

A Case Report of Occurrence of Type B Radix Entomolaris in Permanent Mandibular First Molars

NB Nagaveni¹, Yanina Singh², P Poornima³

ABSTRACT

Aim: To present a case of occurrence of type B radix entomolaris in permanent mandibular first molars.

Background: Radix entomolaris is a condition where an extra root is present distolingually to the distal root in the tooth. It can be seen in primary as well as permanent teeth.

Case description: An 8-year-old patient reported with complaint of pain in lower left and right back tooth region since one month. On clinical examination, deep occlusal caries (ICDAS 5) was seen with respect to 36 and 46. On radiographic examination, an extra root was seen along with distal root in left and right mandibular first molar tooth.

Conclusion: Knowledge of dental anomalies is very important from the perspective of pedodontist and endodontist. If any of the anomalies is missed by the clinician, there are high chances of failure of the treatment. Upon caries excavation, pulp was not exposed so indirect pulp capping treatment was done for 36 and 46.

Clinical significance: Radix entomolaris is considered as an important condition from endodontic point of view and for providing good treatment especially in cases of root canal therapy.

Keywords: Bilateral, Permanent first molar teeth, Radix entomolaris.

CODS Journal of Dentistry (2018): 10.5005/jp-journals-10063-0040

INTRODUCTION

Supernumerary roots can occur in all types of teeth, but the possibility of finding such aberrant canal configurations is much higher in premolars and molars.¹ The majority of Caucasian first molars are two-rooted with two mesial and one distal canal. The major variant in this tooth type is the presence of an additional third root; a supernumerary root which can be found lingually.² The Latin term radix entomolaris (RE) was coined by Mihaly Lenhossek to describe the supernumerary root on the lingual aspect of mandibular molars. Carabelli (1844) was the first to provide a short description of this root, but without naming it.³ Bolk (1915) named it radix praemolarica, as he thought that it occurred only on the first mandibular molars and represented the last manifestation of the third premolar, which was lost during the evolution of primates. However, repudiating Bolk's idea, this additional root was later found on the second and third mandibular molars and even on the first and second primary mandibular molars.⁴ When extra root is seen on buccal side, then it is called as radix paramolaris as suggested by Bolk.^{5,6} Current authors mostly use the following positional terms instead of, or interchangeably with, RE: distolingual root, distolingual extra root, additional distal root and extradistal root.³

The theories concerning the origin of RE have been postulated. According to the first one, RE form as a result of external determinants during odontogenesis, whereas the second theory indicates that an atavistic gene may be responsible for the occurrence of RE. The genetic theory is justified by the fact that reversions could be observed in the next generations of the trait.⁷ A three-rooted molar has a high degree of genetic penetrance and its dominance is reflected in the similar prevalence of the trait in pure Eskimo and Eskimo/Caucasian mixes.¹ It has been seen in less than 5% Eurasians and Indian population and incidence alone in Indian population is very low, about 0.2%.¹ However, recently Nagaveni et al. reported a prevalence of RE in permanent mandibular first of 4.5% in Indian

¹⁻³Department of Pedodontics and Preventive Dentistry, College of Dental Sciences, Davangere, Karnataka, India

Corresponding Author: NB Nagaveni, Department of Pedodontics and Preventive Dentistry, College of Dental Sciences, Davangere, Karnataka, India, Phone: +91 8971695506, e-mail: nagavenianurag@gmail.com

How to cite this article: Nagaveni NB, Singh Y, Poornima P. A Case Report of Occurrence of Type B Radix Entomolaris in Permanent Mandibular First Molars. *CODS J Dent* 2018;10(1):21-23.

Source of support: Nil

Conflict of interest: None

pediatric population.⁸ Apart from its role as a genetic marker, however the RE is also a significant entity in clinical dentistry. The awareness and identification of RE are vital in ensuring the success of endodontic treatment. This means dentist must be knowledgeable about its prevalence, diagnosis, morphology, canal configuration, and the clinical approach required in such cases.¹

Hereby, we are presenting a rare case of bilateral radix entomolaris in mandibular first molar.

CASE DESCRIPTION

An 8-year-old female patient reported to the department of pediatric and preventive dentistry with chief complaint of pain in lower left and right back tooth region since a month. Pain was insidious in onset, moderate in intensity, intermittent and localized which aggravates on eating sweet food and relieves on its own. On intraoral examination, a deep occlusal caries (ICDAS 5) was seen in 36 and 46. An intraoral periapical radiograph (IOPA) was taken for 36 and 46 (Fig. 1). IOPA of 36 showed loss of lamina dura and widening of periodontal ligament (PDL) space at apical third of

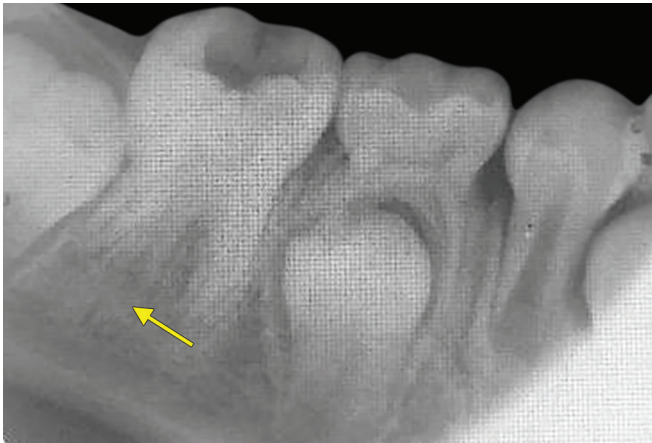


Fig. 1: Intraoral periapical radiograph of 36, an extra root can be seen with distal root (arrow)



Fig. 2: Intraoral periapical radiograph of 46, an extra root can be seen with distal root (arrow)



Fig. 3: Mandibular occlusal view representing occlusal caries in 36 and 46

accessory root and widening of PDL space at apical third of distal root. Radiolucency on occlusal surface of crown of 36 involving enamel and dentin approaching pulp (Fig. 2). IOPA of 46 revealed loss lamina dura at apical third of distal root and widening of PDL space at apical third of all three roots. Radiolucency on occlusal surface of 46 involving enamel and dentin approaching pulp (Fig. 3).

Based on clinical and radiographic findings a diagnosis of apical periodontitis was given for 36 and 46. On the radiograph, an accessory root was found in relation to 36 and 46 therefore a diagnosis of radix entomolaris was given for 36 and 46.

Oral prophylaxis and excavation and review for 36 and 46 was advised. Excavation and review was done for 46, no exposure of pulp tissue was noticed after removal of infected dentin further which calcium hydroxide dressing (Dycal) was placed followed by IRM restoration. Patient was recalled after a month for follow-up.

DISCUSSION

The present article reports the presence of one extra root in relation to mandibular left and right first molar tooth which was an incidental finding on IOPA. There have been several reports of the occurrence of supernumerary roots in both permanent and primary mandibular molars of different populations. But studies of the prevalence of extra root variants in Indian population are few in number. In a study done by Nagaveni et al.,⁸ the author found that the prevalence of RE was 4.5% in permanent mandibular first

molars. When distribution was seen, 7 teeth showed the presence of unilateral RE whereas only in one case of bilateral occurrence was seen. Nagaveni et al.³ did a study in pediatric population of Davangere where the total occurrence of three rooted primary mandibular first molars among the study subjects was 1.3% and no bilateral occurrence was seen. In another study by Nagaveni et al.,⁴ the total occurrence of three-rooted primary mandibular second molars among the study participants was 6.5%, with bilateral occurrence of 2.6%.

There has been seen the ethnic and racial association of RE. Tu et al. found a prevalence of 21.1% using periapical radiographs and 33.33% using the cone-beam computed tomography in Taiwanese subjects.⁹ In Mongoloid traits such as Eskimo, Chinese, and American Indians, it has been reported that RE seen with a frequency ranging from 5–30%. Because of its high prevalence in these populations, the RE is considered to be a normal morphological variant (eumorphic root morphology). In Caucasians, low frequency of 3.4–4.2% has been found and considered to be unusual or dysmorphic root morphology.⁹

The identification and external morphology of RE was described by Carlsen and Alexandersen.¹⁰ They gave four variants of RS on mandibular molar tooth namely A, B, C and AC (Table 1). RE a distolingual root exhibit diverse morphologic features varying from severe curvature to an underdeveloped conical form.^{1,11,12} Based on the anatomy of the extracted samples and the bending of ISO 10 files after scouting of the root canal in the RE, three types of curvature were detected: (I) straight or no curvature; (II) coronal third curved and straight continuation to the apex; and (III) curvature in the coronal third and buccal curvature from the middle third or apical third of the root.^{1,11,12} Song et al.¹³ have suggested a new classification based on morphologic characteristics which were assessed using cross-sectional CBCT. Type I: no curvature; type II: curvature in the coronal third and straight continuation to the apex; type III: curvature in the coronal third and additional buccal curvature from the middle third to the apical third of the root; small type: root length less than half that of the distobuccal root; conical type: cone-shaped extension with no root canal. 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 (30 degrees). This way an accurate diagnosis can be made in the majority of cases.^{1,12,13}

Table 1: Variants for radix entomolaris (given by Carlsen and Alexandersen¹⁰)

Type A	<ul style="list-style-type: none"> Distal part of the root complex consists of three cone-shaped macrostructures: a lingual, a medial, and a facial Either the lingual structure is separate while the medial and facial structures are non-separate or all three macrostructures are non-separate The lingual of the three distal root structures, is identified as RE
Type B	<ul style="list-style-type: none"> The distal part of the root complex consists of two cone-shaped macrostructures that are practically the same size; a lingual and a facial Can either be separate or non-separate The lingual of the two distal root structures is identified as RE
Type C	<ul style="list-style-type: none"> The mesial part of the root complex consists of three cone-shaped macrostructures: a lingual, a medial, and a facial Either the lingual of these structures is separate while the medial and facial structures are non-separate, or all three macrostructures are non-separate The lingual of the three mesial root structures is identified as RE
Type AC	<ul style="list-style-type: none"> The lingual part of the root complex consists of three cone-shaped macrostructures: a central, a mesial, and a distal The central of these structures is either separate or non-separate The central of the three lingual root structures is identified as RE

Various clinical implications of extra roots in permanent mandibular first molars have been mentioned in literature. During endodontic therapy, RE/RP pose a great endodontic challenge, as incomplete pulp extirpation due to missed canal can result in treatment failure.^{1,13} Dentists should be familiar with multiple root anatomy to avoid missing canals. A severe root inclination or canal curvature, particularly in the apical third of the root (in type III RE), can cause shaping aberrations such as straightening of the root canal or a ledge that displays a loss of working length in the ledge canal.^{1,13-16} Calberson¹² recommend using flexible nickel-titanium rotary files to increase the chance of centering the canal third and orifice relocation. Nevertheless, unexpected complications (such as instrument separation) occur and are more likely to happen in the RE due to the severe curvature or narrow root canals. Also, the access cavity must be modified in a distolingual direction in order to visualize and treat the RE, this results in a trapezoidal access cavity. After relocation and enlargement of the orifice of the RE, the author suggested initial root canal exploration with small files (size 10 or less) and creating a gliding path before preparation to avoid any of the procedural errors.^{15,16} A common clinical problem posed by the three-rooted molar is the possible fracture of the distolingual root. Considering its divergent and curved form, the extra disto-lingual root would be expected to fracture during extraction.⁵

Other clinical difficulties resulting from distolingual root would relate to orthodontic procedures, where the extra root would render movement difficult. It is also hypothesized that the presence of extra root (RE) adds to the stability of molars by providing an increased surface area of attachment to the alveolus.^{1,12,13}

CONCLUSION

The above-mentioned literature has clearly shown the importance of radix entomolaris during the treatment phase hence diagnosis should be done adequately. Often, we come across cases where there are doubts regarding any diagnosis, in such cases, high diagnostic techniques should be used like CBCT to rule out the suspicion.

REFERENCES

- Nagaveni NB, Umashankara KV. Radix entomolaris and paramolaris in children: a review of the literature. *J Indian Soc Pedod Prev Dent* 2012;30(2):94-102. DOI: 10.4103/0970-4388.99978.
- De Moor RJ, Deroose CA, Calberson FL. The radix entomolaris in mandibular first molars: an endodontic challenge. *Int Endod J* 2004;37(11):789-799. DOI: 10.1111/j.1365-2591.2004.00870.x.
- Nagaveni NB, Poornima P, Valsan A, et al. Prevalence of three-rooted primary mandibular first molars in children of Davangere, Karnataka, India. *CODS J Dent* 2017;9(1):7-9. DOI: 10.5005/jp-journals-10063-0025.
- Nagaveni NB, Poornima P, Valsan A, et al. Prevalence of three-rooted primary mandibular second molars in Karnataka (South Indian) population. *Int J Pedod Rehabil* 2018;3(1):33-35. DOI: 10.4103/ijpr.ijpr_23_17.
- Nagaveni NB, Bajaj M, Shruthi AS, et al. Radix paramolaris (supernumerary third root) in primary mandibular second molar: report of two cases. *Niger J Exp Clin Biosci* 2014;2(2):134-137. DOI: 10.4103/2348-0149.144861.
- Nagaveni NB, Umashankara KV, Radhika NB. A retrospective analysis of accessory roots in mandibular molars of Indian pediatric patients. *Int J Dent Anthropol* 2012;20:38-46.
- Rózyło TK, Piskórz MJ, Rózyło-Kalinowska IK. Radiographic appearance and clinical implications of the presence of radix entomolaris and radix paramolaris. *Folia Morphologica* 2014;73(4):449-454. DOI: 10.5603/FM.2014.0067.
- Nagveni NB, Poornima P, Mathew MG. Radix entomolaris in the permanent mandibular first molars of Davangere children: a prevalence study. *Niger J Exp Clin Biosci* 2017;5:11-15. DOI: 10.4103/njcp.njcp_28_15.
- Tu MG, Tsai CC, Jou MJ, et al. Prevalence of three-rooted mandibular first molars among Taiwanese individuals. *J Endod* 2007;33(10):1163-1166. DOI: 10.1016/j.joen.2007.07.020.
- Carlsen O, Alexandersen V. Radix entomolaris: identification and morphology. *Scand J Dent Res* 1990;98(5):363-373. DOI: 10.1111/j.1600-0722.1990.tb00986.x.
- Nagaveni NB, Chandani GR, Kothari S, et al. Radix entomolaris in children—A challenge to pedodontist—A report of case series with literature review. *Int J Contemp Dent Med Rev* 2015;2015:360115.
- Calberson FL, De Moor RJ, Deroose CA. The radix entomolaris and paramolaris: clinical approach in endodontics. *J Endod* 2007;33(1):58-63. DOI: 10.1016/j.joen.2006.05.007.
- Song JS, Kim SO, Choi BJ, et al. Incidence and relationship of an additional root in the mandibular first permanent molar and primary molars. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2009;107(1):e56-e60. DOI: 10.1016/j.tripleo.2008.09.004.
- Nagaveni NB, Umashankar KV, Radhika NB, et al. Third root (radix entomolaris) in permanent mandibular first molars in pediatric patients—an endodontic challenge. *J Oral Health Comm Dent* 2011;5(1):49-51. DOI: 10.5005/johcd-5-1-49.
- Gupta S, Nagaveni NB, Chandranee NJ. Three-rooted mandibular first primary molar: report of three cases. *Contemp Clin Dent* 2012;3(Suppl 1):S134-S136. DOI: 10.4103/0976-237X.95126.
- Nagaveni NB, Umashankar KV. Radix entomolaris in permanent mandibular first molars: case reports and literature review. *Gen Dent* 2009;57(3):e25-e29.