

# CLINICAL APPROACH OF A TOOTH WITH RADIX ENTOMOLARIS AND MIDDLE DISTAL CANAL: A CASE REPORT

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## Abstract:

The first permanent teeth to erupt in the oral cavity are the mandibular first molars. They are the most commonly affected by dental caries. Mandibular first molars has two roots and three canals anatomically. The presence of an extra root or a supernumerary root has been related to the tooth in very rare cases. Radix Entomolaris refers to the presence of root lingual to the distal root of molars, whereas Radix Paramolaris refers to the presence of this root buccal to the mesial root. Variations in tooth anatomy can lead to the possibility of veiled canals. In order to achieve successful endodontic treatment, these extra canals must be located, prepared, and obturated.

**Keywords:** Root canal therapy, Mandibular first permanent molar, Middle distal canal, Radix Entomolaris, Radix Paramolaris.

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## INTRODUCTION

Endodontic therapy aims to properly seal the root canals and remove all pulp space in order to prevent reinfection. A successful root canal treatment may result from an understanding of the variations in particular root canal morphology.<sup>1</sup>

Swartz, Skidmore, and Griffen reported that the success rate for mandibular first permanent molars is significantly lower than that of other teeth. The major causes of recurrent infection in molars that have had endodontic treatment are most likely the missing canals and the inability to completely eradicate all bacteria and debris from the root canals. Consequently, it's critical that physicians are aware of and comprehend the differences in the mandibular first molar's root canal shape.<sup>2</sup>

Studies by Barker et al. (1974) and Vertucci and William (1974) revealed the presence of independent

middle mesial canals in the mesial root of lower first permanent molars. According to a literature review by Baugh and Wallace (2004), the incidence of a third mid-mesial canal in mandibular first molars ranges from 1 to 15%. The mid-mesial canal may connect apically with the mesio-lingual or mesio-buccal canals. It can also have an additional canal with a separate canal orifice, or it can be independent with a separate foramen.<sup>2</sup>

A study conducted in 1971 by Skidmore and Bjorndal found that in mandibular first molar teeth, 71.1% of the distal roots have one root canal, 28.9% have two, and in rare instances, three root canals. The Vertucci Type I configuration was found in 62.7% of cases, the Type II configuration (where the pulp canal splits into two near the crown and joins at the apex to form one root canal) in 14.5% of cases, and the Type IV configuration (where the pulp canal separates into two distinct canals and extends till the root apex

separately) in 12.4% of cases reported for the distal root of first mandibular molars. A study that was released in 2010 included this information. In the distal roots of the mandibular first molars, there may also be three root canals. Between 0.2% and 3% of the mandibular first molar's distal root has three root canals. (Figure 3). It has been conclusively confirmed by several studies that the mandibular first permanent molar may have more than four root canals.<sup>2</sup>

### Prevalence of Radix Entomolaris

Radix Entomolaris (RE) in the mandibular first permanent molar is associated with particular ethnic groups. Five to thirty percent of populations are mongoloid, including Chinese, Eskimo, and American Indian populations. Nonetheless, it is less than 5% in populations from Eurasia and India and less than 3% in populations from Africa.<sup>3</sup>

Radix Entomolaris is a condition that primarily affects the first molars, but it can also affect the second, and third mandibular permanent molar teeth. Furthermore, research has reported a 50–67% frequency of bilateral occurrences.<sup>4</sup>

### Etiology Of RE

The exact cause of the condition is yet unknown, but Calberson et al. (2007) suggest that it may have been influenced by outside variables during odontogenesis. Significant gene expression that leads to a more prominent phenotypic manifestation can also be influenced by racial genetic factors.<sup>5</sup>

### Morphology of Radix Entomolaris

It is possible for the distal root of RE to be completely or partially fixed to the coronal third of the disto-lingual root. De Moor et al. (2004) classified the distinct RE variants into three types based on the curvature of buccal-lingual orientation.<sup>6</sup>

A straight root or root canal is referred to as type I. Type II refers to a straight root or root canal that has a curved entrance at first. Type III describes a root canal with two curves: one in the coronal third and the other starting in the middle and extending to the apical third.

### Case Report

A 17- year old female reported to the Department Of Conservative Dentistry and Endodontics at MIDSr Dental College and Hospital, with a chief complaint

of food lodgement and pain in the right lower first molar region. The dull, gnawing pain began about a month ago and was moderately intense. The mandibular right lower first molar was found to have an exposed pulp and a deep distoproximal and occlusal caries on clinical examination. Both the mesial and distal roots displayed periapical radiolucency (Figure 1). When the tooth was palpated, it felt moderately painful and was extremely tender to the touch. When a suspect tooth was pulp tested using an electric pulp tester, it did not respond.



Figure 1.pre-operative radiograph

Following anesthesia, a rubber dam was used to isolate the tooth. A large round bur was used to open the access, and an EZ bur (Dentsply) was used to refine the access cavity. There was a catch in the area between the main distal canals after using a sharp endodontic explorer to find the orifices. 6 and 8 K Files were inserted into the canal using a watch winding motion. Figure 2 shows the location of five orifices, two on the mesial root and three on the distal roots.

The working length was determined by 15 k file. The radiograph showed an independent Middle distal canal and radix entomolaris (Figure 3). The ProTaper Gold File system (Dentsply) were used for biomechanical preparation, by using the crown-down technique. During biomechanical preparation, 5% sodium hypochlorite solution and 17% EDTA (Ethylenediaminetetraacetic acid) were used as irrigants. The canals were prepared up to F1 size. After chemo-mechanical preparation, the patient was given a closed dressing and scheduled for obturation seven days later. The tooth was asymptomatic, so a

master cone radiograph was obtained at the follow-up visit (Figure 4). To dry the canals, paper tips were utilized. Obturation was completed with ProTaper F1 cones and zinc oxide eugenol sealer. A radiograph (Figure 5) was taken after obturation. To close the access cavity, a permanent restoration was used.



Figure 2. Clinical photograph showing five distinct canals with 46

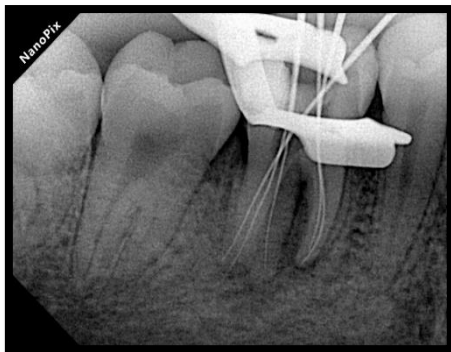


Figure 3. working length

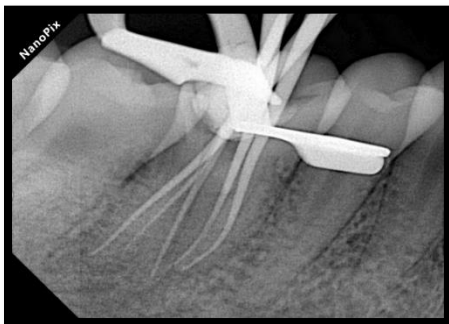


Figure 4. Master cone selection

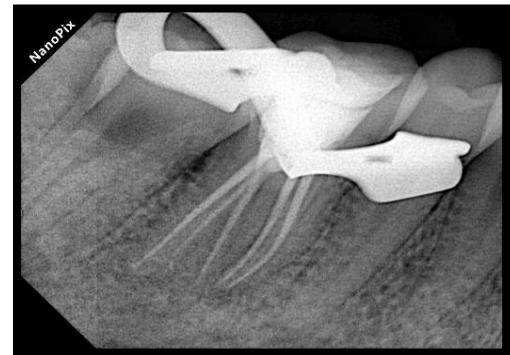


Figure 5. Post-obturation radiographs

**DISCUSSION**

The permanent mandibular first molar can be present with varied anatomy. The detection of canals is important for successful endodontic treatment and satisfactory long-term prognosis. Radix entomolaris can be present as a separate mature root or as a conical extension. It has been further classified as: Based on the location of the cervical part, Carlsen & Alexandersen (1990) divided radix entomolaris (RE) into four categories: Type A: The distal root complex, which has two cone-shaped macrostructures, is lingually to the RE. 2. Type B: the RE has a single cone-shaped macrostructure and is situated lingually to the distal root complex. 3. Type C: The mesial root complex and the RE are situated lingually. 4. Type AC: Between the mesial and distal root complexes, lingually, is where the RE is situated. De Moor et al. (2004) categorized the following as radix entomolaris according to the root canal's or the root's curvature: 1. a root canal, sometimes referred to as a straight root. 2. Type 2: an apical and middle straighter third, with a curved coronal third. 3. Type 3 consists of two curves: a buccally oriented second curve that originates in the coronal third, and a first curve that begins in the middle or apical third. Song JS et al. (2010) added two additional recently defined variations of RE, according to: 1. Small type: length shorter than half of the length of the distobuccal root.

2. Conical type: smaller than the small type and without a root canal.<sup>7</sup>

By initially locating the lingual orifice, a straight line access to treat a RE without excessive dentin removal can be achieved. Using this method will prevent perforations. It is advised to manually preflare in order to avoid instrument separation. With a comparatively longer canal length and a smaller curvature radius, RE has the highest degrees of curvature. It is recommended to use manual canal preflaring with SS files to prevent instrument fracture because the risk of instrument fracture increases significantly with decreasing radius of curvature. Using a glide path in conjunction with precise calculations of working length and canal curvature would reduce procedure errors such as ledging and transportation. Finally, it is stated that a more conservative, rounder, and more centered canal preparation can be achieved with nickel titanium rotary files and the crown down technique than with stainless steel instruments in RE. The taper of the file should not exceed 0.06. <sup>8</sup>

### CONCLUSION

According to reports, the frequency of the Radix entomolaris with middle distal canal ranges from 0.2% to 3% in various populations. The endodontic result is facilitated and potential errors are avoided with an early diagnosis and treatment plan implemented using the right techniques and instruments. Finding the tooth's morphology may be made easier with accurate radiograph interpretation at various angulations. After the condition has been identified, instruments like flexible files, orifice locators, and magnification aids can be used to manage the additional canals and roots.

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