Clinical management of a mandibular first molar with supernumerary distal root (radix entomolaris)

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Abstract

Radix entomolares, a supernumerary root on a mandibular molar, located distolingually, is an anatomical variation of the mandibular first molar. This variation requires special care in order to maintain a high success rate of root canal treatment. This paper describes the procedure for treatment of a mandibular first molar with three roots (one mesial and two distal) and four canals (two mesial and one in each distobuccal and distolingual root). This case report reveals the importance of anatomical knowledge of root canals and preoperative radiographs.

Introduction

Thorough knowledge of root canal anatomy, both normal and abnormal, is essential for successful root canal treatment. The mandibular first molar typically has two well-defined roots: a mesial root characterised by a flattened mesiodistal surface and widened buccolingual surface, and a distal root, which is usually straight with a wide oval canal or two round canals. Sometimes, however, the morphology and number of roots of the mandibular first molar vary; the major variant is the presence of supernumerary roots distolingually. This variant, mentioned for the first time by Carabelli, is known as radix entomolaris.

The prevalence of supernumerary roots is less than 3% in African populations, 4.2% in whites, less than 5% in Eurasian and Asian populations and greater than 5% in populations...
with Mongolian traits. Radix entomolaris was classified by Carlsen and Alexandersen according to the location of its cervical part, resulting in four types. A and B refer to a distally located cervical part of the radix entomolaris with two normal and one normal distal root components, respectively; C refers to a mesially located cervical part, while AC refers to a central location between the distal and mesial root components. This classification allows identification of separate and non-separate radix entomolaris.

This report describes endodontic therapy on a three-rooted mandibular first molar.

Case report

A 22-year-old Syrian male patient presented to the clinic of the dental school at Taibah University with a history of severe pain in the lower-right posterior tooth for a few days. The pain kept him awake at night and was radiating up the side of his face. Clinical examination revealed bad amalgam restoration on tooth no. 30 with recurrent caries on the mesial (Figure 1). The tooth was very sensitive to percussion and was nonresponsive to Endo Ice (Hygienic Corp., Akron, Ohio, USA). The medical history of the patient was non-contributory.

A diagnosis of necrotic pulp with acute apical periodontitis was performed. Emergency treatment involved access cavity preparation, irrigation with NaOCl and placement of a dry cotton pellet for temporization. The patient was then referred to an endodontic specialty clinic. Diagnostic X-rays were taken from various horizontal angles (Figures 2 and 3), which showed an additional distal root. Local anaesthesia was administered, and the tooth was isolated by a rubber dam. Access was prepared with an endo access bur no. E0123 and Endo Z (Dentsply Maillefer, Ballaigues, Switzerland). As the first distal canal was buccal, access was modified to locate the other distal canal, on the lingual side. The root canals were explored with a precurved K-file ISO number 15 (Dentsply Maillefer). The working length was determined electronically with an apex locator (Root ZXII, JMoriita, Suita City, Osaka, Japan) and confirmed by periapical radiography (Figure 4).
The canals were disinfected with NaOCl solution (2.5%). The canals were prepared with an F1 instrument and then dried and filled with Ca(OH)\textsubscript{2} paste (Metapast, Meta Biomed Co., Seoul, Republic of Korea). The access was closed with a cotton pellet and temporary restoration.

Two weeks later, the patient returned for completion of endodontic therapy. Local anaesthesia was again administered, and the tooth was isolated under a rubber dam. The Ca(OH)\textsubscript{2} paste was removed by irrigation, and the canals were shaped with F2 and F3 instruments. The canals were dried, and a gutta-percha master cone was confirmed radiographically (Figure 5). Then, the canals were obturated (Figure 6) by vertical compaction with an Obtura III device and AH26 Sealer (Dentsply Maillefer), and the access was closed with glass ionomer cement (Ketac Fil, 3M ESPE, Seefeld, Germany). The patient was referred to an operative clinic for permanent restoration.

Discussion

There have been several reports of the occurrence of supernumerary roots (an extra distolingual root) in permanent mandibular molars. The anatomical variant radix entomolaris has been considered by some authors to be a genetic trait rather than a developmental anomaly.\textsuperscript{7,8}

Radix entomolaris is commonly found distolingually. It may be a short conical extension or a full-length root. In this case, the supernumerary root was distolingual, full length and contained pulpal tissue. A third root can be detected radiographically in 90% of cases,\textsuperscript{9} but sometimes additional X-rays from different horizontal angles are required.\textsuperscript{10,11}

In a distolingually located orifice of a radix entomolaris, the access cavity should be modified to establish straight-line access. Following orifice location will help in conserving the tooth structure,\textsuperscript{12} and using an electronic apex locater with X-ray to determine the increases in the accuracy of the working length. It is preferable to use nickel–titanium rotary instruments and copious irrigation to improve cleaning and shaping the root canal system.\textsuperscript{13} Prior treatment should be strict to avoid procedural accidents.

Conclusion

In conclusion, to ensure successful root canal treatment, three factors should be considered: thorough knowledge of root canal anatomy and treatment procedures, accurate diagnosis and good skill.

Conflict of interest

We have no conflict of interest to declare.

References