Journal of Advanced Medical and Dental Sciences Research

@Society of Scientific Research and Studies ***NLM ID:*** *101716117*

Journal home page: www.jamdsr.com doi: 10.21276/jamdsr Indian Citation Index (ICI) Index Copernicus value = 91.86

(e) ISSN Online: 2321-9599; (p) ISSN Print: 2348-6805

Case Report

Endodontic Management of Mandibular First Molar with Radix Entomolaris: A Case Report

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ABSTRACT:
The clinician's knowledge and familiarity with root canal anatomy plays a crucial role in the identification of variations in the anatomy like extra canals and roots. Permanent mandibular first molar are known for their anatomical variations. The majority of mandibular first molars have two-roots with two mesial and one distal canal. An additional third root located distolingually in mandibular molars, mainly first molar is called ***Radix Entomolaris (RE).*** This case report presents endodontic management of a mandibular first molar with radix entomolaris in 12 year old boy.
Keywords: radix entomolaris, endodontic, root canal treatment

Received: 16 May, 2022 Accepted: 18 June, 2022

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This article may be cited as: Yaqoob A, Koul MV, Ansari F, Singh SS, Gupta P. Endodontic Management of Mandibular First Molar with Radix Entomolaris: A Case Report. J Adv Med Dent Scie Res 2022;10(7):55-58.

INTRODUCTION

The primary purpose of root canal treatment is eradication of the micro-organisms present in the root canal and restraining it from secondary infections. This could be achieved by proper cleaning, disinfecting and shaping of the root canals followed by obturation with a biocompatible material forming a hermetic seal. Therefore a clinician must be aware about the morphology of the root canals, as various aberrations have been seen in the canal system, which in turn may contribute to the root canal failure. *Hoen and Pink* found that the incidence of missed roots or canals in teeth that required re-treatment was 42%.[1]Permanent mandibular first molar are known for their anatomical variations. The majority of mandibular first molars have two-roots with two mesial and one distal canal. [2] In most cases the mesial root has two root canals, ending in two distinct apical foramina (59.5%). In 40.5%, 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[3]. In 1974, *Vertucci and William*[4], as well as, *Barker et al*[5]reported the cases showing presence of an independent middle mesial canal. Since then, there have been multiple case reports of aberrant canal morphology of the mandibular first molar in the mesial root. [5] Additionally, *Stroner et al*[6] and *Beatty and Interian*[7] have reported on more uncertain cases in which the distal root showed presence of third canal. *Martinez-Berna and Bandanelli* presented two cases of mandibular permanent first molars with six canals. Both teeth had three canals in the mesial and distal roots where both cases had independent orifices in the pulp chamber floor but joined immediately, forming two canals. However, the mesial canals maintain their independence throughout the root. 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 ***Radix Entomolaris (RE).***[1] This supernumerary root is located distolingually in mandibular molars, mainly first molar. An additional root at the mesiobuccal side is called the ***Radix Paramolaris (RP).***[1] According to the classification of *De Moor et al* based on the curvature of the separate RE variants in buccolingual orientation, three types can be identified. [9]

- Type I refers to a straight root/root 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.

The aim of this article is to describe a case of Radix Entomolaris and give a short insight of its etiology, significance and management.

CASE REPORT

A 12 year old boy reported to the Department of Paedodontics and Preventive Dentistry, Career Postgraduate Institute of Dental Sciences, Lucknow with a chief complaint of pain in his lower left back region of jaw since one week. The pain was non continuous in nature and aggravated on taking hot food. On clinical examination, deep carious lesion was present in mandibular left permanent first molar(36) , caries was present occlusally and lingually (class 1 cavity) (Figure 1). On apical percussion, tooth was tender. The pre-operative intra oral periapical radiograph showed radiolucency involving enamel dentin and pulp, widening of periodontal ligament with additional root present distolingually,i.e. Radix Entomolaris(Type I De Moore Classification). Also deep carious lesion was present in maxillary right permanent first molar, however, the tooth was asymptomatic. Diagnosis of chronic irreversible pulpitis was made in mandibular left permanent first molar(36). Root canal treatment was planned and patient's consent was taken. Local anesthesia was administered and access cavity preparation was done by endo access bur (Dentsply, Switzerland). The canal orifices (mesiobuccal, mesiolingual and distobuccal) were initially located and additional distolingual canal was located with DG-16 endodontic explorer. The working length was determined radiographically with #10 k-file (Figure 2). Biomechanical preparation was done with rotary ProTaper file system with apical preparation till F2(Figure 3). Irrigation of root canals was done with 2.5% sodium hypochlorite and final rinsing was done with normal saline. Triple antibiotic paste (ciprofloxacin, minocycline and metronidazole) was used as an intracanal medicament. In consequential visits, when the patient was asymptomatic obturation was done with the gutta percha cones and the access cavity was sealed with Miracle Mix (Silver Alloy admixed GIC) (Figure 4). This was followed by restoration with stainless steel crown.

Figure 1: Pre-operative radiograph

Figure 2: Radiograph showing working length

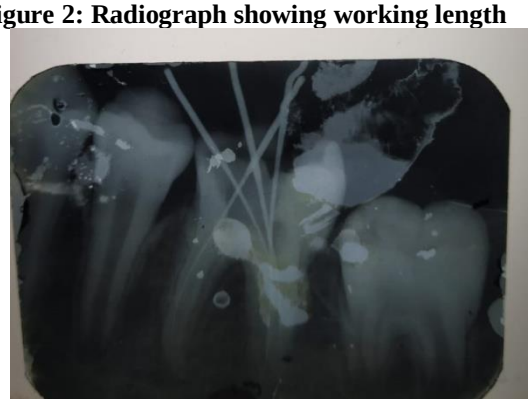

Figure 3: Master cone radiograph

Figure 4: Post-operative radiograph

DISCUSSION

The first mandibular molar shows presence of separate RE associated with certain ethnic groups. Maximum frequency of 3% is foundin African populations, [10] while in Eurasian and Indian populations the frequency is less than 5%.[11]*Curzon*[12]suggested that the 'three-rooted molar' trait has a high degree of genetic penetrance as its dominance was reflected in the fact that the prevalence of the trait was similar in both pure Eskimo and Eskimo/Caucasian mixes. Gender predilection of RE is still unclear. Few studies have reported more of male predilection while others reported insignificant difference between gender and RE. Although studies have reported RE to be more common on left side, however the difference is insignificant for side distribution as well. [14] Bilateral occurrence of the RE has also been reported from 37.14% to 67%.[13] The etiology behind the formation of the RE 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. In eumorphic roots, racial genetic factors influence the more profound expression of a particular gene that results in the more pronounced phenotypic manifestation. [12] A RE can be found on the first, second and third mandibular molar, occurring least frequently on the second molar. [12] The RE is located distolingually, with its coronal third completely or partially fixed to the distal root. The dimensions of the RE can vary from a short conical extension to a 'mature' root with normal length and root canal. In most cases the pulpal extension is radiographically visible. In general, the RE is smaller than the distobuccal and mesial roots and can be separate from, or partially fused with, the other roots. [12]Detection of RE can be based on clinical and radiographic examinations and literature reports that radiographically third root is seen in 90% of cases. Clinically presence of a more prominent disto-lingual lobe or an extra cusp in combination with a cervical prominence or convexity and a more bulbous crown outline may indicate the presence of an additional root. Radiographically the tooth with RE shows unclear outline of the distal root contour.[9]If RE is suspected then buccal object rule may be helpful to confirm the anatomic variation in most of the cases. Advanced imaging modalities like micro-computed tomography and spiral computed tomography have been also utilized for diagnosis of RE. Cone beam computed tomography (CBCT) also has become a promising tool to diagnose morphological variations of the tooth. Other accessories include, clues observed during access cavity preparation like a dark line on the pulp chamber floor which can indicate the precise location of the RE canal orifice, also if the orifice of distal root is narrow and round, RE can be suspected by a phenomena caused by remaining pulp tissue in extra root called as "champagne effect" due to bubbling when sodium hypochlorite is used.[9] In some cases staining the chamber floor with 1% methylene blue dye may be helpful. Diagnostic aids such as magnifying loupes, surgical microscope, endodontic explorer, path finder, DG 16 probe and micro-opener helps in better identification and visualization of all the canals. During biomechanical preparation severe root inclination or canal curvature, as in a type III RE can cause shaping aberrations like straightening of the root canal or ledge formation, resulting in root canal transportation and loss of working length. Flexible nickel-titanium rotary files allow a more centered preparation of shape in these cases. For obturation vertical compaction technique is recommended. Problems encountered during the treatment of radix entomolaris includes difficulty in diagnosis, radiographic interpretation, inability to locate the fourth canal, modification in access cavity preparation, confusion in working length determination and biomechanical preparation and obturation.[9]After RE is confirmed, an extension of the triangular opening cavity distolingually is recommended which results in a more rectangular or trapezoidal outline form and care must be taken to avoid excessive removal of dentin during access cavity preparation which might weaken the tooth.[9]Most of RE are small and curved and may pose difficulty in extractions and orthodontic tooth management as well. Presence of an additional third root in permanent mandibular molars may affect the prognosis of root canal therapy if it is misdiagnosed. Thus, an accurate diagnosis and thorough understanding of root canal morphology and its aberrations is essential for the success of the treatment.

REFERENCES

1. Mohammadi Z, Shalavi S, Jafarzadeh H. Extra roots and root canals in premolar and molar teeth: review of an endodontic challenge. J Contemp Dent Pract. 2013 Sep 1;14(5):980-6.
2. Vertucci FJ. Root canal anatomy of the human permanent teeth. Oral surgery, oral medicine, oral pathology. 1984 Nov 1;58(5):589-99.
3. Ingle JI, Himel VT. Hawrish et al. Endodontic cavity preparation. Endodontics, ed. 2002;5:405-570.
4. Vertucci FJ, Williams RG. Root canal anatomy of the mandibular first molar. Journal of the New Jersey Dental Association. 1974;45(3):27.
5. Barker BC, Parsons KC, Mills PR, Williams GL. Anatomy of root canals. III. Permanent mandibular molars. Australian dental journal. 1974 Dec;19(6):408-13.
6. Stroner WF, Remeikis NA, Carr GB. Mandibular first molar with three distal canals. Oral Surgery, Oral Medicine, Oral Pathology. 1984 May 1;57(5):554-7.
7. Beatty RG, Interian CM. A mandibular first molar with five canals: report of case. Journal of the American Dental Association (1939). 1985 Nov 1;111(5):769-71.

8. Martínez-Berná A, Badanelli P. Mandibular first molars with six root canals. Journal of endodontics. 1985 Aug 1;11(8):348-52.
9. Pandey R, Gupta R, Bhagat N, Khatri A. Endodontic Management of a Rare Anatomic variation Radix Entomolaris of Mandibular I Molar-Case Report. International Journal of Contemporary Medical Research. 2017 Jan;4(1):130-2.
10. Sperber GH, Moreau JL. Study of the number of roots and canals in Senegalese first permanent mandibular molars. International endodontic journal. 1998 Mar 1;31(2):117-22.
11. Calberson FL, De Moor RJ, Deroose CA. The radix entomolaris and paramolaris: clinical approach in endodontics. Journal of endodontics. 2007 Jan 1;33(1):58-63.
12. Corzon ME. Miscegenation and the prevalence of three-rooted mandibular first molars in the Baffin Eskimo. Community Dentistry and Oral Epidemiology. 1974 Jun;2(3):130-1.
13. Steelman R. Incidence of an accessory distal root on mandibular first permanent molars in Hispanic children. ASDC journal of dentistry for children. 1986 Mar 1;53(2):122-3.
14. Yew SC, Chan K. A retrospective study of endodontically treated mandibular first molars in a Chinese population. Journal of endodontics. 1993 Sep 1;19(9):471-3.