



# ENDODONTIC MANAGEMENT OF RADIX ENDOMOLARIS

**Dr. N. Vimala**  
Professor

Department of Conservative Dentistry and Endodontics  
D.Y Patil School of Dentistry, Navi Mumbai  
Email id – [n.vimala@dypatil.edu](mailto:n.vimala@dypatil.edu)

**Dr. Gayatri Pendse**  
Associate Professor

Department of Conservative Dentistry and Endodontics  
D.Y Patil School of Dentistry, Navi Mumbai  
[gayatri.pendse@dypatil.edu](mailto:gayatri.pendse@dypatil.edu)

**Dr Khushboo Mehra**  
Lecturer

Department of Conservative Dentistry and Endodontics  
D.Y Patil School of Dentistry, Navi Mumbai  
[khushboo.mehra@dypatil.edu](mailto:khushboo.mehra@dypatil.edu)

**Dr. Smriti Balaji**  
MDS IIInd year

Department of Conservative Dentistry and Endodontics  
D.Y Patil School of Dentistry, Navi Mumbai  
Email id – [smritibalaji@gmail.com](mailto:smritibalaji@gmail.com)

**Dr.Parinita Agarwal**  
MDS IIInd year

Department of Conservative Dentistry and Endodontics  
D.Y Patil School of Dentistry, Navi Mumbai  
[agarwalparinita96@gmail.com](mailto:agarwalparinita96@gmail.com)

**Dr Vashna Upadhyaya**  
MDS Ist year

Department of Conservative Dentistry and Endodontics  
D.Y Patil School of Dentistry, Navi Mumbai  
[vashna.upadhyaya@gmail.com](mailto:vashna.upadhyaya@gmail.com)

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## ABSTRACT

An awareness and thorough knowledge of internal and external root canal morphology contribute to the successful root canal treatment. Mandibular first molars show most of the anatomical variations not only in the number of canals but also in the presence of number of roots and their morphology. The presence of additional root either lingually or buccally in addition to two roots is one of the complex morphological variations. Diagnosis, identification, and treatment of these variations need adequate knowledge of root and root canal anatomy and configurations which can contribute to the better outcome. This case report discusses the endodontic treatment of two mandibular first molars with a radix entomolaris (RE), with 3 roots and 4 root canals, which are rare macrostructures

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## INTRODUCTION

A thorough understanding of root canal anatomy and morphology is required for achieving high level of success in endodontic treatment. Incomplete instrumentation and cleaning of the root canal space and faulty obturation are the main reasons for failure of endodontic treatment.<sup>1</sup> According to Swartz, Skidmore and Griffen, mandibular first molars have a significantly lower success rate compared with other teeth.<sup>1</sup> Missed canals and the failure to remove all the microorganisms and pulp remnants from the root canal system are probably the main reasons for persistent infection around endodontically- treated molars.<sup>2</sup> It is therefore important that clinicians have an awareness and good understanding of the variations in root canal morphology of the mandibular first molar.<sup>2</sup>

The major variant in this tooth type is the presence of an additional third root; a supernumerary root is found lingually referred as distolingual root, Radix entomolaris (RE), first described by Carabelli, is an anatomical variant found in the permanent mandibular first molar. Endodontic literatures on RE in permanent mandibular first molars reveals its incidence ranging from 0%-43.7%, with highest prevalence among the Mongolian and Eskimo traits.<sup>3</sup>

## CASE REPORT 1

A 16 year old female patient was referred to Department of Conservative dentistry & Endodontics with throbbing, nocturnal pain in lower right back tooth region for the past 1 week. The patient also reported with prolonged sensitivity to hot and cold substances. Clinical examination revealed deep occlusal carious lesions on mandibular first molar. The tooth 46 was tender to vertical percussion. The preoperative radiograph revealed radiolucency of carious lesion involving the pulp with respect to 46 (Figure 1a). Based on the clinical and radiographic findings, a diagnosis of symptomatic irreversible pulpitis with symptomatic apical periodontitis with respect to 46 was made. Informed consent was obtained, and endodontic treatment was initiated.

## CASE REPORT 2

A 22 year old female patient reported to the Department of Conservative dentistry & Endodontics with a chief complaint of pain in lower right back tooth region for the past 3 weeks which had increased in intensity since two days. Clinical examination revealed deep proximal carious lesion on mandibular first molar. The tooth 46 was tender to vertical percussion. The preoperative radiograph revealed radiolucency of carious lesion involving the pulp with respect to 46 (Figure 2a). Based on the clinical and radiographic



findings, a diagnosis of symptomatic irreversible pulpitis with symptomatic apical periodontitis with respect to 46 was made.

#### **CLINICAL MANAGEMENT**

Local anesthesia was administered and the tooth was isolated under rubber dam. Tooth was accessed, and four distinct canal orifices were located and negotiated using k file file ISO 15 (Dentsply Malliefer). Working length was determined using the J Morita apex locator with 15 No. K files and was verified using periapical radiograph (Figure 1b and 2b). Cleaning and shaping was done using Protaper (Dentsple

Maillifer) rotary files upto 25-6% in case report 1 and 25-4% in case report 2 using Azure rotary files. All the canals were irrigated using 3% sodium hypochlorite solution and 17% Ethylene Diamine Tetra Acetate solution. The canals were finally flushed with sterile saline. Master cones were inserted to the working length and were confirmed radiographically (Figure 1c and 2c). The canals were dried with paper points and obturation was performed with AH plus sealer followed by post obturation restoration using composite (Figure 1d and 2d). Final radiographs were taken to establish the quality of the obturation.



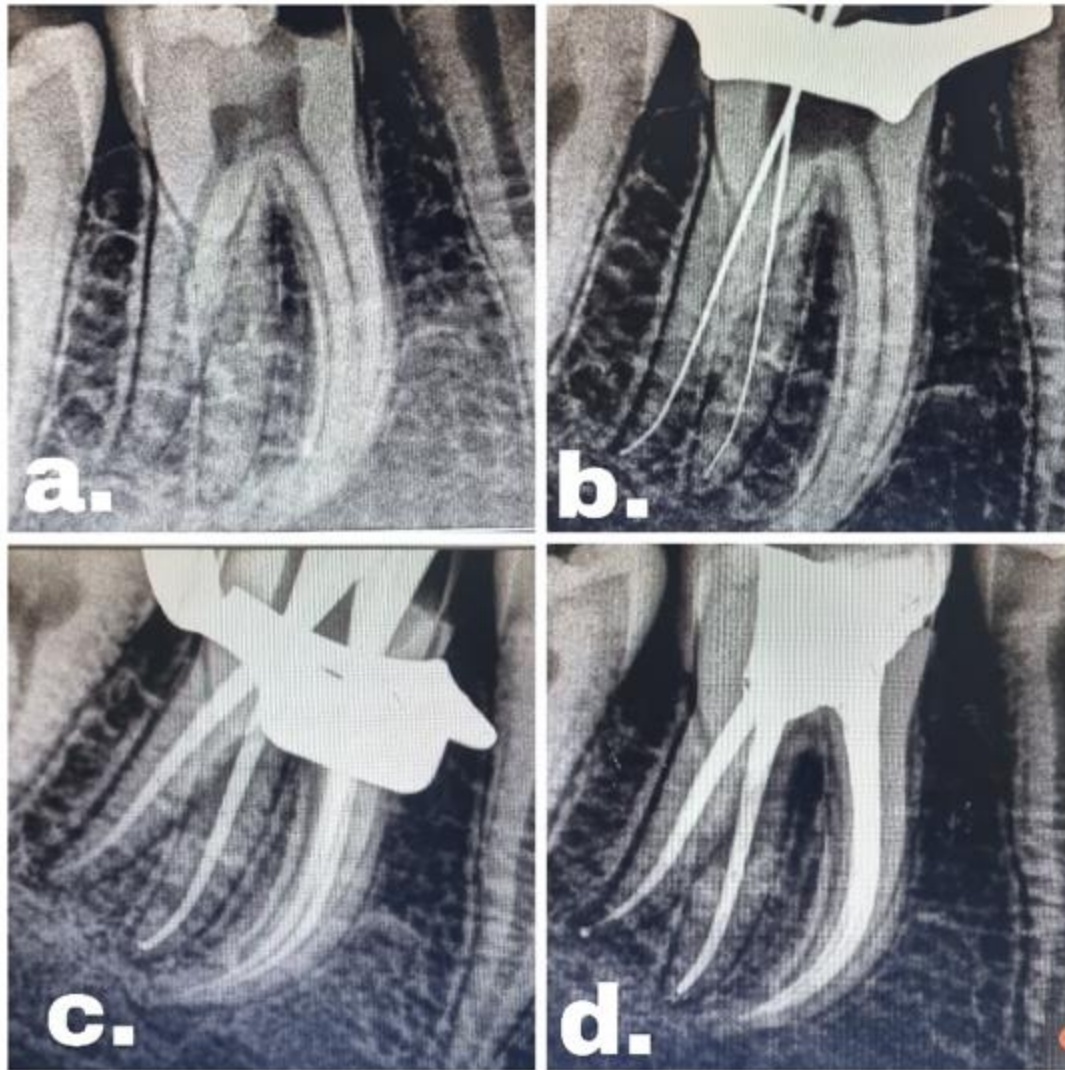


Figure 1 – a: Preoperative radiograph, b: Working length determination, c: Master cone radiograph, d: Obturation with post endodontic restoration

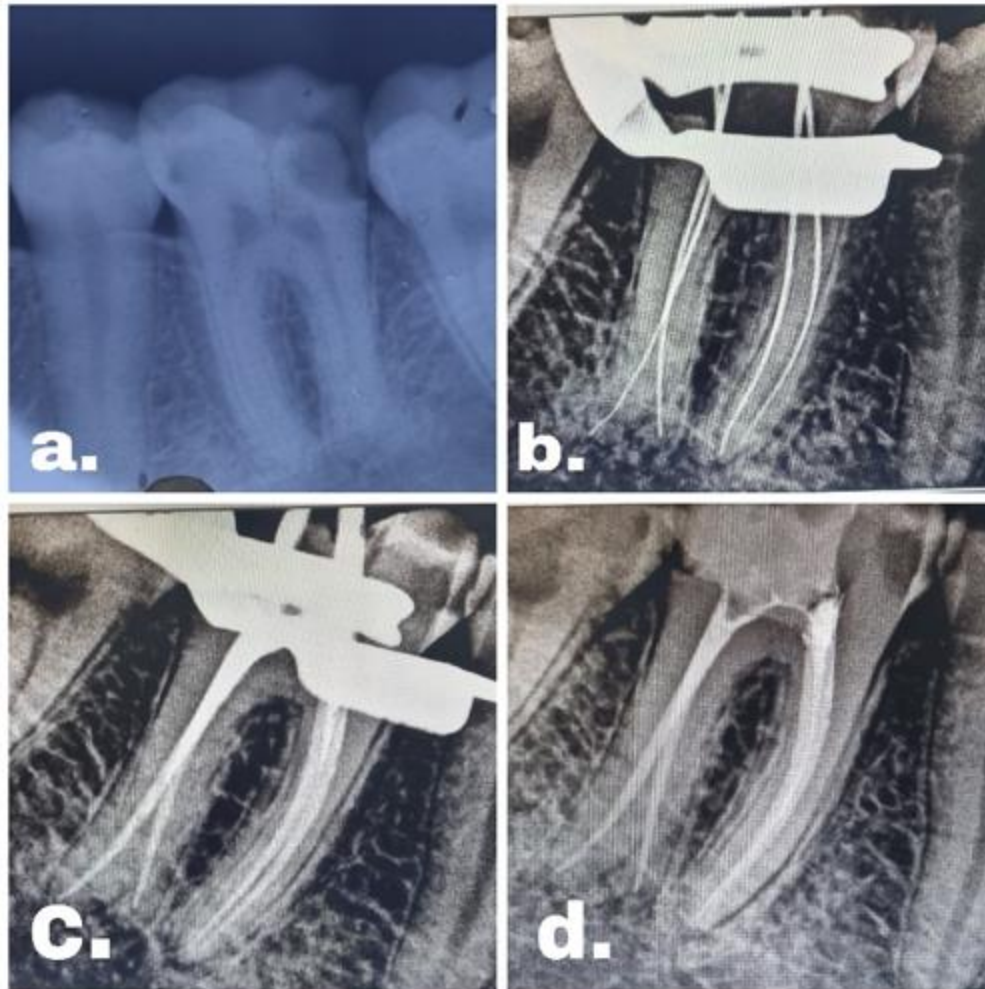


Figure 2 – a: Preoperative radiograph, b: Working length determination, c: Master cone radiograph, d: Obturation with post endodontic restoration

### **DISCUSSION**

A thorough knowledge of internal and external anatomy coupled with a correct diagnosis, adequate cleaning, and shaping of the root canal system will normally lead to a successful outcome. The presence of RE or a radix paramolaris has clinical implications in endodontics, and an accurate diagnosis of these supernumerary roots can avoid complications or a “missed canal” during root canal treatment. Because RE is mostly situated in the same buccolingual plane as the distobuccal

root, a superimposition of both roots can appear on the preoperative radiograph, resulting in an inaccurate diagnosis. According to Calberson *et al.* (2007) the etiology behind the formation is still unclear but it could be related to external factors during odontogenesis.<sup>25</sup> Racial genetic factors can also influence profound expression of a particular gene that can result in the more pronounced phenotypic manifestation. A radix entomolaris can be found on the 1st, 2nd and 3rd mandibular molar, minimal frequently on the

second molar. radixentomolaris from 50% to 67% i a bilateral occurrence<sup>4</sup>.

### Classification

Carlsen and Alexandersen (1990) classified RE into four different types based on the location of its cervical part:

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

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

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.

Song *et al.* (2010) further added 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.

A keen inspection of pre-operative 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 presences of a hidden Entomolaris. To reveal the radix, a another radiograph should be taken from a more mesial or distal [30 degree]. Clinical insepection of the tooth crown and analysis of cervical morphology of the roots checked by periodontal probing, give idea of an additional

root. The location of the orifice of the root canal of entomolaris access cavity shaped triangular to trapezoidal. A severe root inclination or canal curvature, particularly in the apical third of the root canal, can cause shaping aberrations such as straightening of the root canal or a ledge, with root canal transportation and loss of working length. All cases follow up 18 months with no clinical sign and symptoms and no changes in radiograph<sup>5</sup>.

### CONCLUSION

Clinicians should be aware of these unusual root morphological variation of the RE in terms of root inclination and root canal curvature demand careful, adapted diagnostic and clinical approach to avoid or overcome procedural errors during endodontic therapy.

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