

Dr. U. K. Das\*, Dr. Aditya Mitra\*\*, Dr. Jagori Sarkar\*\*\*

### Abstract

The mandibular first molar is one of the most important pillars of the dental arch. Being one of the earliest teeth to erupt it gives the maximum support to the dental arch. The tooth usually has lot of variation in the number of roots and root canals. One rare aberration associated with first molars is the presence of a third root with four root canals (Mesiobuccal, mesiolingual, distobuccal, distolingual canals).

A case report of an 18 year old patient diagnosed with apical periodontitis secondary to carious pulpitis associated with left mandibular first molar presented with such an anomaly in the root and root canal configurations. It was managed by endodontic treatment, post and core followed by porcelain fused to metal crown .

**Key Words** Radix entomolaris, endodontic treatment, fiber post

## INTRODUCTION

The mandibular first molar is one of the earliest teeth to erupt in the dental arch. It presents a lot of variations especially in the number of roots and root canals. This tooth usually has **two roots but occasionally, it has three roots with two or three canals in the mesial root and one, two, or three canals in the distal root**<sup>1</sup>. This tooth frequently requires root canal treatment; hence it is important for us to have a proper knowledge of the anatomy of this tooth.

It generally has two separate roots with a round, or more frequently elliptical, canal in the distal root and two canals in the mesial root. The distal canal may be straight all the way to the apex, oval or flattened in cross- section, but quite large in diameter which makes instrumentation easy. Sometimes, apical 1-2 mm of this canal curves up to 90 degrees distally. Mesial root presents two separate root canals in 90% cases; in the remaining 10%, they join together at a common foramen. The canals of the mesial root take a more curved course with a mesial orientation immediately below the orifice and then distal in the rest of the root canal 2.

The presence of an additional distolingual root in the mandibular molars is known as **Radix Entomolaris**. It was clinically reported by **De Moor et al** in 2004. If the root is present on distobuccal side then this condition is termed as **Radix Paramolaris**.

According to O. Carlsen et al (1990) Radix Entomolaris can be classified into four different types depending on the location of its cervical part:

- (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.**

### ABOUT THE AUTHORS

\*Professor and HOD, \*\*Professor, \*\*\*Post Graduate Student  
Dept. of Conservative Dentistry and Endodontics, Guru Nanak Institute of Dental Sciences & Research, Kolkata.

**(iii) Type C: The RE is located lingual to the mesial root complex.**

**(iv) Type AC: The RE is located lingual to the mesial and distal root complexes<sup>3</sup>.**

An alternative classification of RE by De Moor et al (2004) describes the curvature of the root or the root canal and is based on the work of Ribeiro et al.

**(i) Type 1: A straight root or root canal.**

**(ii) Type 2: A curved coronal third which becomes straighter in the middle and apical third.**

**(iii) Type 3: An initial curve in the coronal third with a second buccally oriented curve which begins in the middle or apical third<sup>10</sup>.**

These aberrations are infrequently associated with the first molar tooth but it is important for us to focus on these cases and go through the management during root canal treatment when deemed necessary and the problems associated with the same.

#### CASE STUDY:

An 18 year old male patient had reported to the dental hospital with the chief complaint of severe pain in the lower left back region of the jaw since 4 days. **The pain in 36 was intermittent in nature, aggravated upon chewing food and persisted even after removal of the stimulus.**

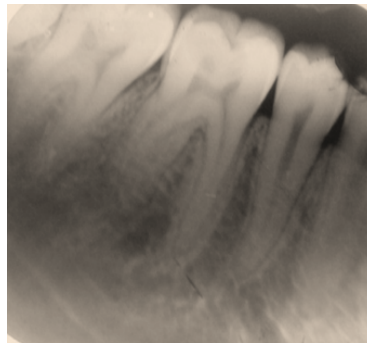
Upon clinical examination a wide occlusal cavity with caries extending upto the pulp chamber

was seen in tooth number 36. The tooth was tender on percussion and patient was advised an intraoral periapical radiograph which revealed the presence of an extra root. Using the SLOB rule (same-lingual, opposite-buccal) it can be seen that the third root in the image moves in the **same** direction as mesial root and therefore it is to the lingual side of the mesial root.

The intraoral periapical radiograph revealed the presence of a third root in the distal side and a deep carious lesion involving the occlusal surface extending from the marginal ridge on the distal side to the central portion. Widening of the periodontal ligament space in the distolingual root was also seen.

So, from the history, clinical examination and radiographic examination acute apical periodontitis secondary to irreversible pulpitis was diagnosed in tooth number 36. The treatment planning was done and patient was advised root canal treatment with 36 followed by post insertion and core build up and porcelain fused to metal crown with the same and informed consent was taken for treatment.

2% Lignocaine hydrochloride with adrenaline (1:80000) was administered after isolation with rubber dam and access cavity preparation was done. The canal orifices were located and it was found that there are four root canals associated with the tooth. Using No.15 K files the working length determination was done followed by biomechanical preparation of the canal using rotary protaper file up to F2. Master cone was inserted and radiograph was taken for evaluation.



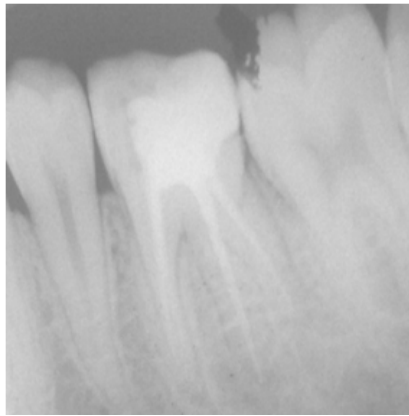
**Preoperative radiograph**



**Working length determination**



**Master cone insertion**



**Post obturation restoration**



**Post space preparation**



**Completed restoration**

Obturation was done with Protaper gutta percha points and post operative radiograph was taken. In the next sitting after seven days, post space preparation was done in the distobuccal canal followed by insertion of fiber post and core build up with light cure composite resin to reinforce the weakened proximal walls after caries removal. There after tooth preparation for porcelain fused to metal crown was done followed by impression making and temporization. In the next day, permanent crown was cemented with glass ionomer luting cement. Patient was found to be completely asymptomatic after the completion of the treatment.

## DISCUSSION

Radix entomolaris (RE) is one of the anatomical variant found in a permanent mandibular molar and was first described by Carabelli(4). It is characterized by the presence of an additional or extra third root, which is typically found distolingually. Radix entomolaris can be found in the first, second, and third mandibular molars, occurring the least frequently in the second molar<sup>5</sup>.

The prevalence of RE is reported to differ significantly with races and ranges from 0-33.1%. The prevalence of RE is said to be highest among the population of Mongolian origin such as Chinese,

Taiwanese, and Koreans which considered to be an eumorphic root morphology among them. It is not very common in African, Eurasian, Caucasian and Indian population and it is said to be dysmorphic root morphology in them<sup>6,7</sup>. Despite RE consideration as an Asiatic trait with a high prevalence and a eumorphic root morphology in certain races such as Chinese, Taiwanese, and Koreans, the incidence of RE among the Indian population is found to be very low and only 0.2%. However, few studies have reported higher prevalence of RE, with a range from 2.19-13.3%, among the Indian population<sup>5</sup>.

Few studies found male predilection for RE, but overall no significant difference was found in the prevalence of RE according to gender. Similarly, no significant difference was found in the side occurrence, despite some studies reporting it to be more on the right side while other studies finding it more on the left side. The bilateral occurrence of RE is reported to vary from 37.14 to 67%. However, some studies have reported only unilateral occurrence of Re<sup>5</sup>.

RE root is commonly found distolingually and ranges from being a short conical extension to a full length root. The root may extend unilaterally or bilaterally and may contain pulpal tissue even if it is short and conical in form.

The infrequent occurrence of such an aberration

requires that the clinician be vigilant in diagnosis and management of the lower molar teeth. The clinical examination of the tooth can reveal a more bulbous outline of the crown, an extra cusp (tuberculum paramolare), or a more prominent occlusodistal or distolingual lobe. These in combination with a cervical prominence or convexity can indicate the presence of an additional root. Aids to clinical examination such as magnifying loupes, an intraoral camera, or a dental microscope may be useful in this respect. Radiographically a third root should normally be readily evident in about 90% of cases. A careful inspection of the radiograph can sometimes reveal the presence of a “hidden” RE as indicated by an unclear view or outline of the distal root contour or the root canal. However, it may still be missed due to its slender dimensions occasionally. An additional exposure of the concerned tooth from different horizontal projections, the standard buccal-to-lingual projection, 20 degrees from the mesial and 20 degrees from the distal reveals all the basic information regarding the anatomy of the tooth<sup>6,7</sup>.

Once a diagnosis is reached and an access cavity has to be prepared, care should be taken to establish a “straight-line” access. With the disto-lingually located orifice of the Radix Entomolaris a modification of the classical triangular access cavity to a trapezoidal form is required to locate and access the root canal. The laws of orifice location<sup>8</sup> may aid in the location of extra orifices. However, care must be taken to avoid gouging or excessive removal of dentin as this may weaken the tooth structure.

Based on the literature, the majority of radices entomolaris are curved. In some cases there is an additional curve starting from the middle of the root or in the apical third. Hence using precurved files, to establish a smooth glide path to the apical segment and is established using precurved or flexible files, then Nickel-Titanium rotary files for cleaning and shaping, is the desired option<sup>9</sup>.

Adequate coronal enlargement avoids hindrances in the coronal segment of the canals and easy passage of the endodontic file to the apical segment. It would also allow root canal irrigants to pass on to the apical segment in larger volumes. Nonetheless, in spite of using the state-of-art gadgets endodontic mishaps may occur, and thus care has to be taken while negotiating and cleaning these curved canals.

Knowledge about the basic root canal anatomy and its variations especially in the Mongoloid and Asian populations is essential in achieving a higher percentage of success in endodontics. Irrespective of the type of file system used, an accurate diagnosis and careful application of clinical endodontic skill, improves the prognosis of mandibular molars with this root canal morphology.

## CONCLUSION

Teeth are never alike and a number of variations can occur which pose a challenge to a clinician. This is a rare occurrence and seen with a frequency of 0.2-32% and its crucial to ascertain the nature of RE in terms of curvature and conformation<sup>10</sup>. So, thorough knowledge of root canal anatomy and awareness of the variations make the diagnosis, interpretation of radiographs and treatment more successful. Long term follow ups are required as in all cases of endodontic treatment and permanent restorations.

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