

Repair of Perforating Internal Inflammatory Resorption with Mineral Trioxide Aggregate: A Case Report

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ABSTRACT

Aim: To report a treatment of a mandibular central incisor with internal inflammatory resorption managed by root canal treatment and surgical repair with white mineral trioxide.

Summary: This paper presents a case of extensive internal resorption affecting 41 (FDI) in a 32-year male patient with the history of trauma 6 years back. Resorption with perforation was present at mid root level with loss of cementum and periodontal communication. Despite a guarded prognosis treatment based on root canal treatment followed by surgical repair of defect with white mineral trioxide aggregate (MTA) was carried out. Follow up radiograph at 12 months demonstrated the maintenance of a functional tooth

Keywords: Internal root resorption, MTA, root canal treatment

INTRODUCTION

Internal inflammatory root resorption is a rare condition in permanent teeth(1).It is characterized by progressive loss of tooth substance starting from the root canal wall. It has been described as resorptive defect of the internal aspect of the root following necrosis of odontoblasts as a result of chronic inflammation (2) and bacterial invasion of the pulp tissue (3). It is caused by transformation of normal pulp tissue into granulomatous tissue with giant cells, which resorb dentin.

Trauma, caries and restorative procedures can lead to internal resorption, but it can also occur as an idiopathic dystrophic change (4). Internal resorption can be found in all areas of the root canal but is most commonly found in the cervical region (5). It is usually asymptomatic and discovered by chance on routine radiographic examinations (6) or by the clinical sign of a 'pink spot' on the crown (7). Three-dimensional imaging (7) has shown such defects to be circumscribed and oval-shaped however the tissue loss can be extensive and often unrestorable. For internal resorption to take place, vital pulp tissue is required. Therefore, non-surgical root canal therapy leading to removal of the granulation tissue and the blood supply to the resorbing should be sufficient to arrest the destruction process (5). However, in cases in which perforation has occurred and a pathway between the pulp canal space and the periodontal tissues is present, root canal treatment alone is not sufficient. It should be followed by repair of the perforation site with a suitable sealing material. Labially or lingually located external root resorption may have a similar appearance. Because the etiology and treatment regimens for both resorption types are different, correct diagnosis is very important.

Mineral trioxide aggregate has satisfactory properties like biocompatibility (8, 9), favourable sealing ability (10), mechanical strength (11) and a capacity to promote periradicular tissue healing (12). MTA has been used successfully in several clinical applications such as pulp capping (13), pulpotomy (14,15), perforation repair (16), treatment of traumatized teeth with immature apices (17) and for treatment of root resorptions (18). MTA can create an environment conducive to periodontal healing, allowing new cement growth on its surface (12). This case report describes the treatment of a mandibular central incisor with an extensive internal inflammatory root resorption, where MTA was employed to restore function.

CASE REPORT

A 32-year-old male patient reported to the department of conservative dentistry and endodontics post graduate institute of dental sciences, Rohtak, Haryana for the routine dental checkup. Patient was asymptomatic and gave the history of trauma 6

years back in the mandibular anterior teeth region. Radiographic examination revealed a uniform radiolucent lesion in the middle third communicating with external surface of the root canal depicting extensive root resorption of 41 [Fig1 (B)]. On clinical examination tooth (41) was non vital and the adjacent teeth tested positive on vitality testing. Periodontal probing did not reveal any loss of attachment and mobility of the tooth was within the normal limits [Fig1 (A)]. The patient's medical status was non-contributory. Possibility of conserving tooth 41 (FDI) was done through a combination of root canal treatment and surgical MTA repair.

STEP 1

After coronal access, the pulp tissue was removed. A communication between the resorption cavity and the lateral periodontium was observed on entering the root canal. File was visible under the buccal mucosa at mid root level. Working length was determined using radiograph. The biomechanical preparation was done with the K files accompanied by copious irrigation with freshly prepared 1% sodium hypochlorite. An apical stop was created with size 40 K file. After removing remaining pulp tissue and control of bleeding, Calcium hydroxide paste dressing was placed to alkalize the environment. After 7 days, the dressing material was removed with 1% hypochlorite irrigation and aspiration. Still continuous bleeding was observed from the root canal wall. At that time surgical management of the perforation area with MTA was planned.

STEP 2

A sulcular full thickness flap was raised after Local anaesthesia was achieved with 2% lignocaine hydrochloride with epinephrine 1:80,000. After flap elevation denuded buccal bone plate with small amount of inflammatory tissue was visible. The resorptive lesion was located in the middle third of the root. Curettage of the overgrown fibrous tissue from the resorptive defect was done with the surgical curette. The resorptive cavity was thoroughly debrided with ultrasonic tip and the thin fragile dentine bordering the defect was removed [Fig1 (C)]. The size 60 gutta percha which was snugly fitting was placed in the canal from the coronal access to preserve the original root canal space [Fig1 (D)]. After this MTA powder was mixed according to the manufacturer's instructions and the resorbed space was filled with white MTA [Fig1 (E)]. MTA was condensed by wet cotton pellets and flap was sutured back to its original position. Excess gutta percha was removed from the coronal pulp chamber which was promptly sealed with a provisional cement. The patient was given post-operative instructions.

STEP 3

On the 7-post op day successful hardening of the MTA was verified. The guide gutta-percha point was removed and the empty root canal space was obturated with zinc oxide eugenol sealer and gutta-percha points. Finally, the coronal chamber was restored with glass ionomer cement. An immediate postoperative radiograph was taken conforming satisfactory filling of the root canal and resorptive defect [Fig1 (F)]. Clinical and radiographic follow-up conducted for 12 months, demonstrating a functional tooth with no endodontic pathology [Fig1 (G, H)].

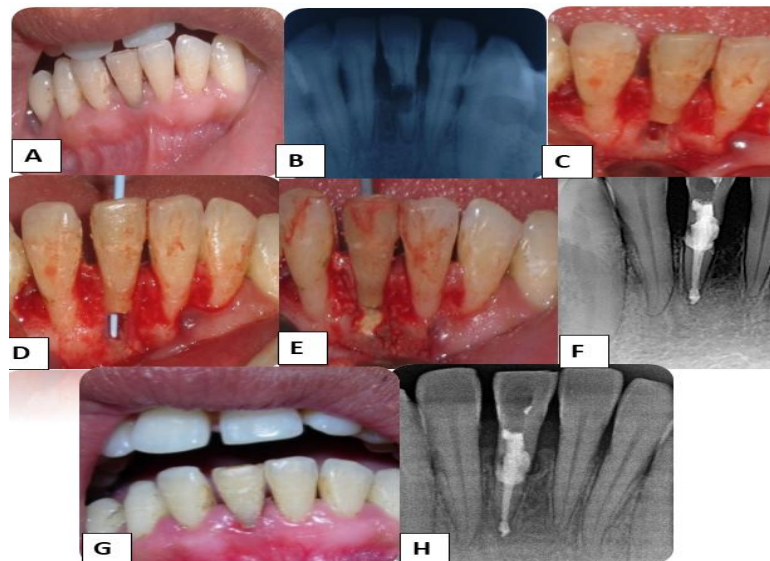


Fig 1

DISCUSSION

Internal resorption is the resorption of dentin which starts in the pulpal cavity either in the pulpal chamber or in the root canal. There are many etiological factors, but its most frequent cause is infection or trauma, which can initiate as an inflammatory response in the pulpal tissue. In response to these stimuli granulation tissue is formed in the pulp; this tissue ultimately produces odontoclasts, which are similar to osteoclasts, and hence the resorptive process begins. Usually, the resorption process is diagnosed either from routine.

The lesion in this case was diagnosed as internal resorption. This diagnosis was based on radiographic examination (clearly defined margins, density, and root canal wall appears to balloon out) and clinically (inability to probe the defect via the periodontal ligament), when diagnosed immediate removal of causative agent must be considered, aiming to arrest the cellular activity responsible for the resorptive activity.

Different approaches exist in the treatment of a perforating internal resorption. Root canal therapy combined with surgical management may be the only option in few cases. Remineralization therapy with calcium hydroxide, which forms a hard tissue barrier against which we can condense the root filling, has been advocated by some (19). In the present case report because of the extensive lesion and continuous exudation, surgical intervention was done. Mineral trioxide was chosen as filling material for its biocompatibility and sealing ability. MTA stimulate repair of periradicular tissues, showed no inflammation and show deposition of cementum over MTA in the majority of the specimens when placed on root perforation. Clinical use of MTA in humans has demonstrated their applicability in wet environment, preventing bacterial microleakage and alkalizing the medium. On account of predominant presence of calcium oxide in its formula, its biological properties are similar to those of calcium hydroxide, making it useful for tissue healing (20).

Consistent with this case report, Maarten & Roeland (21) and Hsiang et al (22) also reported an increase in radiodense bone and establishment of a new periodontal ligament when MTA was used to fill a perforating internal root resorption in a mandibular molar and maxillary central incisor respectively.

Our case can be considered clinically and radiographic ally successful as at the 6 months recall healing was evident in the perforation site, and no fistula, edema, or pain was reported by patient. After 12 months, the tooth remained asymptomatic, radiographic examination showed signs of normality, and the patient is satisfied to keep the tooth.

CONCLUSION

MTA can be employed to restore a severely weakened internally resorbed tooth with satisfactory follow up of 1 year.

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