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Management of Radix Entomolaris: A Case Series

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Abstract

A clinician must have thorough knowledge of internal and external root canal morphology which contributes to the successful root canal treatment. A mandibular first molar having additional lingual root - Radix Entomolaris or having additional buccal root - Radix Paramolaris with two distal roots is an interesting example of anatomic variation. The aim of this paper is to present case of mandibular first molars with an additional distolingual root (Radix Entomolaris) which comprises of three roots (one mesial and two distal) and four canals (two in mesial and one in each distobuccal and distolingual root) and their management using appropriate instruments and techniques. **Keywords:** Anatomical variations, Endodontic treatment, Radix entomolaris and Paramolaris

Introduction

For the success of endodontic therapy, the knowledge of the pulp and root canal anatomy and its anatomic diversities such as extra roots, extra canals, webs, fins, and isthmuses cannot be ruled out. It is essential to have knowledge of normal and usual configuration of the root canal & its variations from the normal. Many authors have reported about the morphology of the mandibular first molars.¹⁻⁴

The elimination of bacteria from the infected root canal is the main aim of endodontic treatment. The process of cleaning & shaping determines both the degree of

disinfection and the ability to obturate the radicular space and provide fluid tight seal. The complexity of the root canal is the major cause of failure of root canal treatment. Mandibular molars can manifest with several anatomical variations, based on the internal and external morphology of the tooth. Anatomical variations have been described in the mandibular first molar like the number of root canals, the number of roots may also vary. The presence of two distal roots is rare but does occur. This additional root that can usually be found distolingually was first mentioned in literature by De Moore et al was called "radix entomolaris" (RE).⁵ An RE was found on the first, second and third mandibular molars, occurring least frequently on

the second molar.⁶ The RE mostly have Vertucci type I canal configuration. Some studies reported a bilateral occurrence of the RE from 50% to 67%.^{7, 8} The presence of three rooted mandibular first molar appears to be less than 3 % in blacks⁹, about 3 % to 4.2% in whites¹⁰, less than 5 % in Eurasians and Asians populations, and approximately 5 % to more than 30 % in mongoloid traits ^{7, 11, 12} (Table 1).

The present case report describes a rare case which have undergone root canal treatment in mandibular first molar with three roots (one mesial, two distal that is an additional distolingual (radix entomolaris) and four canals (two mesial and two distal).

Author/year	Prevalence (%)	Population group
Taylor (1899)	3.4	United Kingdom
Tratman (1938)	5.8	Chinese
Tratman (1938)	0.2	Indians
Skidmore and Bjorndal (1972)	2.2	Caucasians
Yones et al (1990)	2.92	Saudi
Loh (1990)	7.9	Chinese (Singapore)
Yew and Chan (1993)	21.5	Chinese
Sperber and Moreau (1998)	3.0	Senegalese
Gulabivala et al (2001)	10.1	Burmese

Table 1: Prevalence of three rooted mandibular first molars- survey of available studies



Fig 1: Clinical images of extracted mandibular molars with a radix entomolaris or paramolaris. (*A*) first molar

with a radix entomolaris [distolingual view (left), lingual view (right)].

Case 1: A 26-year-old female patient reported to the private dental clinic with a chief complaint of pain in lower-left back tooth region since 15days. The patient revealed a history of mild intermittent pain for the past 1 month, which had increased in intensity during the past 1 week. The patient reported prolonged sensitivity to hot and cold substances. The pain was spontaneous and aggravated particularly at night. Clinical examination revealed deep occlusal carious lesions on mandibular first molar. Radiograph of mandibular left first molar was taken. It showed radiolucency involving enamel, dentin and approaching the pulp with respect to 36 without any periapical changes (**Fig 2a**).

Based on the clinical and radiographic findings, a diagnosis of symptomatic irreversible pulpitis with respect to 36 was made, informed consent was obtained, and endodontic treatment was initiated.

The tooth was anesthetized. Following the initiation of root canal treatment under rubber dam isolation, access preparation was done with endo-access bur (Fig 2b). The canal orifices were located with DG 16 endodontic explorer (Hu-Friedy, Chicago). The fourth disto-lingual canal orifice was present far from distal root canal orifices. Initial negotiation of the root canals was conformed with # 10 K-file (Mani, Japan). The working length of the canals was determined electronically using an apex locator (i-Root, S-denti, South Korea) and confirmed radiographically (Fig 2c). Canals were cleaned and shaped till #30 4% size using Hero shaper rotary Ni-Ti files (Micro Mega, Besancon Cedex, France) using crown-down technique. Canals were irrigated with 5.25% sodium hypochlorite (NaOCl) (Prime dental products, Thane India) solution after each filling. Cavity was restored with Cavit G (3M Center, St. Paul, MN, USA). Analgesics were prescribed and The patient was recalled after 5days.

At next appointment tooth was asymptomatic. The tooth was again isolated under rubberdam and temporary restorative material was removed. Master cone radiograph revealed proper fitting of cones (**Fig 2d**). Final irrigation were carried out by 5ml of 5.25% NaOCl (Prime dental products, Thane, India) per canal followed by 5ml of 17% Ethylene diamine tetra acetic acid (EDTA) solution (Dent Wash, Prime dental products, Thane, India). Canals were dried with paper points and obturated with gutta-percha and Epoxy resin based sealer (AH plus Sealer- Dentsply, DeTrey, Konstanz, Germany) (Fig 2e). Post endodontic restoration was placed and patient was recalled for follow up and full coverage crown.



Fig 2a: Diagnostic radiograph



Fig 2b: Access opening of 36



Fig 2c: Working length radiograph



Fig 2d: Master cone radiograph



Fig 2e: Post obturation radiograph

mandibular right first molar (tooth 46). The tooth was very sensitive to percussion and apical palpation. On radiographic examination of tooth 46, apart from deep mesio-occlusal caries, the presence of an additional distolingual root outline was noticed. An indistinct periapical radiolucency was seen around the disto-lingual root. (Fig 3a). Following pulp testing, a diagnosis of pulp necrosis and acute alveolar abscess was made. The patient was suggested to undergo root canal treatment and an emergency access opening was made to allow drainage. Following the initiation of root canal treatment under rubber dam isolation, the close inspection of the pulp chamber revealed the presence of two mesial and two distal canal orifices. The presence of all the orifices were confirmed using an endodontic explorer (DG16, Hu-Friedy, Chicago). The canals were explored and negotiated using #10 size K-files (Mani, Japan). The working length of the canals was determined electronically using an apex locator (i-Root, S-denti, South Korea) and confirmed radiographically (Fig 3b). All the canals were cleaned and shaped till #30 4% using rotary Ni-Ti files (Hero Shaper, MicroMega France) using crown-down technique. The canals were irrigated using 5.25% NaOCl solution (Prime dental products, Thane, India) after each filing. Pulp chamber was closed using Cavit G (3M Center, St. Paul, MN, USA). Patient was prescribed with medication and recalled after a week. During second visit, tooth was observed non-tender. After rubber dam isolation, temporary restoration was removed. The pulp chamber and canals were found dry without any abscess drainage. #30 4% gutta-percha master cones were selected (Fig 3c). All canals were irrigated using 5ml of 5.25% NaOCl solution and 5 ml of 17% EDTA solution

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Case 2: A 33-year-old female was presented with pain and swelling on right mandibular side of the face. Clinical examination revealed deep mesio-occlusal caries in

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to remove smear layer. Obturation was carried out with master cones and AH plus sealer (Dentsply, DeTrey, Konstanz, Germany) using continuous wave obturation technique (Fig 3d). The access opening was restored with temporary restoration and patient was recalled for further restorative procedure and full coverage crown.



Fig 3a: Diagnostic radiograph



Fig 3b: Working length radiograph



Fig 3c: Master cone radiograph



Fig 3d: Post obturation radiograph **Discussion**

A thorough knowledge of both normal and abnormal anatomy of teeth is essential for the success of the root canal therapy.¹³ Mandibular first molars seem to be the most frequent teeth which undergo root canal treatment as they are the first permanent molar to erupt.¹⁴

The internal anatomy of tooth is not always similar. Mandibular first molars usually have two roots, one mesial and one distal. Sometimes, extra distolingual or distobuccal root may be encountered. There are a number of possible variations occur in number of roots and their shape. However it must be considered that abnormalities are rare, but it is possible that a patient may have one of these rare anatomic variations. According to Vertucci study of internal & external anatomy of teeth, it has been shown that anatomical variations can occur within each group of teeth, within each person and within each racial group.¹⁵

This case report have described mandibular first permanent molar with one mesial root and two distal roots (distobuccal and distolingual). The mesial root had two canals (mesiobuccal and mesiolingual) and two distal roots with one canal each. One of the variations that can occur in mandibular first molars is radix entomolaris.

In the present study in both the cases, a 3-rooted mandibular first molar reported with 1 mesial root with 2 canals and 2 distal roots with a single canal each. The presence of 4 canals is relatively frequent, but the presence of 2 distal roots is uncommon. 16

The etiology behind the formation of RE is still unclear. In supernumerary roots, its formation could be due to external factors during odontogenesis or presence of an atavistic gene or polygenetic system.¹⁷ According to Quackenbush, the extra root occurred unilaterally in approximately 40% of all cases and predominantly on the right side. But in this case report, we also found it on the left side.¹⁸ A meticulous inspection of the preoperative radiograph and interpretation of particular marks or Characteristics such as outline of the distal root contour, can indicate the presence of a "hidden" RE. To locate the RE, a second radiograph should be taken from a more mesial or distal angle (30°). By this manner a correct diagnosis can be made in the majority of cases.¹⁹

Classification

Carlsen and Alexandersen (1990)²⁰ classified RE into four different types based on the location of its cervical part:

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

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

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

4. Type AC: The RE is located lingually between the mesial and distal root complexes.

De Moor et al. (2004) ⁵ classified RE based on the curvature of the root or root canal:

1. Type 1: A straight root or root canal

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

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

Song et al (2010)²¹ further added two more newly defined variants of RE:

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

2. Conical type: Smaller than the small type and having no root canal within it.

In the present case report, the identification and location of the canal orifices were done by using DG-16 endodontic explorer along with that of the conventional periapical radiographs to determine the canal configuration. The RE in the given cases were found to be with straight root and root canal which is classified to be De Moors Classification Type I which were managed successfully.

Conclusion

It is very important to diagnose radix entomolaris or paramolaris (supernumerary root) before initiation of the root canal treatment which facilitate successful endodontic procedure and also it avoid possible endodontic failure. Careful interpretation of the radiograph, using different angulations and advanced tools such as CBCT, may provide their identification. Once diagnosed, management of the extra canal and root can be done easily.

References

- E. Skidmore and A. M. Bjorndal, "Root canal morphology of the human mandibular first molar," Oral Surg Oral Med Oral Pathol 1971;32:778–784.
- F. Pineda and Y. Kuttler. Mesiodistal and buccolingual roentgenographic investigation of 7,275 root canals. Oral Surg Oral Med Oral Pathol 1972;33:101–110.

- F. J. Vertucci. Root canal anatomy of the human permanent teeth. Oral Surg Oral Med Oral Pathol 1984;58:589–599
- Calberson FL, De Moore RJ, Deroose CA. The radix endomolaris and paramolaris: clinical approach in endodontics. J Endod 2007; 33:58-63.
- De Moore RJ, Deroose CA, Calberson FL. The radix entomolaris in mandibular first molar: an endodontiic challenge. Int Endod J 2004; 37:789-99
- Calberson FL, De Moore RJ, Deroose CA. The radix endomolaris and paramolaris: clinical approach in endodontics. J Endod 2007; 33:58-63.
- Yew SC, Chan K. A retrospective study of endodontically treated mandibular fi rst molars in Chinese population. J Endod 1993; 19:471-3.
- Steelman R. Incedence of an accessory distal root on mandibular fi rst permanent molars in Hispanic children. ASDC J Dent Child. 1986; 53:122-3.
- Sperber GH, Moreau JL. Study of the number of roots and canals in Senegalese first permanent mandibular molars. Int Endod J 1998; 31:117-22.
- 10. Curzon ME. Three rooted lower molars in man and their racial distribution. Br. Dent J. 1973; 52:181-3.
- Walker RT, Quackenbush LE. Three rooted lower first permanent molars in Hong Kong Chinase. Br Dent J 1985; 159:298-9.
- Attam K, Nawal RR, Utneja S, Talwar S. Radix entomolaris in mandibular first molars in Indian population: A review and case reports. Case Rep Dent. 2012;2012:595494.
- J. J. Segura-Egea, A. Jimenez-Pinzon, and J. V. Rios-Santos, "Endodontic therapy in a 3-rooted mandibular first molar: importance of a thorough radiographic examination," J Can Dent Assoc 2002;68:541-544.
- G. M. G. Hommez, M. Braem, and R. J. G. de Moor, "Root canal treatment performed by Flemish dentists."

Part 1. Cleaning and shaping," Int Endod J 2003;36:166-173,

- Hasjem AA, Ahmed HM. Endodontic management of a mandibular first molar with unusual canal morphology. Eur Endod J 2017;2:5.
- Parashar A, Gupta S, Zingade A, Parashar S. The radix entomolaris and paramolaris: A review and case reports with clinical implications. J Interdiscip Med Dent Sci 2015;3:1-5.
- Parolia A, Kundabala M, Thomas MS, Mohan M, Joshi N. Three rooted, four canalled mandibular first molar (Radix Entomolaris). Kathmandu University Medical Journal 2009;7: 289-292.
- Quackenbush LE. Mandibular molar with three distal root canals. Dent traumatol. 1986; 2: 48–9.
- Ratnakar P, Saraf PA, Patil TN, Karan S. Endodontic management of radix entomolaris: Two case reports. Endod 2018;30:163-5.
- Carlsen O, Alexandersen V. Radix entomolaris: identification and morphology. Eur J Oral Sci 1990;98:363–373.
- Song JS., et al. "The prevalence and morphologic classification of distolingual roots in the mandibular molars in a Korean population". J Endod 2010;36: 653-657.