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Endodontic Management of Radix Entomolaris: Two Case Reports

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Abstract

Mandibular first molars show most of the anatomical variations not only in the number of canals but also in the presence of number of roots and their morphology. The presence of additional root either lingually or buccally in addition to two roots is one of the complex morphological variations. Diagnosis, identification, and treatment of these variations need adequate knowledge of root and root canal anatomy and configurations which can contribute to the better outcome. This case report discusses the endodontic treatment of two mandibular first molars with radix entomolaris

Keywords: Distolingualis Root, Mandibular First Molar, Supernumerary Root

Introduction

The main objective of root canal treatment is the thorough mechanical and chemical cleaning and shaping of the root canals, before obturation. As stated by Barrett, "of all the phases of anatomic study in the human system, one of the most complex is that of pulp cavity morphology."(1) Anatomical complexities always poses a challenge in the long term success of root canal treatment.

The majority of mandibular first molars have two roots, mesial and distal with two mesial and one distal canal(2) The number of roots in permanent mandibular first molar may also vary. A major variant is the presence of three roots in mandibular first molar, first mentioned in the literature by Carabelli known as radix entomolaris located in distolingual position(3) When located on mesiobuccal surface, the anomaly is known as radix paramolaris(4)

A RE can be found in European populations, mainly on the first and less frequently on the second and third mandibular molar, with a frequency varying from 0.7% to

4.2% .(4) Prevalence of Radix endomolaris in Indian population is 0.2%(5)

The purpose of this article is to present cases on clinical approach for identification, detection, and endodontic management of three RE

Case Presentation

CASE 1: A 19 years old female patient reported with a chief complaint of pain in the lower left back tooth region since 15 days. On clinical examination, there was a deep Class II mesio occlusal caries in relation to #36 which was tender on percussion. Thermal and electric pulp test elicited a negative response. Intraoral periapical radiograph (IOPAR) showed mesiocoronal radiolucency approximating pulp space with periapical radiolucency irt 36 (Fig 1a). Diagnosis of symptomatic apical periodontitis was made, and RCT was recommended.

At the initial appointment Inferior Alveolar Nerve Block was given using 1.8 mL 2% of lignocaine in 1:100000 of adrenaline (Hindustan medicines P LTD, INDIA) and rubber dam isolation was done and access opened. After refining the access cavity, 4 canal orifices were detected: mesiobuccal (MB),mesiolingual(ML), distobuccal(DB) and distolingual(DL). The working length of all canals were determined initially using apex locator (Root ZX; Morita, Tokyo, Japan) and confirmed radiographically thereafter (Fig1b). The canals were initially instrumented with #15 stainless steel *k* files (Mani Inc , ochigi , Japan) under irrigation with 5% sodium hypochlorite (Prime Dental Products, Thane). All the canals were prepared upto F2 ProTaper Gold Universal files (Dentsply Maillefer, Ballaigues, Switzerland).

At the second visit, the canals were irrigated copiously with 5% sodium hypochlorite followed by a final rinse of 17% EDTA. Mastercone radiograph was taken.(Fig1c) Then, the canals were dried and filled with gutta-percha and AH Plus sealer (Dentsply Maillefer) using the lateral compaction technique. Finally, the access opening was restored with resin modified glass ionomer cement and composite restoration.

Figure 1:a - Preoperative radiograph; b - Working length determination; c- Master cone radiograph; d - Postobturation radiograph

Case 2: A 17 year old male patient reported with a chief complaint of pain in the lower right back tooth region since 2 weeks. On clinical examination, there was a temporary filling in relation to #46.Tooth was tender on percussion. Thermal and electric pulp test elicited an exagerrated response. Intraoral periapical radiograph (IOPAR) showed coronal radiopacity indicating the temporary restoration upto the pulpal space with periapical radiolucency irt #46 (Fig 1a).

At the initial visit Inferior Alveolar Nerve Block was given using 1.8 mL 2% of lignocaine in 1:100000 of adrenaline (Hindustan medicines P LTD, INDIA) and rubber dam isolation was done. Temporary restoration was then removed and access opened. After refining the access cavity, 4 canal orifices were detected: mesiobuccal (MB),mesiolingual(ML), distobuccal(DB) and distolingual(DL). The working length of all canals were determined using apex locator (Root ZX; Morita, Tokyo, Japan). All the canals were prepared upto 4% 25 with HyFlex NiTi rotary file (COLTENE).

At the second visit, the canals were irrigated copiously with 5% sodium hypochlorite followed by a final rinse of 17% EDTA. Mastercone radiograph was taken.(Fig1b) Then, the canals were dried and filled with gutta-percha and AH Plus sealer (Dentsply Maillefer) using the lateral compaction technique. Finally, the access opening was restored with composite restoration.(Fig1 c)

Figure 2 :a-Preoperative radiograph; b-Mastercone radiograph; c-Postobturation radiograph

Discussion

The RE is considered as a normal racial and morphological variation rather than an abnormality in certain populations due to its high frequency(6) The exact cause of radix entomolaris is still not known. Some authors say that it may be due to disturbance during odontogenesis or may be due to an atavistic gene.(7) According to Calberson et al. (2007) the etiology behind the formation is still unclear but it could be related to external factors during odontogenesis.Racial genetic factors can also influence profound expression of a particular gene that can result in the more pronounced phenotypic manifestation(8)

RE is most commonly situated in the same plane and is overlapped by the distobuccal root in the buccolingual plane which gives superimposition of both the roots, thus tending to give inaccurate diagnosis. A thorough radiographic interpretation is necessary to identify the RE to rule out the outline of the distobuccal root.(9) To reveal the RE, a second radiograph should be taken from a more mesial or distal angle (30°).(10)

Classification: Carlsen & Alexandersen (1990) classified radix entomolaris (RE) into four different types based on the location of its cervical part:

Type A: the RE is located lingually to the distal root complex which has two cone-shaped macrostructures.

Type B: the RE is located lingually to the distal root complex which has one cone-shaped macrostructures.

Type C: the RE is located lingually to the mesial root complex.

Type AC: the RE is located lingually between the mesial and distal root complexes(3)

De Moor et al. (2004) classified RE based on the curvature of the root or root canal:

Type 1: A straight root or root canal

Type 2: A curved coronal third which becomes straighter in the middle and apical third

Type 3: An initial curve in the coronal third with a second buccally oriented curve which begins in the middle or apical third(9)

Song et al. (2010) further added two more newly defined variants of RE:

Small type: Length shorter than half of the length of the distobuccal root

Conical type: Smaller than the small type and having no root canal within it(9)

Conclusion

Initial diagnosis and implementing the treatment plan with appropriate techniques and instruments facilitates the endodontic outcome and avoids possible errors**.** Failure to identify the Radix Entomolaris can affect the prognosis of endodontic treatment. Thorough knowledge and careful examination of the floor of the pulp chamber are essential

part in clinical practice for the successful management of anatomical variations in endodontic treatment.

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