A case report: Unusual anatomy of maxillary second molar

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Introduction

The main objectives of an endodontic treatment are the elimination of microorganicism from the root canal system and prevention of subsequent reinfection of the system. Inability to find and properly treat the canal may cause failure. This case report presents an unusual maxillary right second molar with four roots (mesiobuccal, distobuccal, mesiapalatal, and distopalatal). The unusual morphology of roots of the maxillary second molar may be a challenge in diagnosis and treatment execution.

Diamond, in his textbook on dental anatomy, has shown two cases of maxillary first molars with two distinct palatal roots.

Sahala, et al, in a radiographic survey, found that the most common aberration of maxillary molars involved the fusion of 22 percent of the facial roots of second molars. They discovered that aberrations occurred in less than 1 percent of the cases and that of 90 percent of such aberrations were bilateral. Liibfeld and Rostein also examined 1200 teeth radiographically, and reported that four rooted maxillary second molars occurred in 0.416% of cases. The four roots in maxillary molar is more frequent in second molars, the conclusion made by Christie, et al.

This case report illustrates the importance of knowledge about unusual variations in morphology of root and canal, proper access opening, gaining straight line access, proper cleaning and shaping of canals, and obturation.

Case report

A 34-year-old female reported to the clinic with the chief complaint of pain in relation to upper left back tooth region since two days, and pain usually occur after stimulation with hot and cold liquids. The patient gave the history of pain getting worse on lying down, and waking up with pain in the middle of the night. The clinical examination showed a large carious lesion on the buccal surface of the maxillary left second molar (#27). Vitality test with cold stimulant revealed severe, rapid, and long-lasting pain from maxillary left second molar. Pre-operative periapical radiograph revealed a large carious lesion on buccal surface of #27 involving the pulp (Fig. 1). Based on clinical and radiographical evidence, it was diagnosed as irreversible pulpitis.

The careful observation of periapical radiograph shows that the second molar has unusual root morphology, i.e., it has four separate roots. The unusual two separated palatal roots are long and diverging like horns.

The non-surgical endodontic therapy was planned for tooth #27. The treatment was started with administration of local anesthesia using 2% lignocaine with 1:200000 adrenaline. Caries was removed, and then the missing buccal surface of the tooth was build up using glass ionomer cement Fuji type II, to facilitate the isolation of tooth using Rubber Dam (Hygienic Corp., USA).

A usual triangular access cavity (Fig. 2) was modified to square-shaped (rhomboidal) (Fig. 3) using cavity access set (by Dentsply Maillefer, Ballagues). The working length (WL) was determined using X-Gates electronic apex locator (EAL), by Dentaport ZX, J. Morita, Japan.

Files were placed in the canals (Fig. 7) according to WL determined by EAL, and then one more periapical radiograph was taken to confirm the WL (Fig. 8).

The cleaning and shaping of canals were carried out with rotary NiTi Protaper instruments series (by Dentsply Maillefer, Ballagues), according to the manufacturer’s instructions. The final instrumentation was carried out with sizes S1 to F5 of NiTi Protaper instruments (Fig. 9). For irrigation, 5% sodium hypochlorite was used during instrumentation and as well as after completion of the preparation. Conelit was carried out with non-standardized gutta-percha of medium size (Sure-endo, Korea) with the help of gutta-percha gauge (Dentsply Maillefer, Ballagues) (Fig. 10 & 11).

Now, the canals were dried using paperpoints of size F5 (by Dentsply Maillefer, Ballagues) and then obturated with selected cone, using down pack with system B and back pack with obtura II device (Fig. 12). A periapical radiograph (Fig. 15) was taken to confirm the quality of obturation. Permanent restoration was done on the next appointment.

Discussion

Incidence of four rooted maxillary second molar is very rare. Etienne Deveaux presented a case report in Vol. 25, No. 8, JOE Aug. 1999, and Peter M Dk. Fiore presented first molar in Vol. 25, No. 10, JOE Oct. 1999. Hartwell and Bellizzi reported that 9.6% of maxillary molars, they examined, had four canals, but had not mentioned about any case with four roots.

Christie, et al, have proposed a classification system for four rooted maxillary second molar abnormalities.

Fig. 1: Pre-operative radiograph

Fig. 2: Triangular access opening

Fig. 3: Modified (Rhomboidal) access opening

Fig. 4: Ultrasonic Tip

Fig. 5: X-Gates being used for straight lining of access

Fig. 6: Access after orifice enlargement

Fig. 7: Files in position for WL

Fig. 8: WL radiograph

Fig. 9: WL radiograph for buccal canals

Fig. 10: Shaping with Protaper Instruments

Fig. 11: Conelit

Fig. 12: Conelit Radiograph
Type I with long tortuous divergent separate palatal roots
Type II with short blunt and parallel roots
Type III those with three convergent roots and distinctly divergent fourth distobuccal root.

The tooth treated in this case appears to be of Type I variety according to the Christie’s classification. According to literature, it occurs bilaterally, but in this patient it was unilateral.

References