

Root Canal Treatment of Mandibular Molar With Accessory Root Canal: A Case Report

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ABSTRACT

Root canal treatment comprises of cleaning and shaping, disinfecting, and root canal obturation. The success of treatment depends on the knowledge of the operator regarding root canal morphology. The mandibular first molars usually have two roots with three canals: distal, mesio-buccal and mesio-lingual. There is a possibility of an additional distolingual root namely radix entomolaris. A 21-year-old male patient was referred to Universitas Gadjah Mada Dental Hospital for root canal treatment. After subjective and objective examination, diagnosis of tooth 36 was pulp necrosis. Dental history of patient revealed caries occurred in left mandibular molar along with spontaneous pain that lasted for hours. The referring dentist had done pulp devitalization and prescribed oral analgesics. Shaping and cleaning were performed on mesio-buccal, mesio-lingual and distal root canal followed by intracanal dressing on first visit. Three days later the patient came with complaint of spontaneous pain. After careful observation, a distolingual root was found, which previously had not been prepared. Root canal preparation was carried out on the distolingual root followed by intracanal dressing. On third visit, the tooth was asymptomatic and root canals were obturated. On fourth visit, the tooth was prepared for onlay restoration and impression was taken. Composite onlay was cemented on the fifth visit. A week later the patient came for recall and no complaints were noted. Conclusion: root canal treatment on mandibular first molars must consider the anatomic variations, such as radix entomolaris. Using proper diagnostic aids and instruments would help identify accessory root canal. A thorough root canal preparation influence the success of root canal treatment.

Keywords: *mandibular molar, radix entomolaris, root canal treatment, anatomic variation.*

1. INTRODUCTION

Root canal treatment comprises of cleaning and shaping, disinfecting, and root canal obturation. The failure of root canal treatment is generally attributed to either residual or resistant microorganisms surviving the chemomechanical cleaning procedures or new microorganisms invading the canals [1]. The treatment of entire root canal system is essential to maximize the success in root canal treatment. It is necessary for the clinician to have a thorough knowledge of the dental anatomy as well as of its variations [2].

The majority of mandibular first molars consist of two roots, mesial root with two canals and distal root with one canal. The major variation in this tooth is the presence of an additional third root found lingually (distolingual root) namely Radix entomolaris (RE). First described in literature by Carabelli back in 1844, Radix entomolaris (RE) refers to mandibular molars having an additional root located lingually [3]. Mandibular first molar which has three roots is less than 5% in white Caucasian, African, Eurasian and Indian populations. While in Mongoloid populations, the frequency is in the range of 5 to 30% [4].

An awareness and understanding of the presence of unusual root canal morphology can contribute to the successful outcome of root canal treatment [5]. This case report highlighted the root canal treatment of a mandibular first molar with radix entomolaris (RE).

2. CASE REPORT

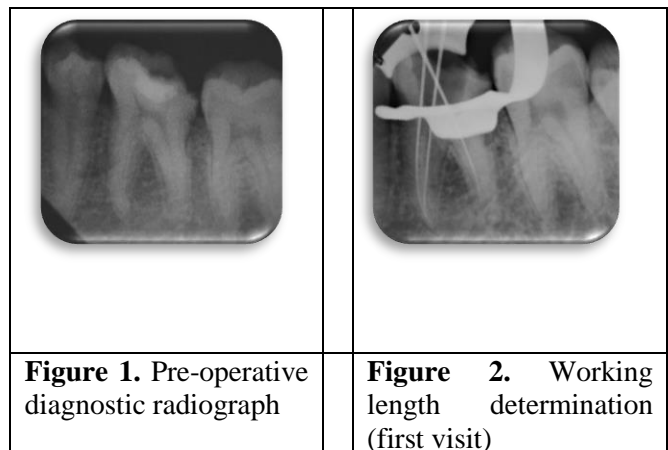
A 21-year-old male patient was referred to Universitas Gadjah Mada Dental Hospital for root canal treatment. Dental history of patient revealed caries occurred in left mandibular molar along with spontaneous pain that lasted for hours. The referring dentist had carried out pulp devitalization and prescribed oral analgesics one week before. The medical history was non-contributory. Clinical examination revealed tooth 36 with temporary filling was still intact, vitality test showed negative result with no tenderness on percussion. Preoperative periapical radiograph showed no apical radiolucency either on mesial nor distal root (**Figure 1**). After subjective and objective examination, tooth 36 was diagnosed pulp necrosis.





Tooth 36 was isolated with rubber dam and access cavity preparation was made using Endoaccess bur and Diamendo (Dentsply Maillefer, Switzerland). Three canal orifices were visually located followed by root canals negotiation using K-File ISO 10 (K-Files, Sybron Endo, USA). The working length was determined by electronic apex locator (Propex Pixi, Dentsply Maillefer, Switzerland) and confirmed by periapical radiograph (**Figure 2**). Crown down root canal preparation was performed as followed: initiated with coronal flaring (One Flare, MicroMega, France), then creating the glide path (One G, Micro Mega,

France) and finished with single file system (One Curve, Micro Mega, France). Root canals were irrigated using 3% Sodium Hypochlorite, 17% EDTA, saline respectively and final irrigation with 2% Chlorhexidine. After drying the canals with paper points, calcium hydroxide was applied as intracanal dressing and the cavity was sealed with temporary restoration. First visit was completed and the patient was scheduled for second visit on the next week.

Three days later the patient came with complaint of spontaneous pain. After administration of local anesthesia using 2% lidocaine with 1:80,000 epinephrine (Lidocaine Compositum, Lucas Djaja, Indonesia), temporary filling and intracanal dressing material were removed, and a careful visual observation was made. In order to improve visibility and detect any accessory root canal, an endodontic hand instrument (Micro-Opener, Dentsply Maillefer, Switzerland) was used to explore pulp floor. An orifice of distolingual root canal was found which previously had not been prepared. The distolingual root canal was negotiated and the working length was measured (**Figure 3**). Root canal preparation was carried out in a crown down manner followed by intracanal dressing and temporary filling.

On third visit, the tooth was asymptomatic. After drying the canals with sterile paper points, Master Apical Cone (MAC) of gutta-percha (One Shape GP Points, Micro Mega, France) was inserted up to working length and confirmed radiographically (**Figure 4**). Root canals were obturated using single-cone technique with epoxy resin sealer (AH Plus, Dentsply De Trey, Germany) and post-operative radiograph was taken (**Figure 5**). On fourth visit, the tooth was prepared for onlay restoration and impression was taken. Composite onlay was cemented on the fifth visit. A week later the patient came for recall and no complaints were noted. Patient was scheduled for second recall after 2 months, the tooth was completely asymptomatic and periapical radiograph showed good adaptation of the restoration and no sign of apical lesion (**Figure 6**).



	
<p>Figure 3. Working length determination (second visit)</p>	<p>Figure 4. Master Apical Cone of gutta-percha</p>
	
<p>Figure 5. Periapical radiograph of root canal obturation</p>	<p>Figure 6. Periapical radiograph 2 months recall</p>

3. DISCUSSION

The success of root canal treatment depends on the knowledge of the operator regarding root canal morphology. A thorough chemo-mechanical preparation of root canals ensures the complete eradication of microorganism and pulp remnants as potential irritants. Failure to recognize the presence of an additional canal may result in unsuccessful treatment and may be the origin of acute flare ups during and after treatment [1]. An endodontic flare-up is a complication of endodontic treatment, which is defined as an acute exacerbation of asymptomatic pulpal or periapical pathosis after the initiation or continuation of root canal treatment. Flare-ups can be caused by inadequate debridement and disinfection of the root canals and also microbial persistence after instrumentation. A study was conducted on teeth with flare-ups and found that part of the root canal space was left untouched during chemo-mechanical debridement [6]. Endodontic flare up in this case was caused by distolingual root (radix entomolaris) that had not been prepared.

Radix entomolaris (RE) can be found on the first, second and third mandibular molar, occurring least frequently on the second molar. Radix entomolaris 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 [5]. The orifice of this root is often covered with overlying dentine or pulp roof remnants and must be removed before it is possible to locate the entrance of the canal. Extension of the access cavity to the disto-lingual side also ensures easy location [7].

Carlson and Alexandersen [8] made a classification of RE based on the location of the cervical part:

- a. Type A: the RE is located lingually to the distal root complex which has two cone-shaped macrostructures.
- b. Type B: the RE is located lingually to the distal root complex which has one cone-shaped macrostructures.
- c. Type C: the RE is located lingually to the mesial root complex.
- d. Type AC: the RE is
- e. located lingually between the mesial and distal root complexes

Another classification was made by De Moor et al [9] based on the curvature RE variants in the buccolingual direction:

- a. Type 1: a straight root or root canal
- b. Type 2: a curved coronal third which becomes straighter in the middle and apical third.
- c. Type 3: An initial curve in the coronal third of the root canal and a second buccally oriented curve beginning in the middle and continuing to the apical third.

The knowledge regarding morphological variations of the RE in terms of inclination and curvature is beneficial. An operator could apply a careful and adapted clinical approach to avoid or overcome procedural errors during root canal treatment [10].

Radix entomolaris as an anatomic variation could be a challenge if the operator do not have proper diagnostic aids and lack in proper knowledge of root canal anatomy [11]. There are some clinical considerations of root canal treatment in teeth with RE in order to achieve successful outcome. Access cavity preparation of tooth should be modified as a trapezoidal shape. It is advisable to use diagnostic aids such as magnifying loupes or surgical microscope to achieve better in identifying and visualize the canals. Various instruments could also be used such as endodontic explorer, path finder file, DG

16 probe and micro-opener. Periapical radiographs could be taken in different angulation, in addition the employment of digital radiography and Cone Beam CT would be very useful. Operator could also use Methylene Blue dye and “champagne effect” of sodium hypochlorite to help the identification of additional orifice(s) [1, 2].

4. CONCLUSION

Root canal treatment on mandibular first molars must consider the anatomic variations, such as radix entomolaris. Using proper diagnostic aids and instruments would help identify accessory root canal. A thorough root canal preparation influences the success of root canal treatment.

REFERENCES

- [1] Sharma A, Hussain S, Vyas T, Shetty PP, 2017, Management of Bilateral Radix Entomolaris, *J Res Adv Dent* 2017;6:3s:119-123
- [2] Chole D, Maske K, Kundoor S, Bakle S, Gandhi N, Deshpande R ,2017, Endodontic Management of Radix Entomolaris: Case Report, *IOSR-JDMS Vol.16, Issue 4 Ver. I, PP 75-78*
- [3] Arafath MY, Subair K, A Kumara EG, K Shashikala, 2013, Radix Entomolaris: An Endodontic Challenge – Case Reports, *IJO CR Jan - Mar 2014; Volume 2 Issue 1*
- [4] Kamath U, Sheth H, Mohan N, Reddy D, 2015, Endodontic management of radix entomolaris: Case Reports, *International Journal of Applied Dental Sciences* 2015; 2(1): 15-19
- [5] Calberson FL, De Moor RJ, and Deroose CA, 2007, The Radix Entomolaris and Paramolaris: Clinical Approach in Endodontics, *J Endod* 2007;33:58–63
- [6] Priyanka.S.R , Veronica, 2013, Flare-Ups in Endodontics – A Review, *IOSR-JDMS Volume 9, Issue 4 (Sep.- Oct. 2013), PP 26-31*
- [7] Van der Vyver PJ, Vorster M, 2017, Radix Entomolaris: Literature review and case report, *SADJ April 2017, Vol 72 no 3 p113 - p117*
- [8] Carlsen O, Alexandersen V, 1990, Radix Entomolaris : Identification Morphology-*J Dent Res* 1990;98:363-373
- [9] De Moor RJ, Deroose CA, Calberson FL, 2004, The Radix Entomolaris in Mandibular First Molars: An Endodontic Challenge, *Int Endod J* 2004;37:789 –99.
- [10] Movassagh Z, Ghahari P, Heidari N, 2016, Radix Entomolaris: A Case Report, *Avicenna J Dent Res. 2016 September; 8(3):e26265.*
- [11] Bolla N, Naik BD, Kavuri SR, Sriram SK, 2013, Radix Entomolaris : A Case Report, *Endodontology. 121-12*