CASE REPORT

RADIX ENTOMOLARIS: A RARE CASE REPORT

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INTRODUCTION

Successful endodontic treatment involves accurate diagnosis, good understanding of the biological principles and excellent execution of the treatment.[1] To be able to execute an excellent treatment, it's imperative that the clinician has comprehensive knowledge of the root canal anatomy and the know-how to locate and treat this anatomy.[2] Therefore, morphological knowledge of root canals is indispensable and improves the operator's ability to locate and trace a root canal to its termination, thereby increasing the degree of successful treatment.

It is known that the mandibular first molar can display several anatomical variations. The majority of first mandibular first molars are two rooted, mesial and distal. The major variant in this tooth type is the presence of an additional third root; a supernumerary root which can be found lingually.[3,4] This rare macrostructure, which is first mentioned in the literature by Carabelli (1844), is called radix entomolaris.[5] Radix Molaris has significance in clinical dentistry. Although this aberrant morphology is rare, knowledge of their occurrence and location is important for successful treatment.

CASE REPORTS

CASE 1

A 52-year-old female reported to the outpatient department of Conservative Dentistry and Endodontics, Bapuji Dental hospital (Davangere, Karnataka) with a chief complaint of continuous and severe pain in the lower left back tooth region since 2 weeks. The patient's medical history was non-contributory. Extraoral examination did not reveal any significant changes. Clinical examination revealed the Composite restoration along with secondary caries in the left mandibular first molar (tooth #36).Thermal and electric pulp testing elicited a delayed and prolonged response in tooth #36 which was lingering in nature.

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Radiographic examination showed no signs of apical periodontitis. The clinical diagnosis of symptomatic irreversible pulpitis was made, and root canal treatment was scheduled. Tooth #36 was anesthetized. A rubber dam isolation was done and endodontic access opening was established in tooth #36. (Fig. 1)The pulp chamber floor was shown to have four canals connected by the developmental root fusion line (DRFL). Coronal enlargement was done with a nickel–titanium (NiTi) ProTaper S1 followed by SX rotary file to improve the straight- line access. Working length was determined with the help of an apex locator and later confirmed by using a radiograph. (Fig. 2) Cleaning and shaping was performed under rubber dam isolation by using ProTaper NiTi rotary instruments (Dentsply Maillefer) with a standardized technique upto apical size F3. Irrigation was performed using normal saline, 2.5% sodium hypochlorite solution and 17% ethylene diamine tetra acetic acid. After completion of cleaning and shaping, the root canals were dried with absorbent points (Dentsply Maillefer). Calcium hydroxide was placed as an intracanal medicament with a lentulo spiral for 1 week and the access cavity was sealed with Cavit. The patient was asymptomatic on the next visit; therefore, tooth #36 was obturated using protaper gutta percha and AH Plus root canal sealer. (Fig. 3) The tooth was permanently restored using composite resin followed by full coverage metal crown.(Fig. 4)The patient was clinically asymptomatic on follow-up visits.

CASE 2

A 36 year old female reported with history of pain since 2 weeks to department of conservative dentistry and endodontics. Patient gives history of spontaneous pain which aggravates during night time. Clinical examination revealed the amalgam restoration along with secondary caries in the right mandibular first molar (tooth #46). Pulp sensibility testing elicited lingering response when compared to adjacent and contralateral tooth. Radiographic examination revealed bone loss (Fig. 1). CBCT (Cone beam computed tomography) revealed presence of primary endodontic and secondary periodontal lesion (Fig. 2).After anaesthesia and isolation under rubber dam, an endodontic access cavity was prepared. When the floor of the pulp chamber was

reached, four canal orifices were identified (Fig.3). Working length was determined with the help of an apex locator and later confirmed by using a radiograph. Cleaning and shaping was performed under rubber dam isolation by using ProTaper NiTi rotary instruments (Dentsply Maillefer) with a standardized technique. Irrigation was performed using normal saline, 2.5% sodium hypochlorite solution and 17% ethylenediamine tetra acetic acid. Canals were obturated using protaper gutta percha and AH Plus root canal sealer. Post endodontic restoration was done with composite.

Fig. 1: Case 1: Four canals visible and prepared

Fig. 2: Case 1: Length Determination

Fig. 3: Case 1: Obturation done

Fig. 4: Case 1: Final crown

Fig. 5: Case 2: IOPAR

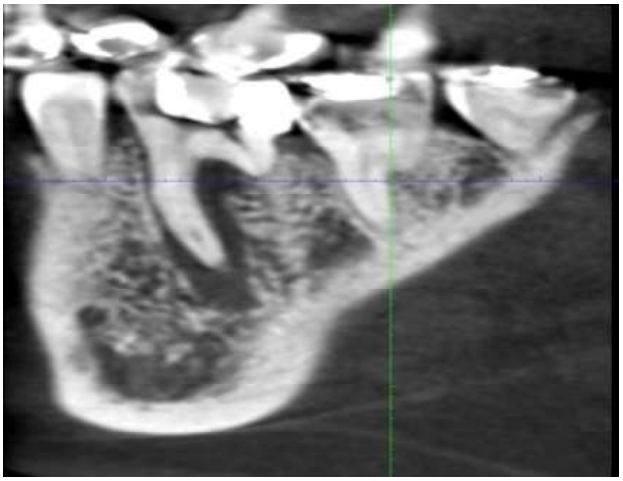

Fig. 6: Case 2: CBCT

Fig. 7: Case 2: Obturation done

DISCUSSION

The prevalence, external morphological variations and internal anatomy of the radix entomolaris and paramolaris are described. The clinical approach to diagnosis and endodontic treatment are discussed below.

PREVALENCE

In the African populations the prevalence of the three-rooted lower first molars is around 3%, and in Caucasians it does not go beyond 4%. In populations with Mongolian traits it ranges between 5–40% and in Asian populations it is less than 5%. In the Indian population the prevalence of radix entomolaris is less (2.16%) than what was reported for any other Asian populations.

Radix Entomolaris (RE) can be found on the first, second and third mandibular molar, occurring least frequently on the second molar. Some studies report a bilateral occurrence of the RE from 50 to 67%.[6,7,8,9] Etiology The etiology behind the formation of the Radix molaris is still unclear. In dysmorphic, supernumerary roots, its formation could be related to external factors during odontogenesis, or to penetrance of an atavistic gene or polygenetic system (atavism is the reappearance of a trait after several generations of absence).[2,10]

MORPHOLOGY

Mandibular molars can have an additional root located lingually (the radix entomolaris) or buccally (the radix paramolaris).[2] When Radix Entomolaris is present, the additional root in a mandibular molar is located distolingually, below the cervical border of the tooth. Seldom is the distolingual supernumerary root equal in size (length or diameter) to the distal root, and it is crosssectionally more circular than the distal root, projected lingually about 45° to the long axis of the tooth.[11,12]

CLASSIFICATION

A classification by Carlsen and Alexandersen describes four different types of RE according to the location of the cervical part of the RE:

- Type A and B - Distally located cervical part of the RE with two normal and one normal distal root components, respectively.
- Type C – Mesially located cervical part,
- Type AC - Central location, between the distal and mesial root components.

This classification allows for the identification of separate and nonseparate radix entomolaris.[12]

DIAGNOSIS AND CLINICAL APPROACH

- A thorough inspection of the preoperative radiograph and interpretation of specific characteristics, such as an unclear outline of the root contour or the root canal, can indicate the presence of supernumerary root.[13]

- Preoperative periapical radiographs exposed at two different horizontal angles are required to identify these additional roots.[14]
- Cone beam computerized tomography (CBCT) can play significant role in diagnosis of extra root and canal.[15]
- Magnification aids such as microscope or loupes can enhance visibility of these canals.[16]
- Presence of a supernumerary cusp or more prominent occlusal distolingual lobe in combination with cervical convexity can indicate the presence of an additional root.[2]
- An extension of the triangular opening cavity to the (disto) lingual results in a more rectangular or trapezoidal outline form.[17]
- A dark line on the pulp chamber floor can indicate the precise location of the RE canal orifice. Pulp chamber floor can be explored with angled probe, DG-16 or microopeners to remove dentin overlying orifices.[12,18]
- These canals have severe curvatures which can result in complications such as instrument separation and strip perforations. Therefore, after location of orifice and coronal flaring of canal, Glide path should be established with small file such as 10K. The use of flexible nickel-titanium rotary files allows a more centered preparation shape of the canal.[19, 20]

CONCLUSION

The high frequency of a fourth canal in mandibular first molars makes it essential to anticipate and find all canals during molar root canal treatment. The operator should always be aware of these unusual canal morphology. The stringent diagnostic and careful clinical approach should be adopted in these cases to avoid procedural errors such as strip perforation or missed canals.

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