, it was determined that there was no perforation during root canal instrumentation because the internal resorption defect was in extreme proximity to the outer surface. After using sterile paper points to dry the canal, an intracanal paste consisting of iodoform and calcium hydroxide paste was inserted. Cavit™ G (3M ESPE) was utilized to seal the access cavity. After two weeks, the temporary filling was removed, the canal was completely dried, and calcium hydroxide was washed out. A radiograph was used to choose and validate the master cone (fig 3b). Canals were coated with AH Plus sealer and sectionally obturated using F2 and F3 gutta percha in mesial and distal canals respectively (fig 3c). MTA was then used to fill the resorptive defect (fig 3d), followed by permanent coronal restoration (fig 3e) and full coverage PFM crown (fig 3f).

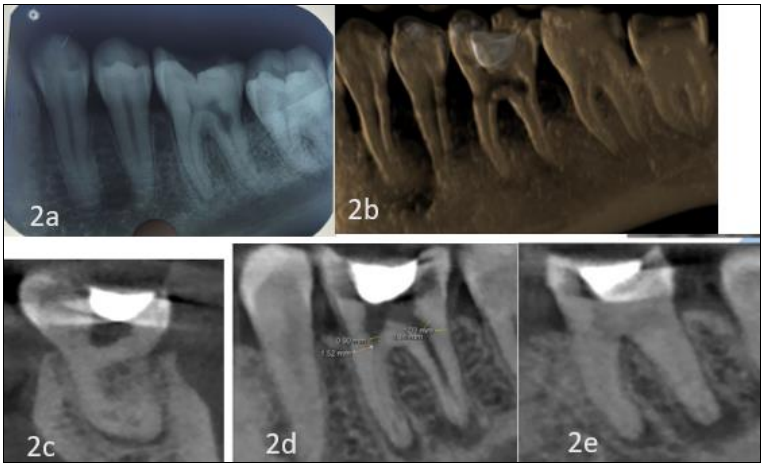

Fig 2a: pre-operative intraoral periapical radiography wrt 36
Fig 2b-2e: Preoperative CBCT wrt 36

Fig 3: Showing radiographs taken during the procedure
Fig 3a: WL determination, fig 3b: master cone fit check, fig 3c: sectional obturation, fig 3d: MTA placement, fig 3e: post obturation restoration, fig 3f: crown placement, fig 3g: 6 months follow up sh

Discussion

Internal resorptive lesions offer challenges during the instrumentation and filling of root canals due to reduced dentin thickness in root canals and concavity defects [1]. These defects could serve as the storehouse for clastic cells, bacteria, and granulation tissues. The ultimate the goal of managing internal resorption is to eliminate all pulpal remnants, and bacteria as as well as disinfecting and sealing the root canal and repairing the perforating defect if present. The diagnosis of internal resorption is of utmost importance in managing it effectively. CBCT has been one of the important diagnostic aids as it evaluates the size of the lesion, its proximity to the outer surface of the root, and whether the defect is

perforating or non-perforating. Hence in this case CBCT was used to check for the findings mentioned above [6]. CBCT revealed a resorptive defect involving the coronal thirds of mesial and distal root canals and proximity to the outer root surface (fig 2b-2e). Clinically, it may or may not be associated with pain. They are discovered by chance on routine radiographs or by the clinical sign of a "pink spot" on the crown. The pink color is related to the highly vascularized connective tissue adjacent to the resorbing cells. This color turns grey/dark grey when the pulp becomes necrotic. "Pink tooth of Mummery", named after the anatomist "James Howard Mummery" [4]. The pulp can either show partial or complete necrosis. In an actively progressing lesion, the tooth may be partially vital and may present symptoms typical of pulpitis. Conventional root canal treatment results in a high degree of success in the management of non-perforating internal resorption. Therefore, in the present case, we decided to go for nonsurgical management which involves thorough chemo-mechanical preparation, intracanal medicament placement within the canal to achieve proper disinfection and osteoclastic activity cessation, filling the internal resorptive defect with MTA followed by composite post-endodontic restoration. Intracanal medicament like Ca (OH)2 has a pronounced antimicrobial effect due to its alkaline pH for the recommended period of 1 to 2 weeks. Disinfection of the root canals plays a huge importance in such cases to eliminate the remnants and microbes. In this case, irrigant activation was done by photo-activated disinfection (PAD), which is achieved by using low-power lasers to trigger a photochemical reaction that results in the production of reactive oxygen species. It is possible to eradicate all kinds of bacteria by employing exogenous photosensitizers such as tolonium chloride, and methylene blue. Recent research has shown that PAD can kill photosensitized oral bacteria, like E. faecalis, *in vitro*. Additionally, it has been shown to kill microorganisms *in vivo* in the root canal system. While PAD can be conducted as part of the normal disinfection of the root canal system, it also has the potential use for eradicate persistent endodontic infections for which traditional approaches have failed [9]. Hence, Photoactivated disinfection using a diode laser (Novolase, 980nm) along with methylene blue dye was used. The resorptive defect has to be repaired by reinforcing the thin and weak tooth structure with suitable material. In this case, Mineral trioxide aggregate was used to repair the defect. MTA was introduced by

Dr. Torabinojad in 1993, and ever since it has been used for various procedures in endodontics due to its excellent sealing qualities, biocompatibility, bactericidal effects, radiopacity, and the capacity to set in the presence of blood. These are only a few of its numerous advantageous qualities [7]. Since it can regenerate a periodontal attachment and induce osteogenesis and cementogenesis, MTA is a good material to treat root resorption [8]. In the case of the non-perforating type of internal resorption, to completely seal the resorptive defect, the flowability of the obturation material is required hence thermoplastic gutta-percha obturation appears to yield the greatest outcomes. The patient was recalled for monthly follow-up to evaluate the treatment outcome clinically and radiographically. Follow-up radio-visio-graphic image shows considerable healing of the periapical lesion indicating success of the treatment.

Conclusion

Early detection, suitable treatment planning, removal of the inflamed pulp tissue, fortification of the tooth's weaker structure, and three-dimensional obturation are all necessary for the successful management of an internal resorption case. Internally resorbed teeth should undergo root canal therapy using contemporary endodontic procedures, such as visual assistance, thermoplastic fillings, and ultrasonic, sonic, or laser enhancement of chemical debridement. Alternative materials, including calcium silicate cement, present fresh possibilities for teeth that have been resorbed.

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