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Middle Mesial Canal in Mandibular Molar : Two Case Report

Dental Science

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ABSTRACT

Successful root canal treatment depends on adequate cleaning, shaping and filling of the root canal system. Mandibular molars demonstrate considerable variations with respect to number of roots and root canals. The presence of middle mesial (MM) root canal of mandibular molars has been reported by various authors. This paper discusses the endodontic management of the rare anatomical complexity middle mesial canal in mandibular first and second molar and also serves to remind the clinicians that such anatomical variations should be taken into account during the endodontic treatment of the mandibular molars.

INTRODUCTION

The primary objective of root canal therapy is to obtain a hermetic seal of the root canal space. Missed canals and spaces within the root canal system may contain micro organisms and their byproducts and may contribute to failure of therapy. A missed canal is neither debrided nor thoroughly sealed, and thus may result in the development or persistence of periapical inflammation.[1] The classical study by Hess[2] on 512 mandibular first molars reported that 0.3% of the teeth had only one, 17.7% had two, 78% had three and 4% had four canals. Several other in vitro and in vivo studies by Skidmore and Bjorndal, Pineda and Kuttler, and Vertucci[3-5] have reported on the morphology of the mandibular molar. These reports have shown that mandibular first and second molars have three or four canals.

However, unusual root canal anatomy associated with the mandibular molars has been reported in several studies and case reports.[6-10] Vertucci and William, as well as Barker et al. first described the presence of a fifth canal called the middle mesial canal.[11,12] In a clinical evaluation of 100 mandibular molars, Pomeranz et al[9] found that 12 molars had MM canals in their mesial roots and classified them into three morphologic categories as follows: fin, confluent and independent. The purpose of this article is to report the successful treatment of mandibular first and second molar with three mesial canals.

CASE REPORTS

CASE REPORT 1

A 40 year female patient reported to my clinic with the chief complaint of sensitivity and pain in the left lower back teeth region since last 4 to 5 months. Medical history was non contributory. Clinical examination revealed a carious lesion in the left mandibular first molar. The tooth was tender to percussion and probing depths were within normal limits. Radiographic examination revealed a disto occlusal cavity in relation to the first molar. A diagnosis of acute apical periodontitis with irreversible pulpitis was made. Treatment options were discussed with the patient and endodontic therapy was the treatment of choice. After local anesthesia and rubber dam application, an access cavity was prepared. A clinical inspection of the pulp chamber under magnifying loupes (Carl Zeiss, 3.5X magnification) revealed 4 orifices (two mesial and two distal). On exploration of the mesial canal orifices and their interconnecting groove by using an endodontic explorer, a "catch" was encountered. The canals were explored by using a #10 K-file (Mani, Inc; Tochigi, Japan).The working length radiograph confirmed the presence of 5 distinct orifices with 4 apical terminations. A middle mesial canal orifice was found, which was equidistant between the mesiolingual and the mesiobuccal canal orifices which terminates as separate apical foramen. All canals were cleaned and shaped using Revo S rotary (Micro Mega, France) and hand files. Canals were irrigated with 5.25% sodium hypochlorite, 17% EDTA and 2% Chlorhexidine. Canals were dried using paper points and finally obturated using gutta percha and AH plus sealer (Dentsply De-Trey, Germany) by warm vertical compaction using Element obturation Unit (Kerr, Romulus, USA). The access preparation was sealed and the post-endodontic restoration was planned.

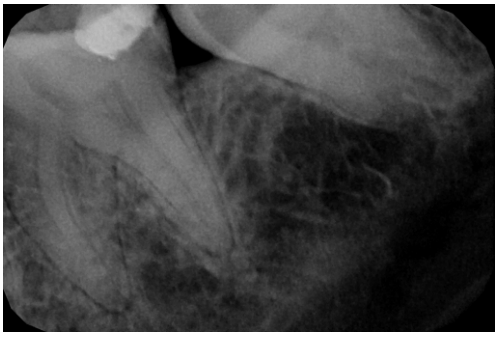

Figure 1:Pre-operative radiograph.

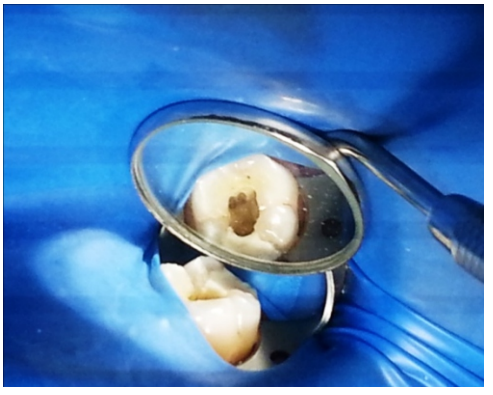

Figure 2: Clinical image revealing three mesial canals.

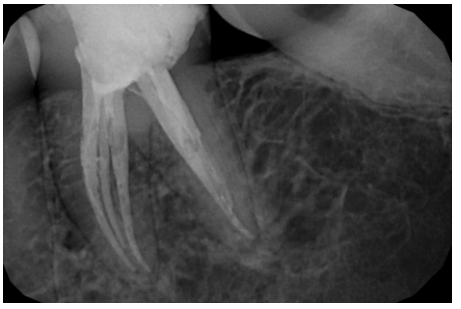

Figure 3: Post obturation radiograph

CASE REPORT 2

A 43-year old female patient reported to my clinic with the chief complaint of pain and sensitivity in the left lower back teeth region since last 4 to 5 months. Medical history was non contributory.

Clinical examination revealed a large carious lesion in the left mandibular second molar. The tooth was tender to percussion and probing depths were within normal limits. Radiographic examination revealed a large occlusal cavity in relation to the mandibular second molar involving the pulp chamber. A diagnosis of chronic irreversible pulpitis was made. Treatment options were discussed with the patient and endodontic therapy was the treatment of choice. After local anesthesia and rubber dam application, an access cavity was prepared. Initial examination revealed two mesial and one distal canal. Similar procedure as in case one was followed to locate the middle mesial canal which was confluent with mesio- buccal canal. During cleaning and shaping, instrument was separated at the apex of mesiobuccal root canal. Since the fractured instrument could not be visualized and was below the root curvature, bypassing was preferred over retrieval. Finally obturation was done using gutta percha and AH plus sealer (Dentsply De-Trey, Germany) by warm vertical compaction using Element obturation Unit (Kerr, Romulus, USA). The access preparation was sealed and the post-endodontic restoration was planned.

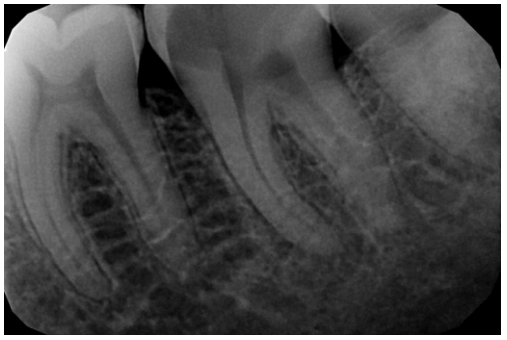

Figure 4: Pre-operative radiograph

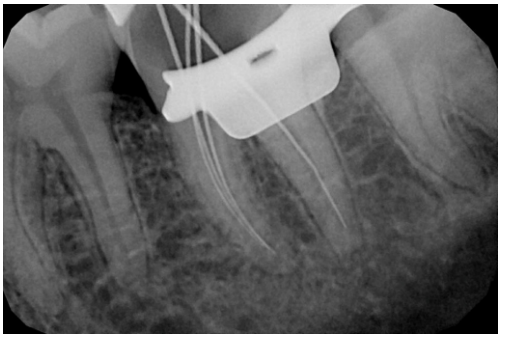

Figure 5: Working length radiograph

Figure6: Post obturation radiograph

DISCUSSION

The biologic objectives of endodontic therapy include removal of all potential irritants from the root canal space and the control of infection and periapical inflammation. A missed canal can lead to failure of Endodontic therapy.[13] Therefore every effort must be made to locate additional canals if any. With the advantages of illumination and magnification,[14] the use of microscope enables dentists to locate and treat ' extra canals' more confidently. The incidence of an Middle Mesial canal ranges from 1% to 15%.[13] In the study of Pomeranz et al,[9] the middle mesial may be classified as (1) an independent canal, which originates in a separate orifice and terminates as a separate foramen, (2) a confluent canal, that originates as a separate orifice but is apically joined to the mesiobuccal or mesiolingual canal, and (3) a fin, when the instrument can pass freely between the mesiobuccal or mesiolingual canals and the middle mesial canal during cleaning and shaping.

Diagnostic measures are important aids in the location of root canal orifices. These measures include obtaining multiple pre-treatment radiographs or CBCT, examining the pulp chamber floor with a sharp explorer, troughing grooves with ultrasonic tips, staining the chamber floor with 1% methylene blue dye, performing the sodium hypochlorite "champagne bubble" test and visualizing pulp chamber anatomy and root canal bleeding points. The use of the surgical operating microscope has vastly enhanced the quality of Endodontic therapy.[13]

When locating the hidden canals, ultrasonics is an excellent means for the removal of secondary dentin on the mesial wall. When searching for hidden canals, one should remember that secondary dentin is generally whitish or opaque, whereas the floor of the pulp chamber is darker and gray in appearance.[15]

CONCLUSION

In root canal therapy, it is challenge to treat teeth with extra roots and/or canals. Re-treatment reduces the prognosis. Therefore, clinicians should pay more attention during initial root canal treatment to obtain maximal treatment benefits.

REFERENCES:

1. Reuben J, Velmurugan N, Kandaswamy D. The evaluation of root canal morphology of the mandibular first molar in an Indian population using spiral computed tomography scan: An in vitro study. J Endod. 2008; 34:212-215.
2. Cleghorn BM, Goodacre CJ, Christie WH: Morphology of teeth and their root canal system. In: Ingle JI, Backland LK, Baumgarthner JC: Endodontics, 6th Edition. BC Decker: Inc, 2008: pp. 151-210.
3. Skidmore AE, Bjorndal AM. Root canal morphol.ogy of the human mandibular first molar. Oral Surg 1971;32:778–784.
4. Pineda F, Kuttler Y. Mesiodistal and . buccolingual roentgenographic investigation of 7,275 root canals. Oral Surg 1972;33:101–110.
5. Vertucci F. Root canal anatomy of the human permanent teeth. Oral Surg 1984; 58: 589–99
6. Beatty RG, Krell K. Mandibular molars with five canals: report of two cases. J Am Dent Assoc 1987;114:802-804.
7. Fabra-Campos H. Unusual root anatomy of mandibular first molars. J Endod 1985;11:568-572.
8. Min K. Clinical management of a mandibular first molar with multiple mesial canals: a case report. J Contemp Dent Pract 2004 15;5:142-149.
9. Pomeranz HH, Eidelman DL, Goldberg MG. Treatment considerations of the middle mesial canal of mandibular first and second molars. J Endod 1981;7:565-568.
10. F. J. Vertucci, "Root canal morphology and its relationship to endodontic procedures," Endodontic Topics, 2005;10:3–29.
11. Vertucci F, Williams R. Root canal anatomy of the mandibular first molar. JNJ Dent Assoc. 1974;48:27-28.
12. B. C. W. Barker, K. C. Parsons, P. R. Mills, and 3.G. L. Williams, "Anatomy of root canals. III. Permanent mandibular molars," Australian Dental Journal, 1974; 19: 408–413.
13. Tooth Morphology and Access Cavity Preparation. Cohen's Pathways Of The Pulp, Tenth Edition. Page no. 210-212.
14. Carr GB. Microscopes in endodontics. J Calif Dent Assoc, 1992; 20:55-61.
15. Gianluca Plotino, Cornelis H, Pameijer, Nicola Maria Grande, et al. Ultrasonics in Endodontics: A Review of the Literature. J Endod 2007;33:81-95.