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Case Report

Non surgical repair of iatrogenic furcal perforation of radix entomolaris

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Furcal perforation is a common example of a procedural mishap. It can happen due to excessive tooth structure removal during attempts to locate the canal orifices; however it may also occur due to non iatrogenic causes. Furcal perforations result in creation of an artificial communication between the endodontic space and the periradicular tissue. This must be sealed to prevent alveolar resorption and damage to the periodontal ligament.[5]

Mineral Trioxide Aggregate (MTA) is stated to be an ideal perforation repair material due to its physical and biological properties.[1,5,6] This case report discusses the successful repair of an iatrogenic furcal perforation in RE by non surgical method using MTA. Obvious healing of the periradicular tissues and resolution of furcal periodontitis was clinically and radiographically evident on review.

Introduction

Radix entomolaris (RE) is a rare tooth macrostructure with a prevalence as low as 0.2% in Indian population.[1] The term is used to describe an additional third root located distolingually in mandibular molars, mainly first molars.[2] Apart from its role as a genetic marker,[3] its presence has clinical significance. Several modifications during radiographic interpretation, access cavity preparation and cleaning and shaping are required to preclude procedural mishaps during endodontic management.[1]

Iatrogenic perforations occur in approximately 2%–12% of endodontically treated teeth.[4] Anatomic variations like RE can significantly contribute to its incidence due to inadequate knowledge or skills of a clinician.[1,3]

Case report

A 15-year-old female patient was referred from a private dental clinic for management of an iatrogenic perforation which had occurred during endodontic treatment of tooth no 46 (mandibular right first molar) on the same day. Removal of the temporary coronal restoration revealed a perforation at the center of pulpal floor. Pre-treatment IOPA radiograph was taken to determine the extent of the defect. Besides the perforation, a periapical lesion in the mesial root of 46 and the presence of a supernumerary root, RE was revealed (Fig. 1A). In addition, clinical examination also revealed that the patient was under fixed orthodontic therapy.

As the perforation site was accessible, non surgical repair using MTA was planned. Endodontic treatment was initiated

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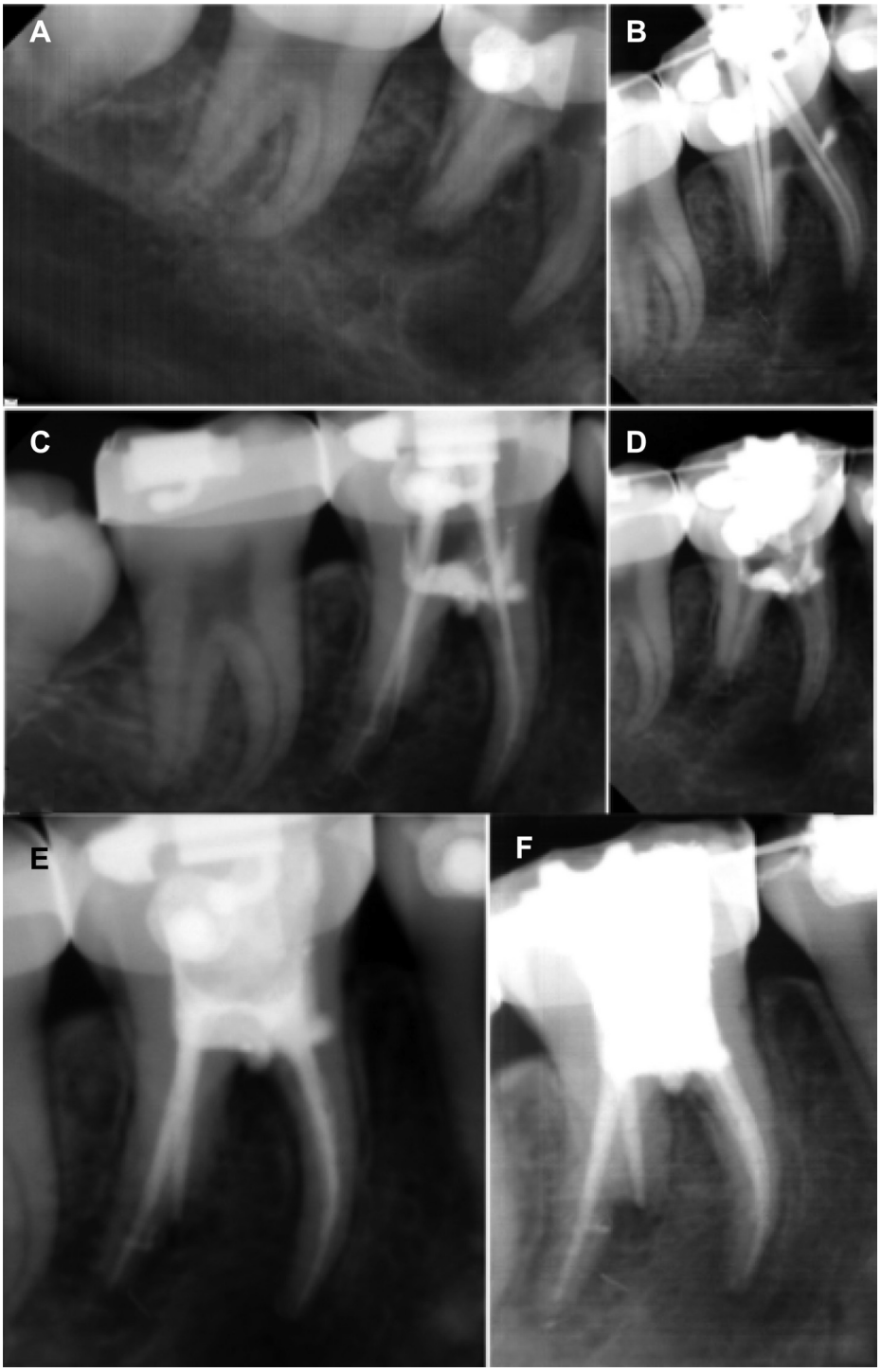

Fig. 1 – (A). Pre-operative radiograph. (B). Cocoa butter coated GP points placed in pre-flared canals. (C). MTA placed in the furcal perforation site. (D). GP points removed after 24 h. (E). Immediate post-obturation radiograph. (F). Radiograph after six months showing periapical and furcal healing.

after application of dental dam secured with dental floss and the canal orifices were located. Distolingual refinement of the access cavity was carried out to locate the orifice of RE. The canals were negotiated with exploratory K files (Mani Inc, Tochigi, Japan) followed by preflaring of the coronal third with S1 and S2 rotary files (Dentsply Maillefer, Ballaigues, Switzerland) using a gear reduction hand piece (X-smart, Dentsply Maillefer, Ballaigues, Switzerland).

Four 2% taper size 25 gutta percha points (GP) (Dentsply Maillefer, Ballaigues, Switzerland) coated with cocoa butter were placed in the canals to maintain their patency (Fig. 1B). White MTA (ProRoot MTA, Dentsply Maillefer, Ballaigues,

Switzerland) was mixed according to the manufacturer's instructions and placed on the perforation site (Fig. 1C). A moist cotton pellet was placed in the chamber to enable the setting process of MTA followed by a temporary restoration (Cavit, 3M ESPE, Minnesota, USA) for coronal seal. Patient was reviewed after 24 h to remove the cotton pellet and the GP points (Fig. 1D).

Working length of the canals was determined using Electronic apex locater (Root ZX; J. Morita, Kyoto, Japan) and confirmed radiologically. Cleaning and shaping was carried out upto size 0.25 mm tip 6% taper using Mtwo rotary files (Sweden-Martin, Pavoda, Italy). 2.5% sodium hypochlorite and normal saline were used as irrigants. Obturation was done using corresponding single cone GP and AH Plus resin sealer (Dentsply DeTrey, Konstanz, Switzerland) (Fig. 1E). The tooth was then restored with resin modified glass ionomer cement (Vitremer, 3M ESPE, Minnesota, USA).

The patient was clinically asymptomatic on follow-up review. The recall radiograph taken after 6 months revealed furcal and periapical healing (Fig. 1F).

Discussion

The occurrence of RE was first reported in literature by Carabelli (1844) and the term coined by Bolk et al (1915).[3] The etiology behind its formation is not clearly known; it can be related to external factors during odontogenesis or to the penetration of an atavistic gene or polygenetic system.[1] This anatomic structure has an important clinical implication as the morphological variations in terms of root inclination and canal curvature demand a careful and adapted clinical approach to avoid missed canals or procedural errors.[2]

Furcal perforations usually occur in multi-rooted teeth when the operator lacks adequate knowledge of the dimensions of the pulp chamber or the anatomical variations of the specific tooth treated. Regardless of the etiology, the four significant factors affecting the prognosis of a perforation repair are the level, location, size and time. In addition, selecting an appropriate repair material is imperative to ensure clinical success.

MTA is considered to be 'an ideal material' for varied clinical applications such as perforation repair, pulp capping, pulpotomy and apexification. The bond strength of most dental materials is significantly reduced during these procedures by the moisture contamination from underlying tissues. In contrast, MTA can acquire its optimal strength and produce excellent seal even in the presence of moisture or blood.[7] MTA has been reported to be an osteogenic, biocompatible material, inductive and conductive of hard tissue formation. By virtue of its strong alkalinity, it is bactericidal and stimulates cementum-like hard tissue formation, periodontal cell growth, osteoblastic adherence and bone regeneration.[8,9]

In the present case, although the location and the size of the iatrogenic perforation was critical, timely repair performed with MTA prevented the complication of furcal inflammation and induced osteogenesis. In addition, it was imperative that a modification in the access cavity design was carried out to locate and treat the RE canal. Otherwise, it would have resulted in treatment failure due to inadequate removal of pulpal tissue and incomplete cleaning of the canal.

Conclusion

Whilst the majority of evidence has focused on repairing perforations using various materials, the evidence on prevention and training is apparently limited. Access cavity preparation with haptic VR simulator[10] against the conventional phantom head training along with adequate knowledge of root canal morphology especially of multi-rooted teeth can minimize the incidence of procedural errors and mishaps.

Conflicts of interest

All authors have none to declare.

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