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Radix Entomolaris: A Case Report and Review of Literature

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ABSTRACT

Understanding and awareness of unusual root canal morphologies in different teeth is extremely important for a dentist in order to achieve maximal beneficial effect to the patient. Any missed canal during endodontic treatment causes persistent infection around endodontically- treated tooth leading to unsuccessful outcome of root canal treatment. One of the altered tooth morphology is of the mandibular molars having additional root located either lingually (the radix entomolaris) or buccally (the radix paramolaris). Therefore, this case report discusses the endodontic treatment of mandibular first molar with a radix entomolaris.

Key Words: Radix entomolaris, Radix paramolaris, Mandibular molar

INTRODUCTION

The primary objective of endodontic therapy is the elimination of microorganisms from the targeted root canal and prevent its reinfection later on. This aim can be primarily achieved by thorough cleaning, irrigating and shaping of the root canal system and followed by obturation in a three-dimensional method. In order to attain these goals, the clinician should be aware of the basic anatomy of the root canal system along with complexities, diversities such as extra roots, extra canals, calcified canals in order to simplify and treat the endodontically involved tooth.

Mandibular first molar, one of the first erupted posterior tooth presents various anatomical variations. Most of the first molars in Caucasians possess two-roots with two mesial canals and a single distal canal. A study in South Asian Indian population reported that among the hundred Indian mandibular first molars, 90% of the mandibular first molars had 2 roots with only five percent had 3 roots.[1] An additional third root, the radix entomolaris is also present which was first quoted in the literature by Carabelli. This supernumerary root is distolingually oriented in mandibular molars, mostly seen in first molars.[2] Another rare anatomical variation of mandibular molar is the existence of a separate root present in mesiobuccal location called as Radix Paramolaris.[3] Radix paramolaris, being a very rare entity, have less frequency than radix entomolaris.[4] Visser studied the prevalence of radix paramolaris which was found to be 0%, 0.5% and 2% for manidibular first, second and third molars, respectively.[5] Although rare, understanding of their occurrence and location is important. In this case report, the endodontic treatment of radix entomolaris is discussed and illustrated.

CASE REPORT

A 50-year-old female reported to the department with a chief complaint of food lodgement in lower left back tooth region. On examination, a large carious lesion (distoocclusal involvement) was detected on mandibular left first molar. The tooth was free of symptoms and radiographical examination revealed no signs of apical periodontitis.

History of the patient revealed that similar lesion was present on the right side of same tooth and the tooth was extracted 4 years ago. Patient also reported that a difficulty was encountered during extraction due to presence of more than two roots. Therefore, before initiating the treatment, presence of an extra root was suspected.

An endodontic treatment followed by placement of fixed prosthesis onto left mandibular first molar was planned. The pulp chamber was opened and one distal and two mesial canal orifices were located. The root canals were explored with a # 15 K-file. On determining the radiographical length measurement, an extra distal root was observed. (Fig. 2 and 3) On visual inspection the canal orifices, it was difficult to detect an extra distal canal. (Fig. 1) Biomechanical prepration of canals was done using hand files and the root canals were filled with gutta-percha using lateral condensation technique. (Fig. 4) The cavity was then restored with a composite restoration.

Fig. 1 Canal orifices

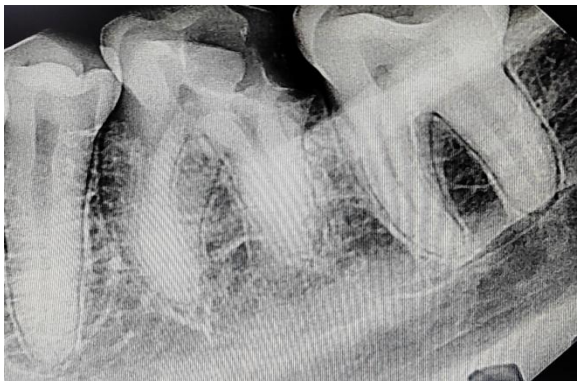

Fig. 2 Radiographic image depicting presence of two distal roots

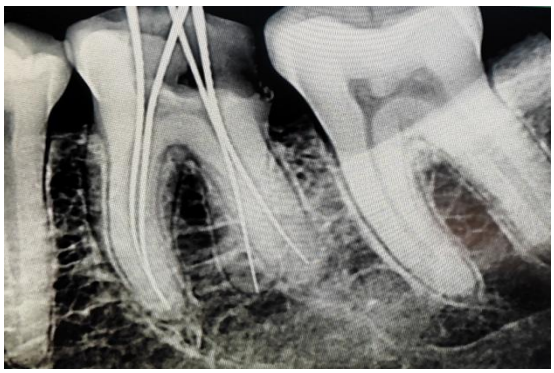

Fig. 3 Determining Working Length

Fig. 4 Post Obturation Radiograph

DISCUSSION

RE occurs in mandibular permanent first, second and third molars. Among these teeth, RE in mandibular second molar is least prevalent.[6] The presence of a Radix entomolaris (RE) in the first mandibular molar is related with some of the ethnic groups and such cases are rarely observed during routine endodontic procedures. RE has prevalence of less than 5% in the Indian population.[7] The exact etiology of RE is not known but according to some authors it might be due to certain disturbances during odontogenesis or due to genetic variability.[8] This genetic variability has been ascribed to the presence of atavistic gene in which there is sudden appearance of a trait after many generations.[8] Study done on Eskimo and Eskimo/Caucasion mixed population also reported a high genetic peneterance as both population groups had same prevalence of trait.[9]

In this report, patient gave a history of difficult extraction due to presence of more than normal roots on the opposite side on the same arch. Also, some of the studies reported a bilateral nature of the RE ranging from 50 to 67%.[10, 11]
The RE is located at distolingual position, with the coronal third fixed either completely or partially to the distal root. The dimensions of the RE might differ from a short conical extension to a mature root with usual length and root canal.
A classification of RE was first given by *Carlsen and Alexandersen* in *1990* which helps to identify separate and nonseparate RE. This classification describes various types of RE based on the location of cervical part: types A, B, C and AC. Types A and B refers to a distally located cervical part of the RE, in which Type A possess two normal distal root components and Type B possess one normal distal root component. Type C refers to RE that is located mesially, while type AC is located between the mesial and distal root components.[12]

Ingle suggested that incomplete obturation of the root canal is the major culprit of failure in endodontic therapy. Vertucci outlined that unusual appearance of additional canals poses a major threat to endodontic treatment failure. These reports by various clinicians compel the clinicians to focus thoroughly on the canal orifices, canal morphology and a proper radiographic interpretation. [13]

RE incidence in the South Asian and Indian population is higher in comparison to the population of other ethnic groups.[14] Presence of RE poses a challenge in endodontic treatment as these canals could be missed during endodontic treatment. The separate RE is placed mostly in the buccolingual plane corresponding to the distal root due to which there occurs superimposition of roots on preoperative radiograph, resulting in an imprecise diagnosis. Therefore, preoperative periapical radiographs should be exposed at two different horizontal angles to detect the additional roots. Cone Beam Computed Tomography may also be used as a better aid than conventional radiographs in diagnosis of RE as it provides a three-dimensional image of the extra root. Clinically, the tooth morphology can also indicate the presence of RE either by presence of an additional cusp known as tuberculum paramolare or by assessing the cervical convexity by careful probing of the tooth.[14]

Root length of RE is highly variable. Therefore, canal length must be verified with apex locators before radiographic length determination. Due to prevalence of an acute canal curvature at the coronal third of the canal, there is an increased risk of instrument separation. To avoid this, preflaring and creation of glide path for rotary instruments is recommended. While assessing the canals in mandibular molars, a triangular access preparation is done but in cases of tooth exhibiting RE, a trapezoidal access preparation is essential for easy access of distolingual presence of RE orifice.[14]

CONCLUSION

Efficient root canal treatment majorly depends on access, thorough shaping and cleaning of canals and three dimensional obturation of root canal system. Teeth possessing either Radix Entomolaris or Radix Paramolaris needs to be diagnosed properly to avoid missed canals. A meticulous understanding of RE, its prevalence and anatomical variations is needed for successful endodontic therapy.

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