



Case Report

Irony of mandibular molar: A case series if management of radix

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ABSTRACT

Endodontics is a comprehensive knowledge of the intricate nature of the root canal system is paramount. In case series we had investigates the intricate landscape of managing radix entomolaris, an additional root often encountered in mandibular molars. Success in endodontic treatment hinges on precise diagnosis, anatomical understanding, and meticulous procedural execution. The enigmatic nature of radix entomolaris introduces complexities due to variations in root canal morphology. Through meticulously documented case reports, we elucidate the diagnostic methods and successful endodontic procedures employed in two distinct patient cases presenting with symptomatic irreversible pulpitis.

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1. Introduction

Endodontic therapy encompasses the thorough cleansing, shaping, and sealing of the intricate root canal system. Success in root canal treatment hinges on accurate diagnosis, understanding anatomical variations, meticulous chemomechanical cleansing, elimination of intraradicular infections, and precise canal shaping to optimize sealing. A compromise in the quality of any of the steps can lead to their failure.¹

In endodontics, a comprehensive knowledge of the intricate nature of the root canal system is paramount. This understanding is crucial for mastering shaping and cleaning techniques, accurately defining the apical boundaries and dimensions of canal preparations, and achieving success in surgical interventions. The diverse morphological variations of root canals in multi-rooted teeth frequently present a challenging scenario for endodontists during procedures.²

Typically, mandibular first molars possess two roots: one mesial and one distal. However, a notable variation is the presence of a third root, which has been frequently documented in literature. When this extra root is situated mesiobuccally, it is termed radix paramolaris, while if it is found distolingually, it is referred to as radix entomolaris (RE). Carabelli initially described this phenomenon, and the term RE was coined by Michlay Lenhossek in 1922.³

Detecting Radix entomolaris involves clinically inspecting the tooth crown and analyzing the cervical morphology of the roots using periodontal probing explorers, path finders, and DG-16 probes. Presence of an extralingual cusp or a more pronounced occlusal distal or distolingual lobe, along with cervical prominence or convexity, may suggest Radix entomolaris. However, an increased number of cusps is not necessarily indicative.⁴ Radiographically, double periodontal ligament images or an unclear view or outline of the distal root contour or the root canal may suggest the presence of RE. This paper presents a case report detailing two instances of radix entomolaris.

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2. Case Report

2.1. Case 1

A 27-year-old male patient reported to the Department of Conservative Dentistry and Endodontics with a chief complaint of severe pain in the right lower back tooth region for the last three days. The discomfort persisted for two to three hours and was sporadic in character. It was made worse by hot food and liquids. Medical history was non-contributory.

On the basis of their medical history, the patient was classified as ASA I, which corresponds to a normal, healthy patient. An extra-oral examination showed a symmetric face with no head and neck lymph node involvement. The TMJ examination revealed no clicking sound and no limited mouth opening. On intraoral examination, an occlusal deep cavitated carious lesion was seen. The tooth was tender on percussion.

For further investigations, a radiograph was advised. The radiograph revealed deep caries approximating the pulp space and a slight widening of the periodontal ligament space around the apical area of the extra root. Since the extra root was seen superimposing the distal root, which was suggestive of the radix entomolaris, the diagnosis established was symptomatic irreversible pulpitis with symptomatic apical periodontitis wrt 46 (Figure 1 A). Thus, root canal treatment was initiated.

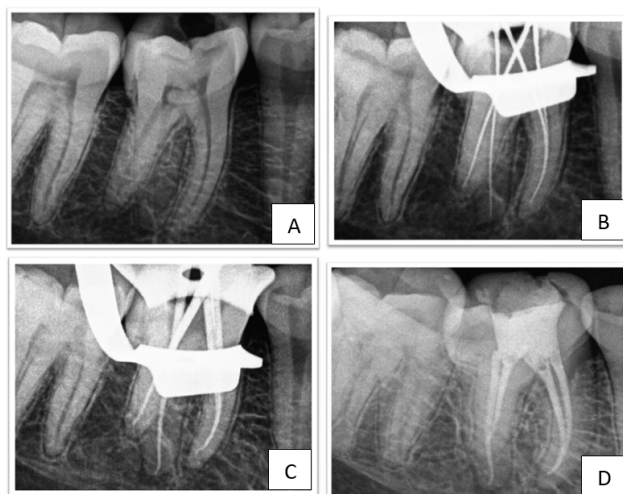


Figure 1: A): Pre-operative radiograph; B): Working length radiograph; C): Mastercone radiograph; D): Post-operative radiograph

Under proper rubber dam isolation, access cavity preparation was done under local anaesthesia with an endo-access bur. The shape of the access cavity was modified from triangular to a trapezoidal form to locate the fourth canal. The DG-16 endodontic explorer was used to locate the root canal orifices, and the #15a K-file (Mani) was

used to establish the patency of the canals. Working length was determined using an apex locator and confirmed radiographically (Figure 1 B).

After the conventional hand filing, biomechanical preparation was done with Neo Endo rotary files (Oricam) in a step-down manner. The canals were constantly irrigated using sodium hypochlorite (NaOCL)(Coltene). After instrumentation was completed, calcium hydroxide was placed for 7 days, and the patient was recalled. On the patient visit, after 7 days, the intra-canal medicament was removed by irrigating the canal with a NaOCL and hand instrument. The canals were dried using paper points and obturated using lateral condensation with Gutta-percha and zinc oxide eugenol sealer (Figure 1 D). Then the tooth was restored with a composite restoration.

2.2. Case 2

A 30-year-old male patient reported to the Department of Conservative Dentistry and Endodontics. The patient has complained of pain in relation to the lower left back tooth region for 20 days. Pain was moderate, intermittent in nature, and relieved on taking medication with sensitivity to cold and hot.

The patient was assigned an ASA I classification based on their medical history, indicating that they are a normal, healthy patient. An extra-oral examination showed a symmetric face with no head and neck lymph node involvement. The TMJ examination revealed no clicking sound and no limited mouth opening. On intraoral examination, an occlusal deep cavitated carious lesion was seen. The tooth was tender on percussion.

The radiograph revealed deep caries approximating the pulp space and a slight widening of the periodontal ligament space around the apical area of the extra root. Since the extra root was seen superimposing the distal root, which was suggestive of the radix entomolaris, the diagnosis established was symptomatic irreversible pulpitis with symptomatic apical periodontitis wrt 36.

Under proper rubber dam isolation Access cavity preparation was done under local anaesthesia with an endo-access bur (Figure 2 A). The shape of the access cavity was modified from a triangular to a trapezoidal form to locate the fourth canal. DG-16 endodontic explorer was used to locate the root canal orifices, and 15 # K-file (Mani) was used to establish the patency of the canals. Working length was determined using an apex locator and confirmed radiographically (Figure 2 B).

After the conventional hand filing, biomechanical preparation was done with Pro taper rotary files (Densply) in a step-down manner. The canals were constantly irrigated using sodium hypochlorite (NaOCL) (Coltene). After instrumentation was completed, the canals were dried using paper points and obturated using lateral condensation with Gutta-percha and zinc oxide eugenol sealer (Figure 2 D).

Then the tooth was restored with a composite restoration, followed by a prosthetic crown (Figure 2 E).

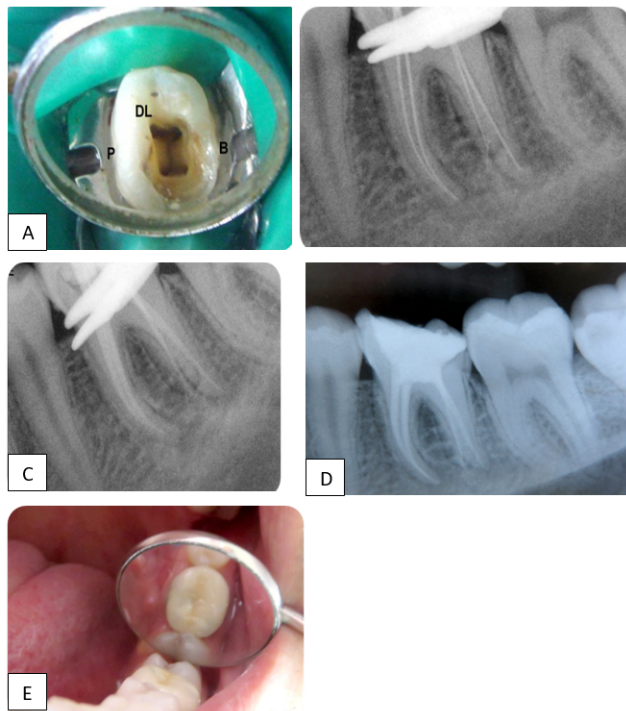


Figure 2: A): Access cavity; B): Working length radiograph; C): Mastercone radiograph; D): Post-operative radiograph; E): Crown luted

3. Discussion

The occurrence of radix entomolaris (RE) in the first mandibular molar shows association with specific ethnic groups, as indicated by various studies:

1. In African populations,
2. In Europe, the prevalence ranges from 3.4% to 4.2%.
3. In Indian populations, it has been reported at 6% (Garg H. et al.)⁴
4. In populations exhibiting mongoloid traits, the prevalence varies from 5% to 30%.

Literature reveals a bilateral presence of RE ranging from 56.6% to 68.57% in the Asian population. RE can be found in the first, second, and third mandibular molars, with its occurrence being least frequent in the second molar. Research suggests that between 50% and 67% of cases of RE are bilateral.⁵

Ribeiro and Consolaro (1997) proposed a classification system for RE, categorizing it into three types:⁶

1. Type I: Characterized by a straight root or root canal.
2. Type II: Exhibits an initially curved entrance with a continuation as a straight root canal.

3. Type III: Features an initial curve in the coronal third of the root canal and a second buccally oriented curve starting from the middle to the apical third.

Carlsen and Alexandersen (1990) introduced another classification system based on cervical location,⁷ dividing RE into four types:

1. Type A: RE located distally with two normal roots.
2. Type B: RE situated lingually to the distal root complex, which has one normal distal root.
3. Type C: RE positioned lingually to the mesial root complex.
4. Type D: RE located lingually between the mesial and distal root complexes.

Additionally, Song et al. (2010) identified two additional variations⁸ of RE:

1. Small type: Characterized by a length shorter than half of the length of the distobuccal root.
2. Conical type: Smaller than the small type and lacking a root canal within it.

Detecting RE primarily relies on clinical inspection of the tooth crown and analysis of cervical root morphology. Additional cusp or prominent occlusal features, combined with cervical prominence, may indicate the presence of an extra root. Three-dimensional imaging techniques such as computed tomography (CT) and cone-beam CT (CBCT) prove valuable in visualizing the true morphology of RE.⁹

Successful root canal treatment depends on adherence to fundamental principles: access, cleansing and shaping, and complete obturation of the root canal space. Among these, achieving "straight-line" access is crucial, especially with the distolingually located orifice of RE, necessitating a modification of the classical triangular opening cavity to a trapezoidal form for better access.

4. Conclusion

The presence of RE carries clinical implications in endodontic treatment. Accurate diagnosis of these supernumerary roots can prevent complications or missed canals during root canal treatment. While angulated radiographs aid in identification and management, understanding prevalence, diagnosis, morphology, canal configuration, and clinical approaches are prerequisites for success. With a reported occurrence of 6% among the Indian population, diligent efforts should be made to identify extra roots in mandibular first molars to ensure successful endodontic treatment.¹⁰

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6. Conflict of Interest

None.

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