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RESEARCH ARTICLE

ENDODONTIC MANAGEMENT AND CLINICAL CONSIDERATION OF RADIX ENTOMOLARIS: CASE SERIES

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ABSTRACT

Root canal anatomy is highly complex and unpredictable. An awareness and thorough knowledge of internal and external root canal morphology contribute to the successful root canal treatment. Usually mandibular molars have two roots with three canals (Mesiobuccal, Mesiolingual & Distal). But in few teeth, the number of roots and canals vary. Mandibular molars can have an additional root located lingually (Radix Entomolaris) Or buccally (Radix Paramolaris). Clinicians should be aware of these unusual root morphologies in the mandibular first molar which needs strategic treatment as unfilled canals remain a nidus for infection and can compromise treatment outcome. This case series discusses endodontic treatment of Mandibular First Molar with Radix Entomolaris, which is a rare entity and poses as an endodontic dilemma for the clinician with respect to diagnosis and subsequent treatment.

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INTRODUCTION

The main objective of root canal treatment is thorough mechanical and chemical cleaning of all the canals. Generally flare-ups occur due to improper cleaning and shaping of canals, lack of understanding of root canal morphology, failure of establishment of hermetic seal, under fillings, over fillings and also due to improper identification of canals.¹ An awareness and understanding of the presence of unusual root canal morphology can thus contribute to the successful outcome of root canal treatment. It is known that the mandibular first molar can display several anatomical variations. In most cases the mesial root has two root canals, ending in two distinct apical foramina. Or, sometimes these merge together at the root tip to end in one foramen. The distal root typically has one kidney-shaped root canal, although if the orifice is particularly narrow and round, a second distal canal may be present. A number of anatomical variations have been described in the mandibular first molar: Fabra-Campos and Bond reported the presence of three mesial canals and Stroner noted the presence of three distal canals. Like the number of root canals, the number of roots may also vary. An additional third root, first mentioned in the literature by Carabelli, is called the radix entomolaris (RE).

This supernumerary root is located distolingually in mandibular molars, mainly first molars. An additional root at the mesiobuccal side is called the radix paramolaris (RP)²

In this Case report morphological variations, clinical approach to diagnosis and endodontic treatment of radix Entomolaris (RE) are discussed.

CASE 1

A 23 years old female patient reported to Department of Conservative Dentistry and Endodontics, Yogita dental college and hospital, Khed with a chief complaint of severe pain in the right lower back tooth region since four days. Pain was of intermittent type, aggravated on taking cold foods and persists even after the removal of stimulus. A diagnostic radiograph was taken which showed deep proximal caries involving the pulp. On keen observation, there appeared to be an additional root. On radiographic examination periapical radiolucency was seen around the roots. Further, the presence of an additional distal root outline was noticed on the radiograph. Local anesthesia was administered and the tooth was isolated under rubber dam. Access opening was done with Endo access bur. Three canals were located but the dentinal map seems to be slightly extending in a distolingual direction.

Access preparation was modified in that direction with an extra shank round bur. The fourth canal was explored with DG 16 explorer. Canals were negotiated using #08 and #10 size K-file. The working length was determined electronically and confirmed radiographically. Canals were cleaned and shaped using rotary Ni-Ti files [ProTaper next ,Dentsply-Maillefer]

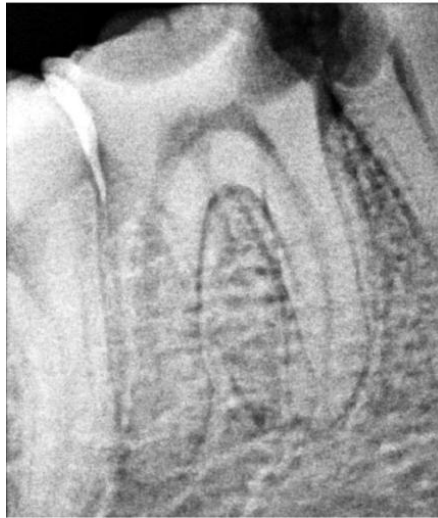


Fig 1.1. Pre-Operative

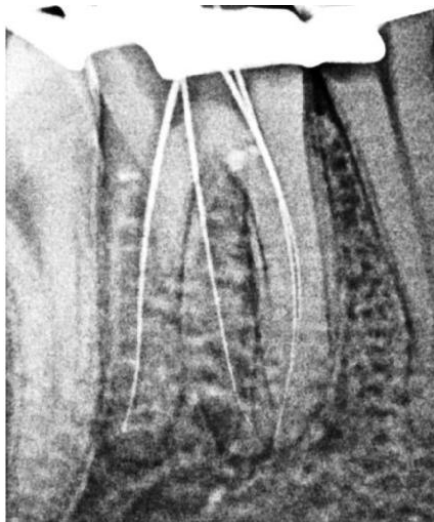


Fig 1.2. Working Length

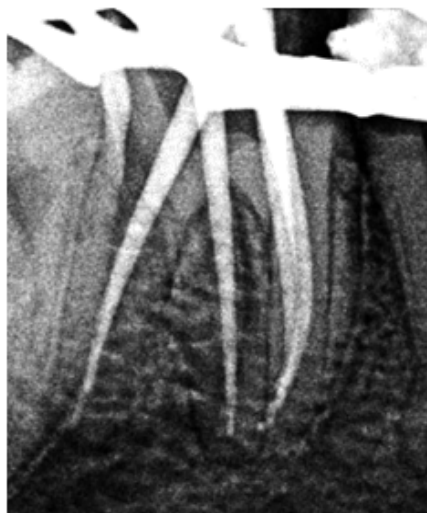


Fig 1.3. Master cone



Fig. 1.4. Obturation and Post Endodontic Restoration



Fig 2.1. Pre-Operative

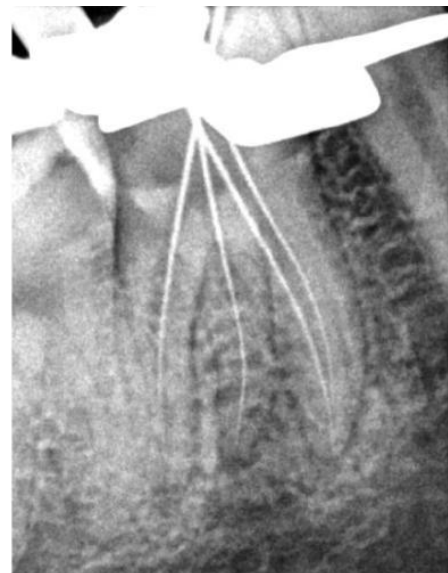


Fig. 2.2. Working Length



Fig. 2.3. Master Cone



Fig. 2.4. Obturation and Post Endodontic Restoration

and crown-down technique Fig 1.3. Canals were irrigated using 3 % sodium hypochlorite solution and flushed with 17% EDTA solution to remove smear layer. Canal was dried with paper point and Obturation was carried out with guttaercha and AH plus sealer [Dentsply,] The access opening was restored with composite restoration Fig 1.4.

CASE 2

18-year-old male patient reported to the Department of conservative Dentistry and Endodontics at Yogita Dental College with the chief complaint of pain in lower right back region of the mouth since 2-3 days. Clinical examination revealed unusual crown anatomy with and deep disto occlusal caries with 36. Intraoral periapical radiograph of 36 revealed deep proximal carious lesion approaching the pulp with thickened periodontal ligament space and presence of an extra root in 36 Fig 2.3. Based on clinical and radiographic examination, diagnosis of symptomatic irreversible pulpitis with apical periodontitis was established. After adequate anesthesia and isolation with rubber dam, access cavity was prepared.

Working length was determined using #15 k files followed by Cleaning and shaping till # 25/0.6 in all the canals (ProTaper gold, Dentsply-Maillefer) Fig 2.3. All the canals were irrigated with 2.5% sodium hypochlorite and 17% EDTA after use of each file. In the subsequent appointment canals were dried using paper points and obturation was done using gutta percha and AH plus sealer. Later, the access cavity was sealed with composite Fig 2.4.

DISCUSSION

The etiology behind the formation of the Radix is still unclear. In dysmorphic, supernumerary roots, its formation could be related to external factors during odontogenesis, or to penetrance of an atavistic gene or polygenetic system (atavism is the reappearance of a trait after several generations of absence). A classification by Carlsen and Alexandersen ^[8] describes four different types of radix entomolaris according to the location of the cervical part of the RE: types A, B, C and AC. Types A and B refer to a distally located cervical part of the RE with two normal and one normal distal root components, respectively. Type C refers to a mesially located cervical part, while type AC refers to a central location, between the distal and mesial root components. This classification allows for the identification of separate and non-separate RE. De Moor et al ⁴ classified RE based on the curvature in bucco-lingual orientation into three types. Type I refers to straight root or canal. Type II refers to an initially curved entrance which continues as a straight root/root canal. Type III refers to an initial curve in the coronal third of the root canal and a second curve beginning in the middle and continuing to the apical third.

Endodontic Management: A thorough inspection of the preoperative radiograph and interpretation of particular marks or characteristics, such as an unclear view or outline of the distal root contour or the root canal, can indicate the presence of a 'hidden' RE. To reveal the RE, a second radiograph should be taken from a more mesial or distal angle (20 degrees). This way an accurate diagnosis can be made in the majority of cases. A dark line on the pulp chamber floor can indicate the precise location of the RE canal orifice. Apart from a radiographic diagnosis, clinical inspection of the tooth crown and analysis of the cervical morphology of the roots by means of periodontal probing can facilitate identification of an additional root. The location of the orifice of the root canal of an RE has implications for the opening cavity. The orifice of the RE is located distal- to mesiolingually from the main canal or canals in the distal root. An extension of the triangular opening cavity to the distolingual side results in a more rectangular or trapezoidal outline form. Visual aids such as a loop, intra-oral camera or dental microscope can, in this respect, be useful.

Conclusion

Clinicians should be aware of these unusual root morphologies in the mandibular first molars. The initial diagnosis of a radix entomolaris before root canal treatment is important to facilitate the endodontic procedure, and to avoid 'missed' canals. Preoperative periapical radiographs exposed at two different horizontal angles are required to identify these additional roots. Knowledge of the location of the additional root and its root canal orifice will result in a modified opening cavity with extension to the distolingual.

The morphological variations of the RE in terms of root inclination and root canal curvature demand a careful and adapted clinical approach to avoid or overcome procedural errors during endodontic therapy.

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