Case Report

Maxillary First Molar with Three Canals in Mesiobuccal Root – A Case Report

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Abstract:

Knowledge of internal dental morphology is a complex and extremely important for planning and performing endodontic therapy. Proper location of additional canals in roots, especially of maxillary first molar, is very fundamental in high rate success of root canal therapy. This article describes the identification and treatment of a maxillary first molar exhibiting three canals in the mesiobuccal root.

Key Words: Mesiobuccal root, three root canals, cleaning & shaping.

Introduction:

The main objectives of root canal therapy are thorough shaping and cleaning of all pulp spaces and complete obturation of these spaces with an inert filling material. The presence of an untreated canal may be a reason for failure. It is extremely important that clinicians use all the armamentaria at their disposal to locate and treat the entire root canal system.

The mesiobuccal root of the maxillary first molar has generated more research and clinical investigation than any other root in the mouth. Weine et al (1969) reported that the mesiobuccal root of the maxillary first molar looks very slender when viewed in a mesiodistal direction, as it is often seen radiographically. However, it appears very broad when viewed in a faciolingual direction. He believed that many treatment failures in the maxillary permanent first molar were related to not locating, and cleaning the mesiopalatal canal. Pomeranz & Fishelberg (1974) discussed the importance of improved access and thoroughly probing the fissure or groove between the mesiobuccal and the palatal canals to locate the mesiopalatal canal. Ferguson et al (2005) reported a case of three canals in the mesiobuccal root of a maxillary first molar by troughing the fissure between the mesiobuccal and the palatal canals with a no. 2 round bur.

The purpose of this article is to report a rare case of maxillary left first molar that presented three root canals in the mesiobuccal root that was managed with successful endodontic therapy.

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Case Report:

A 28-year old male patient was referred for endodontic treatment for tooth number 26 to the department of conservative dentistry and endodontics, Peoples College of Dental Sciences and Research Centre, Bhopal. The tooth was restored with amalgam restoration three years back and had become symptomatic. The periapical radiograph showed periapical radiolucency involving the palatal root. After local anaesthesia, coronal access was obtained. Patient had not permitted rubber dam placement due to severe gag reflex, so endodontic files were used with dental floss. Further measures for isolation were taken to prevent contamination of root canal (Carrotte, 2004). Initially, the mesiobuccal, distobuccal, and palatal canals were located. Subsequent widening of the access cavity and probing with #10 k-file (Dentsply – Maillefer) resulted in locating two additional mesiobuccal canals (Fig.I).

A working length radiograph confirmed the presence of three separate canals in the mesiobuccal

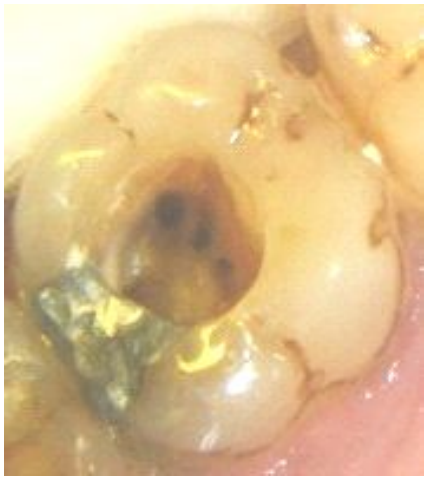

Fig. I: Clinical view of access cavity showing orifices of three mesiobuccal canals.

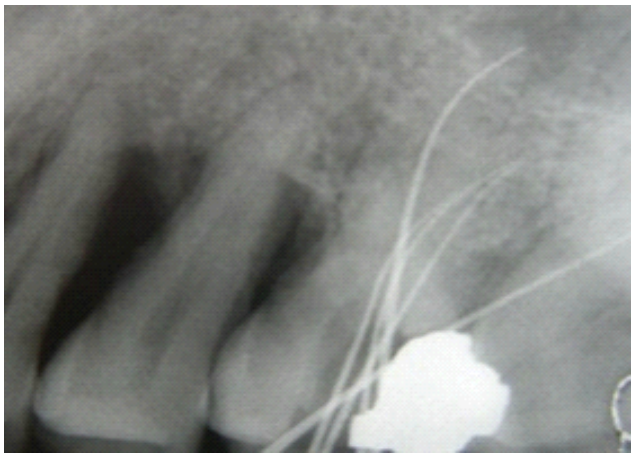

Fig.II: Radiograph showing all five canals. Amongst three mesiobuccal canals, two lingual most canals appears to join short of apex.

root (Fig. II). The two lingual most canals appear to join just short of the apex, while the buccal canal appears to have its own apical foramen.

Thereafter, the canals were chemomechanically prepared by using Protaper Ni-Ti rotary files (Dentsply – Maillefer), and 2% sodium hypochlorite as irrigating solution. The canals were flushed with 17% EDTA for 3 minutes under continuous stirring with no. 15 k-file, rinsed, dried, medicated with calcium hydroxide and the access cavity was closed with Cavit. Three days later, the canals were emptied, copiously flushed with 2% sodium hypochlorite and dried with absorbent paper points. The canals were obturated with Protaper Universal Gutta percha points and AH Plus endodontic sealer (Dentsply– Maillefer). The post operative radiograph was taken to confirm the completeness and extension of root canal fillings (Fig.III).

The old amalgam restoration was removed and an amalgam core was built up. The patient was referred to the department of prosthodontics for full coverage restoration. The patient was monitored clinically and radiographically to ensure a satisfactory periapical response.

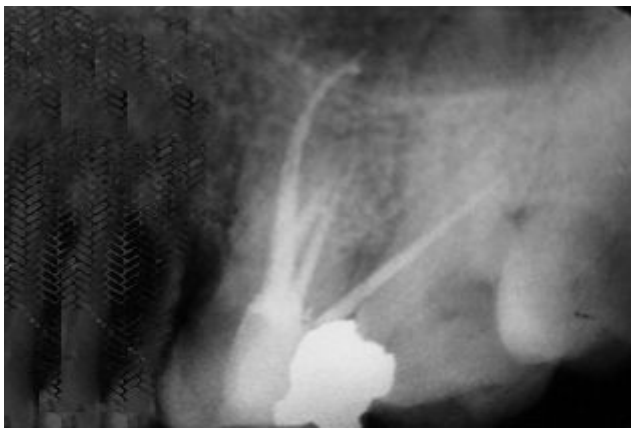

Fig.III: Post operative radiograph.

Discussion:

The variation in dental anatomy plays an important role in root canal therapy. Despite the current high success rate achieved in endodontic treatments, the mesiobuccal root is still associated with a considerable number of failures due to the difficulty in locating and obturating the second and / or third mesiobuccal canals (Vertucci, 1984; Fogel et al, 1994).

Whereas there have been numerous reports in the literature on the prevalence of mesiopalatal canals in the permanent maxillary first molar (Hartwell & Bellizzi, 1982; Kulild & Peters 1990), a third canal has been rarely reported (Ferguson et al, 2005). The third canal reported in this case was located without the aid of the surgical operating microscope. The fact that a third canal has been located in the mesiobuccal root of the maxillary permanent first molar underscores the need for thorough evaluation of canal anatomy during endodontic procedures. Undeniably, endodontists should continue to assume existence of additional canals until all measures have been exhausted in their location (Ferguson et al, 2005). The fact that this third canal was located without the use of a surgical operating microscope is noteworthy, and seems to agree with Sempira & Hartwell (2000). They evaluated whether a surgical operating microscope would increase the number of second mesiobuccal canals that could be located and obturated to within 4 mm of the root apex in vivo. They reported that the use of a surgical microscope did not increase the number of second mesiobuccal canals located, compared with those reports where access preparations were modified and the microscope was not used. However, Baldassari-Cruz et al (2002) evaluated 39 maxillary molars in vitro and concluded the surgical operating microscope did aid in identification of mesiolingual canal orifices. Burhley et al (2002) utilized an in vivo clinical setting to evaluate if surgical operating microscope and/or dental loupes enhanced the ability of endodontists to locate mesiolingual canals in maxillary molars. They found that those practitioners using the microscope, located a mesiolingual canal 57.4% of the time, and those using dental loupes 55.3% and when no magnification was used, a mesiolingual canal was located only 18.2% of the time. Wolcott et al (2002)

examined 1873 conventionally treated and retreated maxillary molars. They noted a significant difference in the incidence of mesiopalatal canals located during initial treatments and retreatments.

The young age of the patient involved in this case could have played a role in the relatively easy identification of the third canal without the use of a surgical operating microscope (Ferguson et al, 2005). However, the use of magnification is essential to ensure the long-term success of endodontic therapy in maxillary molars (Wolcott et al, 2002).

Conclusion:

A case of maxillary left first molar with three canals in mesiobuccal root is reported with successful obturation. It is important from the endodontist's point of view to judiciously locate all possible canals with understanding of variations in morphology of root canal system. This will help to achieve the long term success of the endodontic therapy and ultimate benefit to the patient.

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