

Three-Rooted Mandibular First Molar: A Case Report

Rajendra Bharatiya^{1*} Urvasi Ujaria² Anjali Khotari³ Foram Patel⁴ Ravindra M Chavda⁵ Rujuta Varia⁶

¹Senior Lecturer, Department of Conservative Dentistry, AMC Dental College & Hospital, Ahmedabad, Gujarat, India.

²Reader, Department of Conservative Dentistry, AMC Dental College & Hospital, Ahmedabad, Gujarat, India.

³Professor and Head, Department of Conservative Dentistry, AMC Dental College & Hospital, Ahmedabad, Gujarat, India.

⁴PG Student, Department of Conservative Dentistry, AMC Dental College & Hospital, Ahmedabad, Gujarat, India.

⁵Senior Lecturer, Department of Prosthodontics, Crown & Bridge, AMC Dental College & Hospital, Ahmedabad, Gujarat, India.

⁶Intern, AMC Dental College & Hospital, Ahmedabad, Gujarat, India.

ABSTRACT

Background: An aberration in root canal systems of tooth is a commonly occurring phenomenon. So, meticulous knowledge about the variant root canal system is mandatory for successful endodontic. As like any other tooth, mandibular first molars are also prone for anatomic malformations. One such anatomic variation is the presence of extra root distolingually which is called radix entomolaris (RE). This root is usually curved and smaller, it may contribute to root canal treatment failure because of a “missed” canal or incomplete root canal preparation and obturation. Thus, a very accurate clinical and radiographic diagnostic procedures and meticulous canal preparation are necessary. In the following case two reports, the endodontic treatment of mandibular first molars with an RE and clinical guidelines for successful management are explained.

Keywords: Mandibular first molar, Radix entomolaris, Root canal anatomy.

INTRODUCTION

The prime objective of endodontic treatment is thorough cleaning and shaping of the root canal system followed by 3-dimensional obturation. One of the frequent causes of failure of nonsurgical endodontic treatment is the inability to identify and negotiate additional roots/canals. The mandibular first molar, as the earliest permanent posterior tooth to erupt, is considered to be the most frequently involved tooth in endodontic procedures. It displays considerable anatomic variation and abnormalities regarding the number of roots and root canals. [1]

Clinicians/endodontists should possess sound knowledge of aberrant morphology and must meticulously perform a preoperative radiographic examination before initiation of endodontic therapy.

Mandibular molars with an additional third root located distolingually were first reported in the literature by Carabelli in 1844 and was termed “radix entomolaris” (RE). [2] Rarely, a third root may be found on the mesiobuccal side and is called “radix paramolaris.” [3] RE can be found on the first, second, and third mandibular molar, occurring least frequently on the second molar. [4]

The RE is located distolingually, with its coronal third completely or partially fixed to the distal root. A classification by Carlsen and Alexandersen describes four different types of RE 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

Received: Sept. 3, 2019; Accepted: Oct. 27, 2019

*Correspondence Dr. Rajendra Bharatiya.

Department of Conservative Dentistry, AMC Dental College & Hospital, Ahmedabad, Gujarat, India.

Email: Not Disclosed

and mesial root components. This classification allows for the identification of separate and nonseparate RE. [5]

The presence of a separate RE in the first mandibular molar is associated with certain ethnic groups. In African populations a maximum frequency of 3% is found [6], while in Eurasian and Indian populations the frequency is less than 5% [7].

CASE REPORT

Case 1

A 19 year old male patient presented in dental OPD with a non-contributory medical history, a chief

Complaint of cavity in lower right back tooth & food lodgement since past few months. There was no complaint of pain, but on further questioning, he gave a history of moderate to severe pain about 6 months back which subsided after a course of antibiotics and analgesics. Clinical examination revealed carious mandibular right first molar which gave no response to electrical pulp test. Radiographic examination revealed radiolucency in the crown of mandibular right first molar approximating the pulp & periapical radiolucency in relation to the roots. It also revealed an additional root on the distal side. Based on the subjective and objective findings, a diagnosis of pulp necrosis with chronic apical periodontitis was made. After adequate isolation, access was gained to the pulp chamber. The coronal necrotic pulp tissue was removed and the chamber irrigated with 5.25 % sodium hypochlorite solution. On close inspection of the pulp chamber, four distinct canal orifices, two mesial & two distal, were found. Initial negotiation of the root canals was performed with an ISO 15 No. K-file. Although the coronal enlargement and relocation of the canal orifices allowed straight-line access in three canals, insertion of the file in the fourth, distolingual canal showed a more lingually oriented access inclination. This, together with the different access inclinations between the two distal canals, indicated the presence of two separate distal roots. Cleaning and shaping was completed and all the canals were obturated with gutta-percha and zinc-oxide eugenol based sealer. Finally, prosthesis was done.

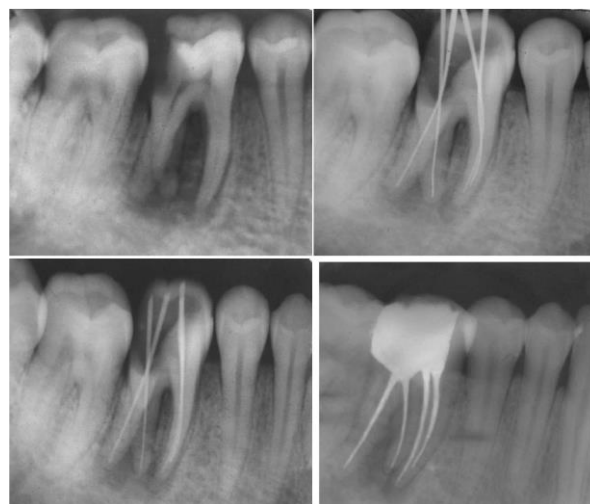


Fig 1:

Case 2

A 28 years old female came for endodontic treatment of mandibular right first molar. On clinical examination the tooth was deeply carious and was suffering from irreversible pulpitis. Radiographical examination showed two distal roots. Access cavity four distinct canal orifices were found. Initial negotiation of the root canals was performed with a K-file #10. The lengths of these canals were measured radiographically and verified using apex locator (Root ZX Triauto ZX). The canals were cleaned with 2.5 % sodium hypochlorite solution and Glyde (DENTSPLY Maillefer)), and shaped with ISO instruments with crown down technique. All canals were filled with gutta-percha and ZOE sealer. Prosthesis was done.

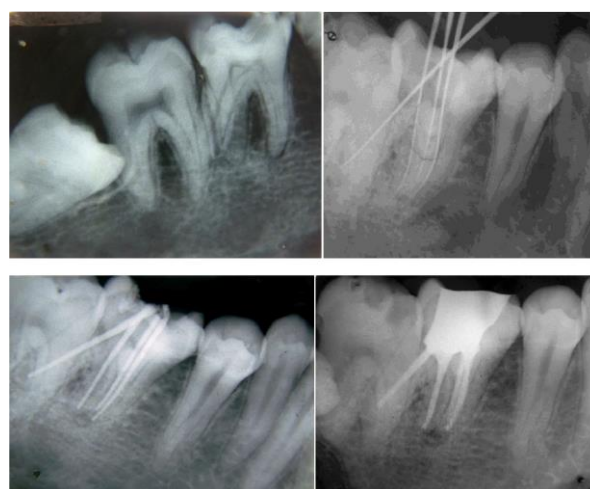


Fig 2:

DISCUSSION

Many dental clinicians have the perception that a given tooth will contain a predetermined number of roots and/or canals. Careful evaluation of research material has, however, shown that deviation from the norms in root canal morphology are not uncommon. Dental clinicians should keep this possibility in mind whenever they perform root canal treatment. The presence of 4 canals is frequent, but the presence of 2 distal roots is relatively uncommon in mandibular permanent first molars. The extra root is smaller than the distobuccal root and is usually curved. The number of roots in the mandibular first molar may be increased not only by the presence of a distolingual root, but also through bifurcation of the mesial root, a trait found in 0.5% of mandibular permanent first molars. These variations in root anatomy may be identified through careful reading of radiographs. Apart from conventional radiography, digital radiographic techniques are also useful in identifying such morphological variations. With the distolingually located orifice of the *radix entomolaris*, a modification of the classical triangular opening cavity to a trapezoidal form in order to better locate and access the root canal is essential; straight line access must be established. Radiographically, *radix entomolaris* is readily evident in about 90% of cases (Walker & Quackenbush 1985), but, occasionally may be difficult to visualize because of slender dimensions of distolingual root. Additionally, a file placed in such a root may give the artifactual appearance of a perforation. In such cases, vertically and horizontally angled views may be helpful.

SUMMARY & CONCLUSION

The high frequency of a fourth canals in mandibular first molars makes it essential to anticipate and find all canals during molar root canal treatment. The possibility of an extra root should also be considered and looked for carefully. Clinicians should be aware of these unusual root morphologies in the mandibular first molars. The

morphological variations of the "*radix entomolaris*" 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. Straight-line access, in this respect, has to be emphasized as the majority of the "*radices entomolaris*" are curved [Ribeiro & Consolaro (1997)].

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

REFERENCES

1. Vertucci JF, Haddix EJ, Britto RL. Tooth morphology and access cavity preparation. In: Cohen S, Hargreaves MK, editors. Pathways of the pulp. 9th ed. St. Louis (MO): Mosby; 2006. P.149-232.
2. Carabelli G. Systematisches Handbueh der Zahnkeilkunde. 2nd ed. Vienna: BraumuUer und Seidel, 1844. p. 114.
3. Calberson FL, De Moor RJ, Deroose CA. The *radix entomolaris* and *paramolaris*: clinical approach in endodontics. J Endod 2007;33:58-63.
4. Visser JB. Beitrag zur Kenntnis der menschlichen Zahnwurzelformen. Hilversum: Rotting; 1948. p. 49-72.
5. Carlsen O, Alexandersen V. *Radix entomolaris*: identification and morphology. Scan J Dent Res 1990; 98:363-73.
6. Sperber GH, Moreau JL. Study of the number of roots and canals in Senegalese first permanent mandibular molars. Int Endod J 1998; 31:112- 6.
7. Tratman EK. Three-rooted lower molars in man and their racial distribution. Br Dent J 1938; 64:264-74.