

## CASE REPORT

# ENDODONTIC MANAGEMENT OF RADIX ENTOMOLARIS: TWO CASE REPORTS

### ABSTRACT

A thorough knowledge of anatomy is necessary for the success of endodontic treatment. Anatomical variations should be kept in mind during endodontic treatment of maxillary molars. These teeth have highly variable root canal morphology. This case report describes the diagnosis and endodontic management of mandibular first molar with four canals.

**Key words:** Endodontic treatment, radix entomolaris.

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## INTRODUCTION

The aim of endodontic therapy is to effectively eliminate the bacteria from the root canals, which have been infected by microorganisms and to avoid recontamination of the canals, which are mainly attained by proper cleaning and shaping, followed by a three dimensional fluid-tight seal of root canals. A clinician should have a proper knowledge of the root canal anatomy and its variations such as extra roots, fins, webs, and isthmuses, which make the treatment complicated.<sup>1</sup> Lack of understanding of the root canal morphology and improper shaping and cleaning can lead to the flare-ups.<sup>2</sup>

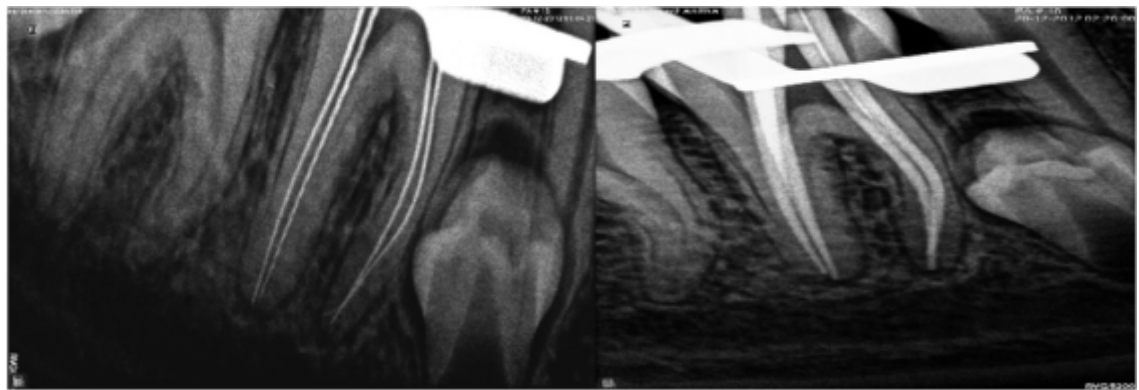
A clear understanding of the human teeth anatomy is a prerequisite to achieving proper access cavity preparation, thorough cleaning, disinfection and obturation of the pulp space. These objectives can be achieved by detecting the anatomical variations of the tooth under treatment. One of the major reasons for failure of root canal therapy is the inadequate

knowledge about the anatomy of the pulp space in the root canals. Root canals are left untreated when the dentist fails to identify them particularly in teeth that have additional root canals.<sup>3</sup>

## CASE REPORTS

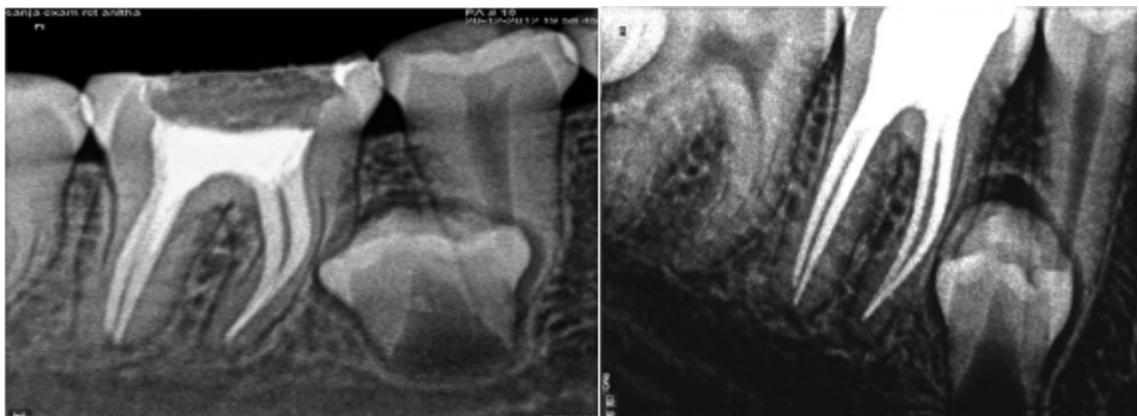
### Case 1

A 25year old female patient reported to the Department of Conservative Dentistry and Endodontics with a chief complaint of pain in lower-left back tooth region for 1 month. The patient revealed a history of mild intermittent pain for the past 2 months, which had increased in intensity during the past 2 weeks. The patient reported prolonged sensitivity to hot and cold substances. The pain was spontaneous and aggravated particularly at night. Clinical examination revealed deep occlusal carious lesions on mandibular first molar. The tooth 36 was



**Working Length**

**Mastercone**



**Obturation**

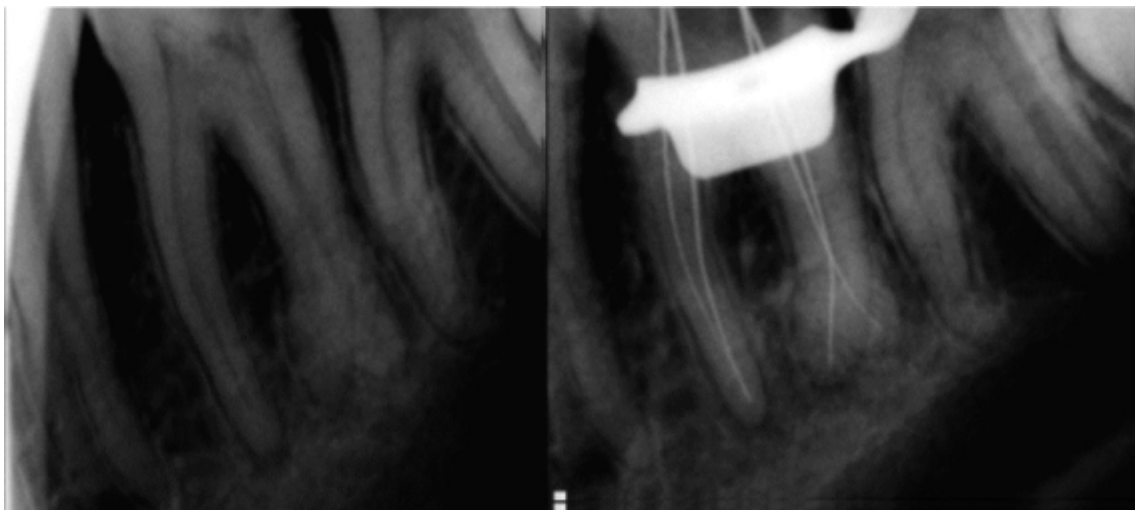
**Postoperative Radiograph**

tender to vertical percussion. Periodontal probing around the tooth showed normal alveolar bone morphology, normal sulcular depth, absence of pocket. The preoperative radiograph revealed radiolucency of carious lesion involving the pulp with respect to 36. Based on the clinical and radiographic findings, a diagnosis of symptomatic irreversible pulpitis with symptomatic apical periodontitis with respect to 36 was made and routine nonsurgical endodontic treatment was planned. Treatment plan was explained to the patient and consent obtained.

### Case 2

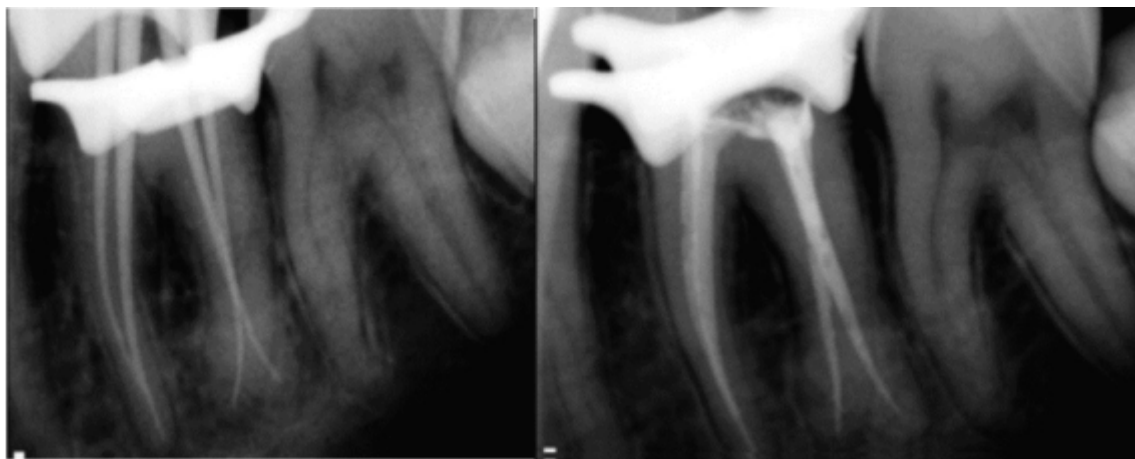
A 30-year-old female patient reported to the Department of Conservative Dentistry and

Endodontics with a chief complaint of pain in lower-right back tooth region for 2 months. The patient revealed a history of mild intermittent pain for the past 1 month, which had increased in intensity during the past 1 week. The patient reported prolonged sensitivity to hot and cold substances. The pain was spontaneous and aggravated particularly at night. 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. 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.



**Preoperative**

**Working Length**



**Master Cone**

**Obturation**

## CLINICAL MANAGEMENT

After a consent from the patients, local anaesthesia was administered with 1: 80,000 epinephrine and isolation was done with a rubber dam. After endodontic access cavity preparation, a clinical examination was carried out with a DG16 endodontic explorer. Upon close examination found two mesial and two distal canals. In the subsequent visits, canals were explored and negotiated using #08 and #10 size K-files. The working length of the canals was determined electronically using an apex locator and confirmed radiographically. Canals were cleaned and shaped using neo endo rotary files. Canals were irrigated using 2.5% sodium hypochlorite solution. In both the cases, the finding of a separate disto-lingual canal orifice and radiographic outline of the roots in the subsequent radiographs indicated the presence of an RE. In the next visit after a week, the canals were dried using paper points, master cone radiograph was taken, and obturation was done. The access cavity was restored with temporary restoration, postobturation radiograph was taken, and the patient was scheduled for full coverage restoration.

## DISCUSSION

Radix entomolaris, first described by Carabelli, is an anatomical variant in the first permanent mandibular molar typically characterized by an additional third root located distolingually. RE occurs in first, second and third molars with the lowest prevalence in second mandibular molars.<sup>4,5,6</sup>

**Classification:** Carlsen & Alexandersen et al (1990) classified radix entomolaris (RE) into four different types based on the location of its cervical part<sup>7</sup>:

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 macrostructures.
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 radix entomolaris based on the curvature of the root or root canal<sup>8</sup>:

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 JS et al. (2010) further added two more newly defined variants of Re<sup>9</sup>:

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.

Endodontic treatment success in the presence of RE mainly depends on its diagnosis, treatment plan, anatomy of morphology assessment, canal configuration, and approaching the tooth clinically<sup>10</sup>.

Apart from the awareness about the possible existence of RE, factors such as an extra cusp, prominent distolingual lobe, cervical convexity, complex external contour of the furcation can indicate the presence of an RE. Radiographically, double periodontal ligament images or an unclear view or outline of the distal root contour or the root canal can give hint to the presence of an RE. However, this requires a thorough inspection of the preoperative radiograph.<sup>11</sup>

Modification of the conventional triangular access to obtain rectangular or trapezoidal outline form assists in locating the orifice of RE. Since canal entrances are equidistant from a line drawn in a mesiodistal (MD) direction through the pulp chamber floor and lie on a line perpendicular to this MD line across the centre of the floor of the pulp chamber, following the laws of symmetry helps in both detecting and locating an RE.<sup>10</sup>

A clinical approach to endodontically treat an RE should consist of adopting measures to minimize complications. An initial relocation of the orifice to the lingual without excessive removal of dentin helps to achieve straight-line access and avoid perforations. Manual preflaring is recommended to prevent instrument separation. It is said that RE exhibits

the greatest degrees of curvature among the other roots of a mandibular molar with its canal having relatively longer length and smaller radius of curvature. As the risk of instrument fracture significantly increases with the decrease in the radius of curvature, canal preflaring with manual use of stainless steel files is suggested to overcome instrument fracture. Initial root canal exploration with small files (size 10 or less), creation of a glide path along with the proper determination of the canal curvature and working length would reduce the procedural errors such as ledging and transportation. Finally, use of nickel-titanium rotary files having a taper of not more than 0.04 taper and crown down technique is said to allow a more centered, rounder and conservative canal preparation than the use of stainless steel instruments in RE.<sup>12</sup>

## CONCLUSION

Failure to identify and treat an RE can significantly affect the outcome of an endodontic treatment. Angulated radiographs can play a key role in the identification radix entomolaris and also clinician should have through knowledge about prevalence, diagnosis, morphology, canal configuration of an RE.

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