Extensive external localized idiopathic root resorption – An unusual case report

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Abstract

External root resorption of permanent teeth is a multifactorial process. This article presents an unusual case of localized idiopathic extensive external root resorption involving the whole mesial root of the right mandibular first molar in a 42-year-old female patient. No significant systemic, dental, or familial findings could be identified as a possible cause. The cause of the resorption remained unclear. The tooth was managed by nonsurgical endodontic treatment using mineral trioxide aggregate to seal resorbed canals. A 5-year follow-up revealed satisfactory results clinically and radiographically with mobility within physiological limits.

Keywords: Extensive; external root resorption; idiopathic; localized; mineral trioxide aggregate

INTRODUCTION

External root resorption is of two types: physiologic resorption and pathologic resorption.[1] Pathological root resorption is related to several local factors such as orthodontic therapy, trauma, occlusal stress, periapical or periodontal inflammation, tumors, cysts, impacted and supernumerary teeth, transplantation, and reimplantation and systemic factors such as endocrine imbalances, Paget’s disease of the bone, and renal and hepatic diseases.[2] If an etiological factor cannot be identified for root resorption, the term “idiopathic” is applied.[3] This article describes a case of extensive localized idiopathic apical root resorption of the mesial root of the mandibular first molar with distal root intact. Till date, no such case of extensive root resorption of one complete root in a multirooted tooth has been reported.

CASE REPORT

A 42-year-old female patient reported with a chief complaint of pain in the right mandibular back tooth region for 3 days. Medical history of the patient was noncontributory. On clinical examination, the right mandibular first molar presented with mild attrition. Cervical abfraction was noticed for teeth 44, 45, and 46 [Figure 1a]. There was a deep disto-occlusal carious lesion in relation to tooth 17, and teeth 36 and 21 were missing. Dental history revealed that the patient visited a dentist 8 years ago with a complaint of severe pain in relation to tooth 36 for which the tooth was extracted. The patient does not remember the cause for loss of tooth 21 as the tooth was missing for many years for which she was wearing a removable partial denture. There was no history of any orthodontic treatment. Intraoral periapical radiograph of the mandibular right posterior region revealed extensive external resorption of the mesial root of tooth 46 [Figure 1b]. Upon cold test (RC Ice; Prime Dental Products Pvt. Ltd., Mumbai, India) and electric pulp testing (EPT) (Parkell Electronics Division, Farmingdale, NY, USA), tooth 46 gave an exaggerated painful response. EPT reading for tooth 46 was 6 (early response); for tooth 47, it was 25, and as the contralateral tooth was missing, tooth 37 was tested which responded at 28. A probing depth of 2–4 mm was recorded, and the clinical attachment of the gingiva was considered to be normal with no mobility. There was no swelling, discharge, or sinus opening in relation to tooth 46. The periodontal sulcus was probed

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using a standard periodontal probe. Hematological investigations including complete blood count as well as calcium, phosphorus, and alkaline phosphatase were within the normal range, so endocrine diseases such as hyperparathyroidism, hypoparathyroidism, hypophosphatemia, hyperphosphatemia, and Paget’s disease were ruled out. The patient was informed about the questionable prognosis of tooth 46 due to resorption of mesial root, and written informed consent was taken. Provisional diagnosis of irreversible pulpitis was made, and to relieve the patient from pain, emergency endodontic treatment was planned.

After administration of local anesthesia (2% lignocaine with 1:80,000 adrenaline), access opening was done under rubber dam isolation. Three root canal orifices were located (mesiobuccal [MB], mesiolingual [ML], and distal [D]) [Figure 1c]. Working length was determined using radiographs (Ingle’s method) and confirmed with an apex locator (Root ZXII, Morita, Tokyo, Japan). MB and ML canals were measuring only 4 mm. Cleaning and shaping was done for distal root with ISO 2% taper files up to size 40 (MANI Inc., Tochigi-Ken, Japan). MB and ML canals were enlarged till #3 GG drills (MANI Inc., Tochigi-Ken, Japan). Irrigation was done using 3% sodium hypochlorite solution (Prime Dental Products Pvt. Ltd., Maharashtra, India) and 17% EDTA (Prime Dental Product Pvt. Ltd., Mumbai, India). Final rinsing of the canal was performed using 2% chlorhexidine digluconate (Neelkanth Healthcare Pvt. Ltd., Rajasthan, India). Then, the canals were dried with paper points (Prime Dental Products Pvt. Ltd., Maharashtra, India), and a calcium hydroxide dressing was placed (Ultralcal; Optident, Skipton, UK). To rule out the possibility of resorption involving other teeth, an orthopantomogram was taken which confirmed localized idiopathic apical resorption (LIAR) involving tooth 46 [Figure 1d]. After 1 week, temporary restoration was removed and canals were cleaned and dried. The distal canal was obturated by lateral compaction of gutta-percha (Maillefer, Dentsply) and AH Plus resin sealer (Maillefer, Dentsply). The mineral trioxide aggregate (MTA) cement (ProRoot MTA; Dentsply Tulsa Dental, Tulsa, OK) was mixed according to the manufacturer’s instructions and placed into the MB and ML canals using amalgam carrier and condensed vertically with hand pluggers (Maillefer, Dentsply) [Figure 1e]. The tooth was then restored with a posterior composite resin core (Filtek Z250 3M ESPE, A2 shade/USA) followed by a full-coverage porcelain crown in the subsequent visit. Five-year follow-up revealed satisfactory result as the tooth was completely asymptomatic clinically with no mobility, and radiographically, there was no evidence of further furcal breakdown and resorption [Figure 1f].

**DISCUSSION**

Four types of external idiopathic root resorption have been described: localized idiopathic cervical resorption, multiple idiopathic cervical resorption, LIAR, and multiple idiopathic apical resorption. LIAR is reported in the people of 15–48 years of age with male predominance. The teeth most commonly involved were mandibular first molars and mandibular premolars, sometimes bilaterally.

Few cases of multiple idiopathic apical root resorption exist in the literature. The present case is different from other cases reported: most of the reported cases were involving multiple teeth, asymptomatic diagnosed on routine radiography; in the present case, there was only one involved tooth which had symptomatic irreversible pulpitis. It was extensive resorption of only mesial root with distal root intact. Radiographic appearance of the tooth was like a cantilever molar (tooth was resting only on distal root) with periapical replacement resorption (PARR). PARR is a characteristic feature of LIAR where resorbed root area is replaced by normal trabecular bone without ankylosis. Such excessive production of bone surrounding absorbed roots might be a compensatory response to osteoclastic activity. The possibility of bilateral occurrence cannot be proven as the contralateral tooth was missing due to extraction 8 years ago. The process of root resorption
involves a complex interaction of inflammatory cells, resorbing cells, hard tissue, cytokines, and enzymes such as collagenase, matrix metalloproteinases, and cysteine proteinase.\[8] The exact pathogenesis of LIAR remained unclear. Genetic factors predisposing to external resorption were examined by Al-Qawasmi et al.\[9] Activation of interleukin-1β inflammation pathway has been implicated as potential molecular models of root resorption.\[10] Occlusal stress is considered as one of the contributing factors responsible for resorption which can result in dystrophic changes in periodontal ligament, alveolar bone, cementum, and pulp.\[2,11] There was mild attrition with abfraction in relation to involved teeth indicating occlusal stress. There is no documented literature stating that occlusal stress can lead to such extensive root resorption involving single root. Most of the literature in relation to occlusal stress and root resorption was in correlation with orthodontic treatment. Hence, the cause remained unclear.

In the present case, calcium hydroxide intracanal medicament was used for disinfection of the root canal system due to its wide range of antimicrobial activity against common endodontic pathogens. It also induces hard tissue formation and is effective for stopping inflammatory exudates.\[12]

Calcium silicate-containing cement such as MTA are biocompatible and have excellent potential in endodontic use. MTA is a bioactive material that has the ability to induce the production of bone morphogenetic protein-2 and transforming growth factor beta-1 which contributes to the favorable biologic response stimulated in periapical tissues. It also stimulates the production of interleukin which may influence the regeneration of the periodontal ligament and formation of cementum and bone.\[13] In the present case, MTA was the choice of material to obturate the canals. Literature regarding treatment for idiopathic external root resorption states that no treatment can arrest resorption, and it was only wait and watch or extraction.\[14] Nevertheless, a 5-year follow-up of the present case shows that the patient was asymptomatic, and there was no progression of resorption suggesting positive results for MTA as filling material in LIAR.

**CONCLUSION**

The present article reports a unique case of extensive external root resorption of unknown etiology affecting only one root of a multirooted tooth. Further studies of resorption on molecular basis are recommended to understand exact etiology for appropriate treatment plan to prevent tooth loss.

**Declaration of patient consent**

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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**Conflicts of interest**

There are no conflicts of interest.

**REFERENCES**

1. Patel S, Karagasingam S, Pitt Ford T. External cervical resorption: A review. J Endod 2009;35:616-25.
2. Bakland LK. Root resorption. Dent Clin North Am 1992;36:491-507.
3. Belanger GK, Coke JM. Idiopathic external root resorption of the entire permanent dentition: Report of case. ASDC J Dent Child 1985;52:359-63.
4. Kanas RJ, Kanas SJ. Dental root resorption: A review of the literature and a proposed new classification. Compend Contin Educ Dent 2011;32:e38-52.
5. McMullin A, Fleming PS, Dibiase AT. Idiopathic generalized apical root resorption: A report of three cases. Int J Paediatr Dent 2008;18:312-6.
6. Regezi JA, Slcubba R, Jordan R. Abnormalities of teeth. In: Oral Pathology: Clinico-Pathological Correlations. 6th ed. St. Louis, Mo: Saunders Elsevier; 2012:373-89.
7. Soğur E, Soğur HD, Baksi Akdeniz BG, Sen BH. Idiopathic root resorption of the entire permanent dentition: Systematic review and report of a case. Dent Traumatol 2008;24:490-5.
8. Gupta R, Prakash V. Bilateral extensive idiopathic apical root resorption in supraerupted maxillary molars: A case report. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2008;106:e44-7.
9. Al-Qawasmi RA, Hartsfield JK Jr, Everett ET, Fiury L, Liu L, Foroud TM, et al. Genetic predisposition to external apical root resorption. Am J Orthod Dentofacial Orthop 2009;136:242-52.
10. Bastos Lages EM, Drummond AF, Pretti H, Costa FO, Lages EJ, Gontijo AI, et al. Association of functional gene polymorphism IL-1beta in patients with external apical root resorption. Am J Orthod Dentofacial Orthop 2009;136:542-6.
11. Neff P. Trauma form occlusion. Restorative concerns. Dent Clin North Am 1995;39:335-54.
12. Kawashima N, Wadachi R, Suda H, Yeng T, Parashos P. Root canal medicaments. Int Dent J 2009;59:5-11.
13. Cehreli ZG, Sara S, Uysal S, Turgut MD. MTA apical plugs in the treatment of traumatized immature teeth with large periapical lesions. Dent Traumatol 2011;27:59-62.
14. Moazami F, Karami B. Multiple idiopathic apical root resorption: A case report. Int Endod J 2007;40:573-8.