

Manuscript type- **Case Report**

Title- **Multiple root canals in the maxillary molar: A case report**

Authors:

1-Dr Ramesh Chandra, Professor, Department of Conservative Dentistry and Endodontics, Career Post Graduate Institute of Dental Sciences and Hospital, Lucknow.

Dr.rameshchandra01@gmail.com

2- Dr Mariyam Khan, Associate Professor, Department of Conservative Dentistry and Endodontics, Career Post Graduate Institute of Dental Sciences and Hospital, Lucknow

3- Dr Ankita Mehrotra, Associate Professor, Department of Conservative Dentistry and Endodontics, Career Post Graduate Institute of Dental Sciences and Hospital, Lucknow

4- Dr Taha Siddique, Assistant Professor, Department of Conservative Dentistry and Endodontics, Career Post Graduate Institute of Dental Sciences and Hospital, Lucknow

5- Dr Nurez Anwar, Assistant Professor, Department of Conservative Dentistry and Endodontics, Career Post Graduate Institute of Dental Sciences and Hospital, Lucknow.

6- Dr Ankita, Postgraduate student, Department of Conservative Dentistry and Endodontics, Career Post Graduate Institute of Dental Sciences and Hospital, Lucknow.

Abstract

Introduction: The objective of this report was to highlight the importance of using a dental operating microscope to locate supernumerary canals and diagnose variations in root canals.

Case presentation: A 35-year-old male had pain in the upper right posterior maxilla for 3 months and was referred to evaluate symptomatic apical periodontitis and mesio-occlusal caries for upper right first permanent molar. Root canal therapy was proposed and conducted with the use of dental operating microscope and radiovisiography.

Conclusions: Proper diagnosis and careful clinico-radiological examination are necessary, and it is essential to reinforce the knowledge of the rare morphology of root canals for clinicians.

Keywords: Microscope, Root canals, Radio-visio-graphy, dental operating microscope

Introduction

The main objective of root canal treatment is to relieve pain, disinfect the root canal, and prevent reinfection [1]. Many of the challenges faced during root canal treatment may be directly attributed to an inadequate understanding of the canal morphology of teeth. Undetected extra roots or root canals are a major reason for failure of root canal treatment [2]. The use of preoperative radiographs at different angles helps to detect and evaluate root canal morphology and anatomy [3]. The present clinical report describes a rare maxillary first molar with five root canals and three roots. Incorporating a dental operating microscope and cone-beam computed tomographic (CBCT) imaging into clinical endodontic practice will increase clinician knowledge and awareness of anatomic complexities. Successful dredging of all root canals in this patient was facilitated with a dental operative microscope.

Case Report

A 35-year-old man was referred to the Department of Conservative Dentistry and Endodontics, Career Post Graduate Institute of Dental Sciences and Hospital, Lucknow for pain in permanent upper right maxillary first molar. Clinical examination revealed the presence of caries. The patient gave history of dull, non-continuous pain that subsides on taking medication. Pain on percussion was present with the maxillary first molar. A diagnostic radiograph revealed complex root anatomy. Response to vitality test was negative. Symptomatic chronic apical periodontitis was diagnosed with right maxillary first molar. The medical history was noncontributory.

Careful examination of the radiographs revealed the possibility of more than 1 palatal root canal and MB2 (Figures 1(a) and 1(b)).

The tooth was anesthetized, and access to the pulp chamber was achieved using a round diamond bur (no. 4; MANI Inc., Tochigi-ken, Japan). Clinical evaluation of chamber floor confirmed the presence of 5 root canal orifices, 2 (MB1 and MB2) located mesially, 2 (DB1 and DB2) and 1 palatally (Figure e). Working length of each canal was estimated by means of an apex locator (Root ZX; Morita, Tokyo, Japan) and confirmed with digital intraoral periapical (IOPA) radiography (Figures 1(a) and 1(b)). The root canals were cleaned and shaped using Niti rotary Protapers (Dentsply Maillefer, Ballaigues, Switzerland) with crown-down technique [4]. Apical preparations in the buccal canals were enlarged to a protaper number F1, and in the palatal canals to the number of F2. The root canals were frequently irrigated with 5.25% sodium hypochlorite (Prime Dental Products, Thane, India) and alternating with saline. Calcium hydroxide (RC Cal; Prime Dental Products) paste was then placed as an intracanal medicament. The patient was recalled after 1 week, and the tooth was asymptomatic. At the next appointment, the root canals were irrigated with 5.25% sodium hypochlorite and saline then dried with paper points. Then the canals were obturated with AH-Plus sealer (Dentsply DeTrey, Konstanz, Germany) and protaper guttapercha. After placing a composite permanent restoration, a postoperative radiograph showed the unique palatal morphology (Figure e). A porcelain-fused to-metal crown was given.

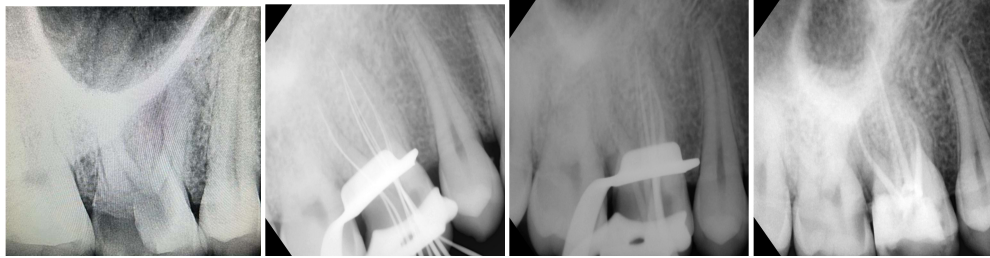


Fig-(a)

Fig-(b)

Fig-(c)

Fig-(d)

Fig-a-showing pre-operative rvg, Fig-b-showing working length, Fig-c-showing placement of gutta percha into canals, Fig-d-showing obturation

Discussion

The most common morphology of the maxillary first molar is three roots and four canals. However, the mesiobuccal root of the maxillary first molar often contains a double root canal system, and the incidence of a second mesiobuccal canal (MB2) has been reported to be between 18.6% and 96.1% [5]. The presence of the MB2 root canal is 58.4% for maxillary first molars among Asians [6]. Accessory canals have been observed in the mesiobuccal root in (MB1) 30.8% and (MB2) 5.6%, the distobuccal root in 15.1%, and the palatal root in 11.7% of maxillary molars [7]. The observed frequency of accessory canals in the distobuccal and palatal roots is similar [6,8].

In case of the present paper, a large access was required on mesial side to locate the 2 root canals. With routine use of the DOM, specific instruments are necessary to increase the clinical procedure's efficiency and effectiveness. High magnification and illumination can be used for locating supernumerary canals and improving the discovery of root canal orifices [9]. Studies have shown that the combined use of magnification and CBCT images significantly facilitates the location and negotiation of root canals in upper molars [6, 7]. A number of canals and morphologically abnormal canals can exist in a tooth with vital pulp; thus, proper diagnosis and careful clinic-radiological examination are required. We demonstrated the possibility for

complex maxillary molar variations and the need to reinforce clinician knowledge of the rare morphology of root canals.



Fig-(e) Image taken under microscope.

Conclusions

Anatomic variation in the number of roots and root canals can occur in any tooth. Although such cases occur infrequently, dentists should be aware of them when considering endodontic treatment. Examination of clear radiographs taken from different angles and careful evaluation of the internal anatomy of teeth are essential for successful treatment. Root canal treatment is likely to fail if extra roots or root canals are not detected.

References

- (1) L. I. Grossman, S. Oliet, and C. E. Rio, "Principles of endodontic treatment," in *Endodontic Practice*, L. I. Grossman, Ed., pp.132–144, Lea & Febiger, Philadelphia, Pa, USA, 11th edition.
- (2) R. R. Slowey, "Radiographic aids in the detection of extra root canals," *Oral Surgery Oral Medicine and Oral Pathology*, vol. 37, no. 5, pp. 762–772, 1974.

- (3) H. M. Fogel, M. D. Peikoff, and W. H. Christie, "Canal configuration in the mesiobuccal root of the maxillary first molar: a clinical study," *Journal of Endodontics*, vol. 20, no. 3, pp. 135–137, 1994.
- (4) W. H. Christie, M. D. Peikoff, and H. M. Fogel, "Maxillary molars with two palatal roots: a retrospective clinical study, *Journal of Endodontics*, vol. 17, no. 2, pp. 80–84, 1991.
- (5) L. R. G. Fava and P. M. H. Dummer, "Periapical radiographic techniques during diagnosis and treatment," *International Endodontic Journal*, vol. 30, no. 4, pp. 250–261, 1997.
- (6) Kottoor J, Velmurugan N, Surendran S. Endodontic management of a maxillary first molar with eight root canal systems evaluated using cone-beam computed tomography scanning: a case report. *J Endod*. 2011;37:715–9.
- (7) Badole GP, Warhadpande MM, Shenoi PR, Lachure C, Badole SG. A rare root canal configuration of bilateral maxillary first molar with 7 root canals diagnosed using cone-beam computed tomographic scanning: a case report. *J Endod*. 2014;40:296–301.
- (8) F. Baratto Filho, S. Zaitter, G. A. Haragushiku, E. A. de Campos, A. Abuabara, and G. M. Correr, Analysis of the internal anatomy of maxillary first molars by using different methods, *Journal of Endodontics*, vol. 35, no. 3, pp. 337–342, 2009.
- (9) Coutinho FT, La Cerda RS, Gurgel FED, de Deus GA, Magalhaes KM. The influence of the surgical operating microscope in locating the mesiolingual canal orifice: a laboratory analysis. *Braz Oral Res*. 2006;20:59–63.