

RADIX ENTOMOLARIS – A Case Series Of Endodontic Management Of A Rare Anatomic Variation In Mandibular Molars

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Abstract: Radix Entomolaris is the presence of a distolingual supernumerary root found in the first, second, and third mandibular molars. The prevalence of three-rooted mandibular first molars appears to be less than 5% in Eurasian and Asian populations. This case series describes successful endodontic management of a series of seven cases of Radix Entomolaris. [Tagdiwala D NJIRM 2015; 6(6):102-105]

Key Words: Anatomy, Mandibular molars, Radix Entomolaris

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Introduction: Root canal complexity can often be the primary reason for failure of root canal therapy. An awareness and understanding of the presence of unusual root canal morphology can therefore contribute significantly to the successful outcome of root canal treatment. In mandibular molars, the most common variation seen is the presence of a distolingual supernumerary root called Radix Entomolaris (RE) (1). Radix entomolaris (RE) was first described by Carabelli (2). It is found in the first, second, and third mandibular molars, occurring the least frequently in the second molar. The prevalence of three-rooted mandibular first molars appears to be less than 5% in Eurasian and Asian populations (3). This case series describes successful endodontic management of a series of seven cases of Radix Entomolaris.

Case report: Written and signed consent was taken from all the patients for the use of their intraoral periapical radiographs for the following case report. Written approval was obtained from the Ethical Committee of the institute for the same.

Case 1:

A 28 year old female patient reported to the Department of Conservative Dentistry and Endodontics with pain in the lower left posterior region. On intraoral examination, it was seen that tooth no. 36 showed extensive proximal caries (mesial surface) and was tender on percussion. The preoperative radiograph (Figure 1, upper left) showed deep proximal caries involving the pulp with periapical widening and presence of an additional root between the mesial and distal roots. A diagnosis of chronic irreversible pulpitis with apical periodontitis was made.

Treatment:

The tooth was anesthetized and access cavity was prepared using an endoaccess bur (Figure 1, middle left). Two distal and two mesial canal orifices were located using an endodontic explorer (DG-16). After pulp tissue extirpation and placement of a temporary restoration, the patient was referred to the Department of Oral Radiology where a CBCT was taken. CBCT images showed presence of bifurcation of the distobuccal root in the middle 1/3rd region into distolingual root (Figure 1, upper right). In the next appointment, initial glide path was prepared till 15# k-file in all the canals which was followed by use of Sx file for coronal flaring of the root canals. The canal lengths were determined using an Electronic apex locator and confirmed using a radiograph (Figure 1, middle right). Cleaning and shaping was performed using Protaper system upto F1 in MB, ML and DL canal and F2 in DB canal. Cleaning and shaping were supplemented with irrigation using 3% sodium hypochlorite and saline. RC-Help was used as a lubricant during instrumentation. A final rinse was done using 17% EDTA followed by 0.2% chlorhexidine. After the master cone selection (Figure 1, lower left), the canals were obturated using lateral condensation technique in all the canals. Post obturation radiograph was taken (Figure 1, lower right).

Case 2:

A 26-year-old female patient presented with dull aching pain while chewing food on mandibular left first molar (tooth 36). Following clinical and radiographic evaluation, a diagnosis of pulp necrosis was made and root canal treatment was started under rubber dam isolation. After achieving adequate anesthesia, access opening was performed (Figure 2, upper left). Exploration of the pulp chamber floor using an

endodontic explorer revealed an extra canal orifice situated distolingually and confirmed the presence of RE. The endodontic treatment was carried out similar to Case 1 with radiographic confirmation of working length (Figure 2, upper right), mastercone fit (Figure 2, lower left) and obturation (Figure 2, lower right).

Figure 1: Case 1. Upper left - Preoperative radiograph Upper right- CBCT image showing extra root, Middle left - Access opening showing four orifices, Middle right - Working length radiograph, Lower left - Master cone radiograph, Lower right - Post obturation radiograph

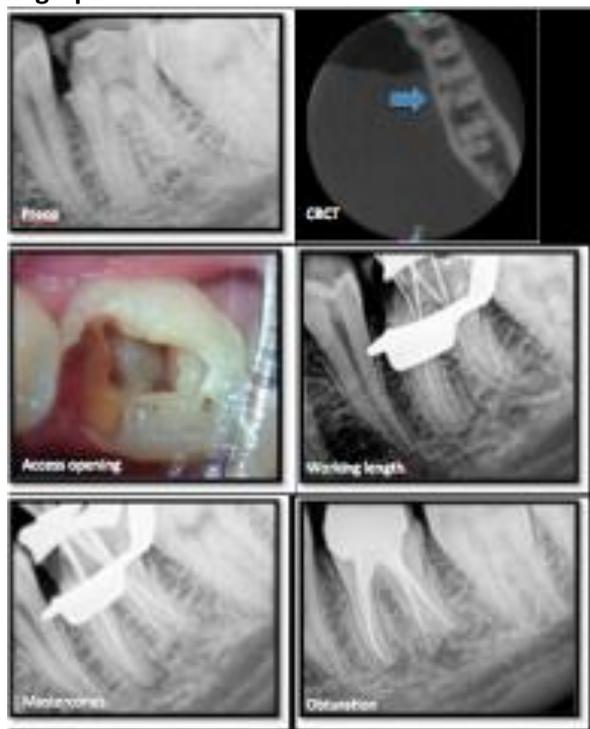
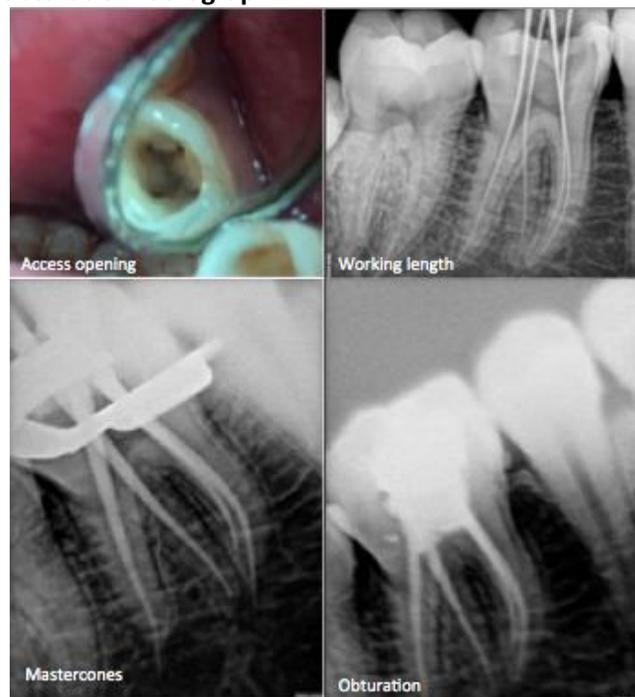


Figure 2: Case 2. Upper left - Access opening, Upper right - Working length radiograph, Lower left - Mastercone radiograph, Lower right - Post-obturation radiograph



Figure 3: Case 3. Upper left - Access opening, Upper right - Working length radiograph, Lower left - Mastercone radiograph, Lower right - Post-obturation radiograph



Case 3:

A 35-year-old male reported with a complaint of severe pain in mandibular right first molar (tooth 46) since 2 days. Based on clinical and radiographic findings, a diagnosis of symptomatic irreversible pulpitis was made and root canal treatment was initiated. Access preparation and pulp chamber inspection led to the finding of an extra canal orifice toward the distolingual corner of the pulp chamber in addition to other three regular canal orifices (Figure 3, upper left). The distolingual orifice was found very distinct and indicated the presence of a RE. The endodontic treatment was carried out as in Case 1 with radiographic confirmation of working length (Figure 3, upper right), mastercone fit (Figure 3, lower left) and obturation (Figure 3, lower right).

Case 4:

A 21-year-old female came to the Department of Conservative Dentistry and Endodontics with a chief complain of pain in lower right posterior tooth. Clinical examination revealed deep occlusal caries in mandibular right first molar (tooth 46). Following clinical and radiographic evaluation and pulp testing, a diagnosis of pulp necrosis was made. The preoperative radiograph showed the presence of an additional distal

root outline (Figure 4, top row, left). The patient was advised to undergo root canal treatment. Root canal treatment was completed in the same manner as in Case 1 with radiographic confirmation of working length (Figure 4, top row, middle) and obturation (Figure 4, top row, right).

Case 5:

A 32-year-old female was presented with excruciating pain in a mandibular right first molar. Clinical examination of the tooth showed the presence of deep mesio-occlusal caries and radiographic examination of tooth 46 revealed caries close to mesial pulp horn and an extra root outline suggesting the presence of an RE (Figure 4, second row, left). Following a diagnosis of acute irreversible pulpitis, the endodontic treatment was carried out similar to Case 1 with radiographic confirmation of working length (Figure 4, second row, middle) and obturation (Figure 4, second row, right).

Case 6:

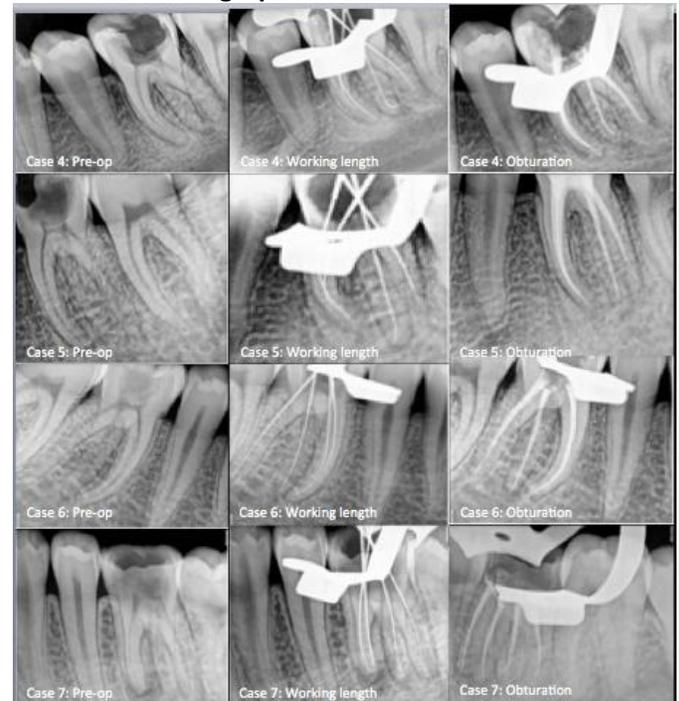
A 27 year-old male patient was referred to Department of Endodontics with chief complaint of severe pain in lower left posterior tooth. A diagnosis of irreversible pulpitis was reached after clinical and radiographic evaluation (Figure 4, third row, left). Careful access opening revealed three orifices. In the process of removing the remaining roof in the distolingual corner, a bleeding spot was observed which when explored was found to be an additional canal. The access cavity preparation was modified from a triangular to a trapezoidal form for proper accessibility of all the canals. After that the orifice enlargement was done, the same treatment protocol as Case 1 was followed, with radiographic confirmation of working length (Figure 4, third row, middle) and obturation (Figure 4, third row, right).

Case 7:

A 31 year old male patient reported with chief complaint of severe pain in the right lower posterior tooth region. Diagnostic radiograph showed periapical changes in mesial root and radiolucency involving pulp (Figure 4, bottom row, left). Three canals were located during access cavity preparation under local anesthesia but the dentinal map seemed to extend in a distolingual direction. Access preparation was modified in that direction with a long shank round bur and a extra orifice was located. A fourth canal was confirmed and then the same treatment regimen was followed as mentioned in Case 1 with radiographic confirmation of

working length (Figure 4, bottom row, middle) and obturation (Figure 4, bottom row, right).

Figure 4: Top row - Case 4. Left - Preoperative radiograph, Middle - Working Length Radiograph, Right - Post-obturation Radiograph
Second row - Case 5. Left - Preoperative radiograph Middle - Working Length Radiograph, Right - Post-obturation Radiograph
Third row - Case 6. Left - Preoperative radiograph Middle - Working Length Radiograph, Right - Post-obturation Radiograph
Bottom row - Case 7. Left - Preoperative radiograph Middle - Working Length Radiograph, Right - Post-obturation Radiograph



Discussion: The Radix Entomolaris is located distolingually, with its coronal third completely or partially fixed to the distal root. The dimensions of the Radix Entomolaris can vary from a short conical extension to a 'mature' root with normal length and root canal. In most cases, the pulpal extension is radiographically visible. In general, the Radix Entomolaris is smaller than the distobuccal and mesial roots and can be separate from, or partially fused, with the other roots. It is considered to be an Asiatic trait (4,5) and according to Grossman (6), the incidence of radix entomolaris is 5.3 %.

RE can be classified into four different types depending on the location of its cervical part (Carlson and Alexander) (7).

- i. Type A: the RE is located lingual to the distal root complex, which has two cone-shaped macrostructures.
- ii. Type B: the RE is located lingual to the distal root complex, which has one cone-shaped macrostructures.
- iii. Type C: the RE is located lingual to the mesial root complex.
- iv. Type AC: the RE is located lingual between the mesial and distal root complexes.

Each type has a sub-classification to allow for the identification of separate or non-separate RE.

Ribeiro and Consolaro (8) proposed a classification for Radix Entomolaris as follows:

- A. Type I refers to a straight root/root canal.
- B. Type II refers to an initially curved entrance and the continuation as a straight root/root canal.
- C. Type III refers to an initial curve in the coronal third of the root canal and a second buccally oriented curve starting from the middle to apical third.

No two teeth are ever alike and the occurrence of anatomic variations is a constant challenge to the clinician. While routine endodontics is a comfortable task, achieving a good degree of overall clinical success often depends on how the rarely occurring root canal presentations are detected and treated. Knowledge and understanding of tooth morphology & careful evaluation of preoperative radiographs of each and every case is mandatory. The morphological variations of the Radix Entomolaris in terms of root inclination and root curvature demand a careful and adept clinical approach to avoid or overcome procedural errors during endodontic therapy.

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