



## Management of Radix Entomolaris

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### Abstract

Mandibular first molar shows the greatest variation in the morphology in terms of root number as well number of canals. Extra root is located on the distal root either in the lingual direction or the buccal direction, called radix entomolaris or radix paramolaris respectively. Supernumerary roots and root canals are treated routinely in an endodontic practice. Apt understanding of the root canal anatomy, clinician's expertise, and careful examination can help in identification and management of these anatomical variations for endodontic procedures. This case report discusses the endodontic management of a mandibular left first molar with radix entomolaris (RE), which is a rare anatomical variation.

**Keywords:** Supernumerary Roots; Anatomical Variations; Radix Entomolaris; Radix Paramolaris

### Abbreviations

RE: Radix Entomolaris; RP: Radix Paramolaris; w.r.t: With Respect To; EDTA: Ethylene Diamine Tetra Acetate

### Introduction

Successful endodontic treatment has the prerequisite of thorough cleansing and shaping of root canals by chemo mechanical means for eradication of microorganisms from root canal system followed by packing of root canal material and securing a hermetic seal to prevent reinfection. Mandibular molars exhibit great number of variations with respect to number, shape of the canals as well as number of roots.

An additional third root was firstly reported by Carabelli in 1844 [1,16], is called the radix entomolaris (RE); a tooth with a third root that is a distolingual root. An extra root in the mesiobuc-

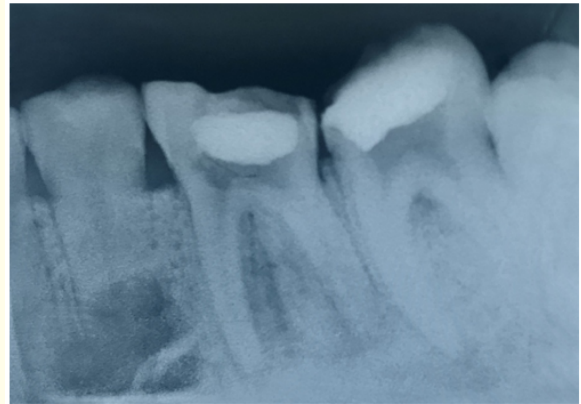
cal direction is called the radix paramolaris (RP) which is even a rarer entity described by Bolk [2,16]. Careful examination aids in their diagnosis. Once diagnosed, it is treated as other root canals. In this case report, diagnosis and successful endodontic treatment of radix entomolaris has been discussed.

### Case Report

A male patient aged 33 years presented with the chief complaint of pain in lower left back tooth region for 7 days. Patient revealed the history of first episode of pain 20 days ago when he visited the army hospital where treatment was initiated but he was transferred after single sitting so could not go for second appointment. It was asymptomatic until pain started 10 days ago. Pain was mild and intermittent. Sensitivity to both hot and cold was there. On clinical examination, temporary restoration was present with respect to 36 and 37 (Figure 1). 36 was positive to vertical percussion.



**Figure 1:** Intraoral view after removal of a temporary restoration.



**Figure 2:** Preoperative radiograph taken at mesial angulation revealing third root.

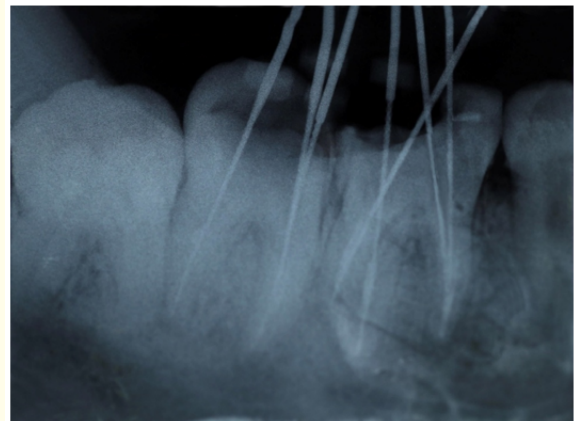
Preoperative radiograph was taken with mesial angulation revealed a distinct distolingual root, open pulp chamber suggestive of root canal initiated (Figure 2). The periapical radio-opacity with respect to 36 and 37 revealed condensing osteitis, indicating chronic low grade infection.

According to clinical and radiographic evaluation, symptomatic irreversible pulpitis with symptomatic apical periodontitis along with condensing osteitis was diagnosed with respect to 36 and 37. Patient was informed about the ailment as well as the treatment plan and endodontic procedure was commenced after obtaining the written consent.

Inferior alveolar nerve block with 2% Lignocaine with 1:100000 epinephrine was administered on the left side and temporary restoration was removed (Figure 2).

Rubber dam isolation was attempted but patient had a severe gag reflex. Initial inspection with a 15 number hand K file, revealed three canals - mesiobuccal, mesiolingual and the distal. Then file number 20 was inserted with fitted snugly indicating that just pulp was removed and biomechanical preparation upto number 15 hand file was done. The triangular shaped access preparation was modified into somewhat trapezoidal shape to negotiate distolingual canal opening. Canal orifice was found with a DG 16 end-

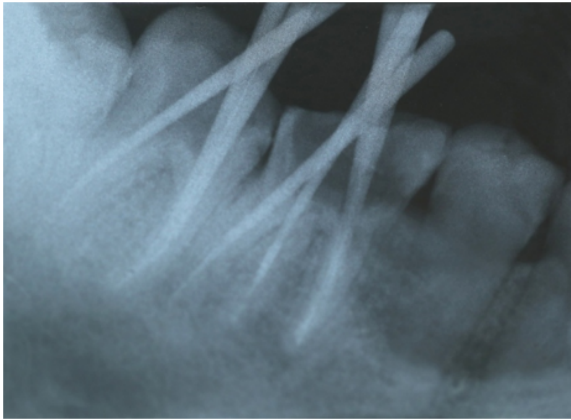
odontic explorer and canal was negotiated with number 10 K file. The root canal lengths were confirmed with the radiograph using a number 15 K file at mesial horizontal angulations (Figure 3).



**Figure 3:** Working length radiograph.

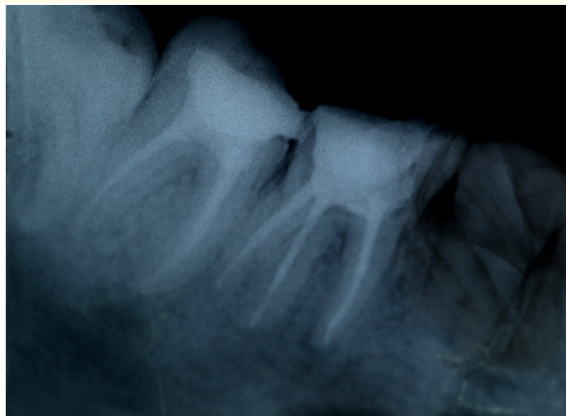
Biomechanical preparation was done using Protaper gold 6% (Dentsply Maillifer) rotary files with respect to 36 and 37 up to size F2. All canals were irrigated using 3% sodium hypochlorite solution and 17% Ethylene Diamine Tetra Acetate (EDTA) solution

intermittently. After flushing with sterile saline and a calcium hydroxide paste (Metapex) was placed in the canals and the patient was called back after 8 days. At the subsequent appointment, the patient was totally symptom free. Master cones were placed in the canals upto the working lengths and were confirmed radiographically (Figure 4).



**Figure 4:** Master cone radiograph.

Canals were rigorously dried with paper points and obturation was completed with single cone technique by using zinc oxide eugenol based sealer (Kerr; Orange, CA, US). Postoperative radiograph shows uniform obturation till radiographic apex (Figure 5).



**Figure 5:** Post-operative radiograph.

## Discussion

### Prevalence and etiology of radix entomolaris

The occurrence of an additional root in the mandibular first molar has more likelihood to occur in people of specific ethnic origin [4-8]. Natives of Europe, Africa and Asia present a prevalence rate less than 5% [7,9,10]. In the people of Indian [11] origin, the occurrence of RE is less (2.16%) than the other Asian populations. In Mongoloid people like Chinese, Eskimo and American Indians, it may reach more than 40% [3]. Due to its high prevalence in these traits, the RE is considered to be a normal morphological variant rather than anomaly.

Radix root may be found in all mandibular molars but has highest frequency of occurrence in the first molar and least likely to occur in the second molar. Its same rate of occurrence in males and females [12-14].

The etiology of RE is indeterminate yet. It can be associated to external agents during odontogenesis process, or to expression of an atavistic gene or polygenetic system as the racial genetic factors profoundly affect the expression of a particular gene resulting in the marked phenotypic manifestation [5,15].

### Various classifications

RE has been divided into four types based on the location of its cervical part by Carlsen and Alexandersen (1990):

1. Type A: The RE is located lingually to the distal root complex which has two cone shaped macrostructures.
2. Type B: The RE is located lingually to the distal root complex which has one cone shaped macrostructure.
3. Type C: The RE is located lingually to the mesial root complex.
4. Type AC: The RE is located lingually between the mesial and distal root complexes [16-18].

Based on the curvature of the root or root canal, De Moor, *et al.* (2004) classified RE:

1. Type 1: A straight root or root canal.
2. Type 2: A curved coronal third which becomes straighter in the middle and apical third.
3. Type 3: An initial curve in the coronal third with a second buccally oriented curve which begins in the middle or apical third [16-18].

Song, *et al.* (2010) did addition of two more newly defined variants of RE:

1. Small type: Length shorter than half of the length of the distobuccal root
2. Conical type: Smaller than the small type and having no root canal within it [16-18].

### Clinical implications

Accurate diagnosis of these supernumerary roots needed through thorough inspection visually as well as with radiographs to avoid complications like missing canal leading to treatment failure. Careful probing helps in the identification of accessory roots during clinical inspection of the crown as well as periodontal tissues [19,20]. Furthermore, the location of the orifice of the root canal on the pulpal floor may hints towards the presence of additional canals. For instance, the orifice of the radix entomolaris is often present in the distolingual direction to the main distal root [7,10]. Also, widening of access opening from triangular form to trapezoidal form, use of loupes and microscope can help in finding distolingual canal. As the RE and the distobuccal root are usually aligned in the same buccolingual plane, their superimposition on the preoperative radiograph, can result in an incorrect diagnosis. A vigilant inspection of the preoperative radiograph and interpretation of peculiar features, like an unclear view or outline of the distal root or the root canal, can indicate the presence of a 'invisible' RE. To reveal the RE, an another radiograph from a more mesial or distal angulation usually 30 degrees horizontally should be taken. Hence, it can lead to an accurate diagnosis in the most of cases.

In this case report, the canal orifices were determined conventionally using the DG-16 endodontic explorer. Thorough awareness about root morphology, root canal anatomy together with the periapical radiographs at different angulations aided in identification of the canal configuration. The RE was found to be with straight root and root canal, therefore classified as De Moors Classification Type I which was treated efficiently.

### Conclusion

Thorough knowledge of variations in morphologies, careful examination of pulp floor, conventional radiographs projected at different horizontal angulations along with alteration in standard preparation form aids in precise diagnosis and successful treatment of anatomical variations.

### Disclosure

In this study there isn't conflict of interest. I am looking forward for your evaluation and to being included in this outstanding publication.

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