Endodontic Management of Radix Entomolaris in Second Molar

Abstract
The presence of radix entomolaris (RE) in a mandibular first molar is a common occurrence, which accounts for 0.2%–32% of the population, but the presence of RE in a mandibular second molar is a rare occurrence in our ethnic group. This presence of additional root can lead to difficulties during endodontic treatment. A thorough knowledge of anatomy is necessary for the success of endodontic treatment. This article presents a review on clinical approach and a case series on the detection and management of RE on mandibular second molar. RE was identified using Same lingual opposite buccal (SLOB) technique with preoperative radiograph, modifying the access cavity preparation, locating the canals followed by cleaning, and shaping of canals with nickel-titanium instruments. Obturation was done with respective master cones and AH + resin sealer.

Keywords: Anatomical variation, distolingual root, mandibular second molar, radix entomolaris

Introduction
The aim of endodontic therapy is to effectively remove the bacteria from the canals which have been infected by microorganisms and to avoid recontamination of the canals, which are mainly attained by proper cleaning and shaping protocols, followed by a three-dimensional fluid-tight seal both coronally and apically. 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. Lack of understanding of the root canal morphology and improper shaping and cleaning can lead to the flare-ups.

The most common variations among the mandibular first molars are three roots which were first documented by Carabelli known as radix entomolaris (RE), i.e., the presence of distolingual supernumerary root or mesiobuccal root which is known as radix paramolaris. This has a frequency of 5%–30% among the mongoloids such as Chinese, Eskimos, and Native Americans populations and a frequency of <5% in white Caucasians, Africans, Eurasians, and Indian populations.

According to Manning, mandibular second molars showed morphological variation of 22% as having single root, 76% as two roots, and 2% as three roots. They observed that a change in the second molar anatomy had a direct relationship with that of patients’ age, sex, and race. Almost 87.8% of second molars have two separate roots with three canals. Both the distal and mesial roots showed two roots with a wide variation in canal number and configuration. Type IV and Type I canal anatomy were more common in the two rooted second molars, respectively, among Indians.

RE has an occurrence of <5% in the Indian population and such cases are not routinely observed during dental procedures. This article deals with RE of mandibular second molar with three roots and three canals confirmed by SLOB technique.

Case Report
A 35-year-old female patient was referred to the Department of Conservative Dentistry and Endodontics with the chief complaint of spontaneous pain in the lower left mandibular region for 3 days. Patient-reported pain was intermittent for the past 15 days. On clinical examination, there was an incomplete access prepared, carious, mandibular left second molar (tooth 37). The tooth was tender on percussion and palpation.

Preoperative radiograph showed occlusal radiolucency with pulpal involvement and periodontal space widening relative to
the mesial and distal roots with an additional distolingual root [Figure 1]. Based on these findings, the tooth was diagnosed with dental caries with symptomatic irreversible pulpitis and apical periodontitis. Endodontic management was planned for the involved tooth. Endodontic treatment was planned out.

After a consent from the patient, local anesthesia 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 and the surgical loupes 2.5X, revealed one mesial and two distal canals; distobuccal orifice located away from the center (buccally) and distolingual orifice (lingually), mesial orifice located at the center of the tooth. Therefore, access cavity shape was modified as a triangle with base facing the distal surface. All the canals were negotiated, and the working length was measured with ROOT ZX MINI (J Morita, Osaka, Japan) and confirmed with radiograph [Figure 2]. Canals were cleaned and shaped, and disinfection was carried out using calcium hydroxide.

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 CAVIT-G, postobturation radiograph was taken [Figure 3], and the patient was scheduled for full coverage restoration.

**Discussion**

Endodontic therapy success in the presence of RE primarily depends on its diagnosis, treatment plan, anatomy of morphology assessment, canal configuration, and approaching the tooth clinically.[4]

RE is most commonly situated in the same plane and is overlapped by the distobuccal root in the buccolingual plane which gives superimposition of both the roots, thus tending to give inaccurate diagnosis. A thorough radiograph interpretation is necessary to identify the RE to rule out the outline of the distobuccal root. To reveal the RE, a second radiograph has to be taken in distal angle (30°). This way accurate diagnosis of the RE can be made in many of the cases.[8]

Three-dimensional imaging technique-based computer tomography (CT) and cone-beam CT are useful in identifying the RE in a noninvasive manner with lesser radiation. However, cost and availability to them is said to be limiting factors.[9,10]

Straight line access to treat an RE without excess removal of dentin will be achieved by initial location of lingual orifice. This approach will avoid perforations. Manual preflaring is recommended to prevent instrument separation. RE exhibits the greatest degrees of curvature, 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 SS files is suggested to overcome instrument fracture. 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 0.06 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.[4]

Conclusion

RE has been reported to occur with a frequency of 0.2%–32% in different populations. Initial diagnosis and implementing the treatment plan with appropriate techniques and instruments facilitates the endodontic outcome and avoids possible errors. Proper interpretation of radiograph in different angulations may help to identify the morphology of the tooth. Once diagnosed, management of the extra canals and roots can be achieved by using equipments such as magnification aids, orifice locators and flexible files.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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