

## Management of Radix Entomolaris in Mandibular First Molar

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### Abstract

The aim of endodontic therapy is to achieve a three-dimensional obturation of the root canal space which effectively removes the bacteria from the canals which have been infected by microorganisms and to avoid recontamination of the canals by proper cleaning and shaping protocols. The major reason for endodontic treatment failure is due to missed roots and canals. Mandibular molars are most common teeth that requires endodontic treatment and exhibit numerous variations in its internal anatomy; one among those is the presence of an extra root lingually known as Radix Entomolaris (RE). The presence of this extra root can lead to difficulties during endodontic treatment. The success of Endodontic treatment depends on having proper knowledge about these possible variations of anatomical and morphological characteristics of the teeth. This case report presents the successful detection and management of mandibular first molars with RE by proper clinical and radiographic examination.

**Keywords:** Radix Entomolaris (RE); Mandibular molars; Roots, Canals.

### Introduction

The primary objective of successful endodontic therapy is to thoroughly debride the canal system of organic substrate, infected pulp tissue, and microorganisms and to three dimensionally seal the root canal space. A missed canal is neither debrided nor thoroughly sealed, and thus may result in the development or persistence of periapical inflammation.<sup>[1]</sup> An awareness and understanding of the presence of unusual root canal morphology can thus contribute to the successful outcome

of root canal treatment. The mandibular molars usually have two roots placed mesially and distally, and three root canals. Mandibular molars are the common teeth to be endodontically treated and show numerous variations in the internal anatomy.<sup>2</sup> The variations include an extra distolingual root called as Radix entomolaris,<sup>3</sup> C-shaped canals,<sup>2</sup> Middle mesial canal.<sup>2</sup> Radix entomolaris (RE) is one of the anatomical variation found in a permanent mandibular molar and was first described by Carabelli.<sup>4</sup> It is characterized by the presence of an additional or extra third root, which is typically



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found disto-lingually. Radix entomolaris can be found in the first, second, and third mandibular molars, occurring the least frequently in the second molar.<sup>5-7</sup> This has a frequency of 5% to 30% among the mongoloids such as Chinese, Eskimos, and Native American populations and a frequency of <5% in white Caucasians, Africans, Eurasians, and Indian populations.<sup>8</sup> RE has an occurrence of <5% in the Indian population. However, few studies have reported higher prevalence of RE, with a range from 2.19 to 13.3%, among the Indian population.<sup>6,7,9,10</sup> This case report presents detection and management of RE in mandibular first molar with three roots confirmed by SLOB technique.

### Case Report

A 19-year-old female patient with non-contributory medical history was referred to the Department of Endodontics with the chief complaint of intermittent pain in the lower right back teeth region since 1 month. Clinical examination revealed deep mesio-occlusal caries and tenderness on vertical and horizontal percussion with the first molar, indistinct periapical radiolucency was seen around the roots. Further, the presence of an additional distal root outline was noticed on the radiograph. Based on

the clinical and radiographic interpretation, a final diagnosis of necrotic pulp with symptomatic apical periodontitis was made of the mandibular first molar, and root canal therapy was initiated.

Tooth was anesthetized, rubber dam isolation was done, and access was obtained using a large round bur and safe end bur (Dentsply Maillefer, Switzerland). Pulp chamber was inspected carefully for the root canal orifices. Canal orifices were located using endodontic explorer (DG16, Hu-Friedy, Chicago). Four root canal orifices were detected, two mesial and two distal canals. In the subsequent visits, canals were explored and negotiated using #08 and #10 size K-files (Dentsply Maillefer, Ballaigues, Switzerland). The working length of the canals was determined electronically using an apex locator (Canalpro, Coltene) and confirmed radiographically. Canals were instrumented using Protaper rotary files (Dentsply Maillefer, Switzerland) and irrigated with 3% sodium hypochlorite and 17% ethylene diamine tetracetic acid (EDTA) solution. Calcium hydroxide intracanal medicament was placed in the first visit. In the next visit after 14 days, irrigation was done. The canals were then dried with paper points, obturation was carried out with master cones and Sealapex sealer. The access cavity was sealed with a permanent restoration (Figs. 1-5).



Fig. 1:

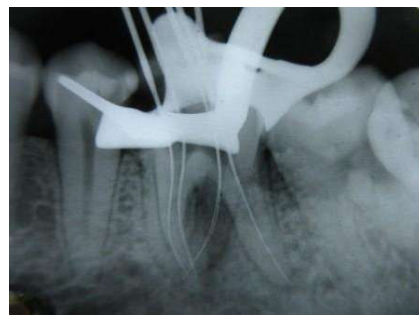


Fig. 2:



Fig. 3:



Fig. 4:



Fig. 5:

### Discussion

Endodontic treatment success in the presence of RE primarily depends on its diagnosis, treatment plan, anatomy of morphology assessment, canal configuration, and approaching the tooth clinically.<sup>11</sup> An accurate diagnosis of RE can avoid complications like missed canal which is a common reason for endodontic failure. Detection of RE can be mainly based on thorough clinical examination, radiographic and imaging techniques and other accessories.<sup>11,12</sup> The morphology of this extra-root has been studied by many and De Moor *et al.* concluded in their study that the majority of the RE were curved.<sup>11</sup> Various diagnostic methods are available to locate additional canals such as, knowledge of law of symmetry, law of orifice location, visualizing the dentinal map and canal bleeding points, Endodontic explorer, Pathfinder, DG 16 probe, Micro-openers, champagne bubble test. Visual aids such as a loupe, intraoral camera or dental microscope can also be useful. Three-dimensional imaging technique-based computer tomography (CT) and cone-beam computerized tomography (CBCT) are useful in identifying the RE in a noninvasive manner with lesser radiation. However, cost and availability to them is said to be limiting factors.<sup>13,14</sup> A clinical approach to treat an RE should consist of Straight line access without excess removal of dentin will be achieved by initial location of lingual orifice. This approach will avoid perforations. Manual preflaring is recommended to prevent instrument separation. As the risk of instrument fracture significantly increases with the decrease in the radius of curvature, canal preflaring with manual use of SS files is suggested to overcome instrument

fracture. A glide path along with the proper determination of the canal curvature and working length would reduce the procedural errors such as ledging and transportation. Finally, use of nickel-titanium rotary files having a taper of not more than 0.06 taper and crown down technique is said to allow a more centered, rounder, and conservative canal preparation than the use of stainless steel instruments in RE.<sup>11</sup> A thorough radiographic interpretation is necessary to identify the RE. It is mentioned that the radiographs were successful in over 90% of the cases while identifying additional roots but superimposition of the distal roots can be limiting factor. An angled radiograph (25–30°) can be more useful in this regard and it is said that a mesial angled radiograph is better than a distal angled radiograph for RE detection.<sup>11,12</sup> Thus, proper knowledge about the location of additional roots, clinical approach and proper radiographic examination will pave the long-term success of endodontic treatment.

### Conclusion

During molar endodontic treatment, RE has been reported to occur with a frequency of 0.2%–32% in different populations. It is essential to find all the roots and canals for successful endodontic treatment. Failure to identify and treat an RE can significantly affect the outcome of an endodontic treatment. The sound knowledge about the variable anatomy of the root canal is very important for the clinician to locate and treat the root canals. Initial diagnosis, ability to correctly interpret the radiograph, careful inspection of the pulp chamber floor, and use of recent concepts in access cavity

preparation along with appropriate techniques and instruments such as magnification aids, orifice locators and flexible files, facilitates the endodontic outcome in the mandibular molar with RE.

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**Conflict of interest:** Nil

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