CASE REPORT

Endodontic management of middle mesial canal of the mandibular molar

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SUMMARY

Thorough knowledge of root canal morphology and unusual anatomy of the tooth is critical for successful endodontic treatment. Although the most common configuration is two roots and three root canals, mandibular molars might have many different combinations. In the literature, it is less described about three mesial canals and two distal canals in mandibular second molars, indicating a rare anatomical configuration. A case of unusual root canal morphology is presented to demonstrate anatomical variations in mandibular molars. Endodontic therapy was performed in a mandibular second molar with five separate canals, three mesial and two distal. This report points out the importance of looking for additional canals and unusual canal morphology, because knowledge of their existence might occasionally enable clinicians to treat a case successfully that otherwise might have ended in failure. In conclusion, every attempt should be made to find and treat all root canals of a tooth.

BACKGROUND

Endodontic success in teeth with the number of canals above that normally found requires a correct diagnosis and careful inspection.

This report points out the importance of looking for additional canals and unusual canal morphology of a rare anatomical configuration and successful management of the same.

CASE PRESENTATION

A 40-year-old female patient reported with a complaint of pain in the posterior left mandibular region for the past 1 week. She gave a history of pain during chewing in the same region for the past 1 month. Her medical history was found to be non-contributory. Clinical examination revealed a carious permanent mandibular left second molar (37) with no tenderness on percussion. The clinical findings, radiographical findings and vitality tests led to a diagnosis of irreversible pulpitis of the left mandibular first molar, necessitating endodontic therapy.

INVESTIGATIONS

Intraoral periapical radiograph—radiographical evaluation of the involved tooth did not reveal any unusual anatomy (figure 1).

DIFFERENTIAL DIAGNOSIS

Apical periodontitis and periapical granuloma since patient gave history of pain while chewing food.

TREATMENT

The tooth was anaesthetised using 2% Lignocaine with 1 : 80 000 adrenaline (Lignox, Indoco Remedies Ltd, India) and isolated using rubber dam. Endodontic access cavity was established. The pulp chamber was frequently flushed with 3% sodium hypochlorite to remove debris. Inspection of the pulp chamber revealed five canal orifices (three mesial and two distal; figure 2). Canal patency was checked with number 10 K-file (Mani, Inc; Tochigi, Japan). Working length radiograph was taken (figure 3) and the presence of five canals was confirmed. Cleaning and shaping was performed using a standardised technique with Mtwo files (VDW, Germany) under abundant irrigation with 3% sodium hypochlorite solution in a 5 ml syringe and EDTA (Glyde, Maillefer, Dentsply, Ballaigues, Switzerland). The tooth was then temporised. Patient was then recalled after a week. The root canals were then dried with paper points, appropriate size master-cone was selected (figure 4). Cleaned canals are obturated with cold, laterally condensed gutta-percha and AH plus resin sealer (Maillefer, Dentsply, Ballaigues, Switzerland) and orifices are sealed (figure 5). Postobturation radiograph was taken to confirm the full-length canal filling (figure 6).

OUTCOME AND FOLLOW-UP

Successful endodontic therapy was performed with 6 months follow-up.

DISCUSSION

There is an abundant amount of reports that relate the anatomical variations of mandibular molars. This should induce the clinician to accurately observe the pulp chamber floor to locate possible

Figure 1 Preoperative radiograph.

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Figure 2 Five canal orifices.

Figure 5 Five sealed canal orifices.

Figure 3 Working length.

canal orifices. Searching for additional canal orifices should be the standard practice for clinicians.

Fabra-Compos¹ describes that the presence of a third canal (middle mesial) in the mesial root of the mandibular molars has been reported to have an incidence of 0.95–15%. It is found that in almost all of the clinical cases reported until today, mesial middle canal joined the mesiobuccal or mesiolingual canal in the apical third.^{1–4} However, a few mandibular first

molars that had three independent canals in their mesial root have been reported. In this case report, middle mesial canal was connecting to mesiobuccal canal with no separate apical foramen or root. This is in agreement with Aminsobhani *et al*⁵ who found 44.5% middle mesial canal joined the mesiobuccal canal in the apical third and 14.8%, it joined to the mesiolingual canal in the apical area. These findings are similar to Campos's study which showed that middle mesial canal joined to mesiobuccal canal in most cases.¹

Pomenraz *et al*⁶ in their study of over 100 first and second molars found eight fins, two confluent canals and two independent canals. In our case, middle mesial canal was confluent variety where middle mesial canal originated as a separate orifice but apically joined the mesiobuccal or mesiolingual canal.

A round bur or an ultrasonic tip can be used for removal of any protuberance from the mesial axial wall which would prevent direct access to the developmental groove between mesiobuccal and mesiolingual orifices. This developmental groove should be carefully checked with the sharp tip of an endodontic explorer. If depression or orifices are located, the groove can be troughed with ultrasonic tips at its mesial aspect until a small file can negotiate this intermediate canal.

New technologies, such as the dental operating microscope and dental loupes, offer magnification and illumination of the operating field and substantially improve the visualisation of root canal orifices. We did not use magnification or these new

Figure 4 Master cone selection.

Figure 6 Obturated canals.

technologies during treatment sessions. It is possible that more cases may have been discovered with magnification and extra illumination. Three-dimensional models, such as tuned aperture CT imaging and Spiral CT which make possible observations from arbitrary viewpoints, are replacing two-dimensional methods for the morphological study of pulp space.

Learning points

- ▶ Knowing the variations in anatomy of root canal system plays an important role in successful endodontic therapy.
- ▶ Thorough search for additional canals while performing root canal therapy in permanent molars.
- ▶ Developmental grooves in the pulpal floor plays a very important role in identifying the canal system.

Competing interests None.

Patient consent Obtained.

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