

Most Treated and Least Understood Molar: A Case Report

Gijo John¹, Niyati Singh Thakur², Karthik Roy Konda³, P. Navya Jyothi⁴

1- 3rd Year Pg, Department Of Conservative Dentistry And Endodontics, MNR Dental College, MNR Nagar, Sanga Reddy, Medak District, Telangana. 2- BDS, Vivekananda Dental Hospital, Opp. ITC Grand Kakatiya Hotel, Green Lands Road, Begumpet, Greenlands Road, Punjagutta, Hyderabad, Telangana. 3- 3rd Year Pg, Department Of Conservative Dentistry And Endodontics, MNR Dental College, MNR Nagar, Sanga Reddy, Medak District, Telangana. 4- BDS, Mallareddy Institute Of Dental Sciences, Suraram Crossroad, Quthbullapur Municipality, Hyderabad.

Correspondence to:

Dr. Niyati Singh Thakur, Vivekananda Dental Hospital, Opp. ITC Grand, Kakatiya Hotel, Green Lands Road, Begumpet, Hyderabad, Telangana.

ABSTRACT

Root canal therapy is carried out in dentistry as one of the routine dental procedure for the patient. An operator needs to have a thorough understanding of the anatomy of teeth and their canals can ensure endodontic success. Variable root canal morphology becomes a challenge to treat. Hence the use of latest adjuncts like radio-visuography (RVG) and clinically the use of magnification loops would help in the accurate management of such cases. This clinical case report presents a case of six canals in the three roots of maxillary first molar which is a rare case.

KEYWORDS: Additional Canals, Multiple Canals, Maxillary First Molar, Root Canal Therapy, Variable Root Anatomy

INTRODUCTION

Inadequate obturation has been shown to be the reason for a majority of endodontic failures. This is why, an operator needs to have a thorough understanding of the anatomy of teeth and the canals, before approaching a root canal procedure.¹ Adequate instrumentation, irrigation and intracanal medication are pre-requisites for a successful therapy. These enable for a thorough cleaning, disinfection and obturation of the canals. Extra canals have always been complex for the operator primarily at the stage of assessment.²

Failure to recognize even a single canal may lead to the failure of the entire treatment process. An in-depth knowledge of the morphology of teeth, combined with thorough clinical and radiographic examination are quintessential for endodontic success.

The internal anatomy of 370 maxillary molars was studied by T. Pe` Cora et al. (1992), which showed that the frequency of occurrence of a second mesiobuccal canal in the maxillary first, second and third molars was 25%, 42% and 32% respectively.³

Few have also reported the occurrence of 2 canals in each of the palatal, mesiobuccal and distobuccal roots.^{4,5}

CASE REPORT

A 31-year-old patient appealed to the clinic with a complaint of pain and swelling in the upper left tooth back region since 10 days. The tooth was tender on vertical percussion. Periodontal probing and the mobility of the tooth were under physiologic limits. The Radiographic assessment was performed to confirm the diagnosis (Figure 1- Pre-operative Radiograph). An

RVG was done using shift cone technique, for better understanding of root canal anatomy. Radiography indicated some abnormality. Six canals, palatal 1 and palatal 2, mesiobuccal 1 and mesiobuccal 2, and distobuccal 1 and distobuccal 2 were identified with the help of conventional access opening and observation under magnification loupes.

Patient was educated and made aware regarding the complete treatment plan. The entire procedure was explained to the patient to create awareness. There was no significant medical history.

The tooth was anaesthetized with 1.8 ml of 2% lidocaine containing 1 : 80,000 epinephrine (lignox 2%), followed by rubber dam isolation technique. A conventional access cavity was done initially and later it was modified according to the lubeck-shamrock modification (Figure 2- Access Cavity Preparation). With the help of ultrasonic troughning, additional canals were identified. The three rooted tooth revealed 2 canals in each root (palatal root, mesiobuccal root and distobuccal root) under magnification loupes. This was followed by a microscopic evaluation for further confirmation.

This unusual morphology was evaluated three dimensionally, by using an intra-oral camera with radio-visuography (rvg). The image obtained from the patient revealed the abnormal canal morphology of the tooth.

The next visit was followed by working length determination, and thorough cleaning and shaping of the canals (Figure 3- Working Length Determination, Figure 4- Working Length Determination with Rubber Dam). Pro-taper Ni-Ti instruments were used for the cleaning and shaping. This was followed by copious saline and

How to cite this article:

John G, Thakur NS, Konda KR, Jyothi PN. Most Treated and Least Understood Molar: A Case Report. Int J Dent Med Res 2015;1(6):122-125.

2.5% sodium hypochlorite irrigation to flush out all the debris and pulpal remnants.

The canals were dried thoroughly, followed by the placement of master cone (Figure 5- Master cone Placement). And obturation was done using gutta percha, by cold lateral compaction technique (Figure 6- Obturation). A resin based sealer was used for the obturation. The tooth was then restored using resin modified glass ionomer cement. During the follow up, the patient was found to be asymptomatic and was advised a full coverage porcelain crown.



Figure 1- Pre-operative Radiograph

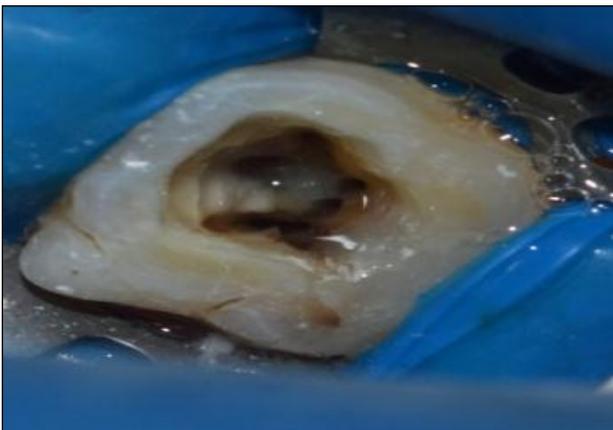


Figure 2- Access Cavity Preparation



Figure 3- Working Length Determination

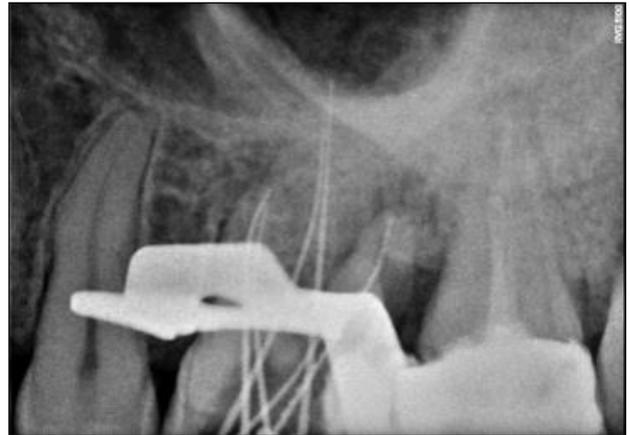


Figure 4- Working Length Determination With Rubber Dam



Figure 5- Master Cone



Figure 6- Obturation

DISCUSSION

The endodontists are constantly challenged by the complex nature of the root canal system of a maxillary first molar. The occurrence of double canals in the roots of a maxillary molar is unusual.⁶

Most of the times the presence of extra or more than normally found canals in a tooth are discovered after the endodontic therapy, due to continuous discomfort.⁷

Normally, the maxillary first molar has three roots and three canals. The frequency of occurrence of fourth canal ranges from 50.4% to 95%^{3,8-11} and a fifth canal 2.25%.¹² A few authors have also reported cases with 6 canals.^{13,14} Weine *et al* found that the teeth with a fourth canal occurred more frequently than the teeth with three canals (51.5% vs. 48.5%). And the inability to detect the second canal in the mesiobuccal root of a first molar usually was the reason for the failure of the root canal treatment.¹⁵

In a clinical analysis, where maxillary first molars were evaluated, a fourth canal frequency was seen in 67.14% of the teeth. A tooth with 7 root canals was found to occur in 0.72% of the cases. The occurrence of more than one root canal in the mesiobuccal root, was found in 92.85% of the teeth.

Additional root canals were located in the mesiobuccal root in 92.85% of the teeth. Clinical assessment showed that the teeth that exhibited 4, 5, and 6 root canals, showed a frequency of 53.26%, 0.35%, and 0.35% respectively.³ Table 1 provides a list of multiple canal findings.

In 1927, okumara found that of 299 extracted teeth, 53% had 2 canals in the mesio-buccal (mb) root, 2.9% in the distobuccal (db) root, and 0.3% in the palatal root.¹⁶ Bond *et al*. 1988 reported a case of maxillary first molar with six canals: with two canals joining in the apical third of the palatal root, two canals with separate foramina in the mesiobuccal root, and two canals with separate foramina in the distobuccal root.³

Hence, one must assume that there is a fair chance of finding more than traditionally occurring three canals in all the molar teeth.¹⁷

The additional canals can generally be detected by the help of different methods like proper radiographic interpretation, cone-beam computed tomography (CBCT), operative microscope, methylene blue staining, sodium-hypochlorite champagne test, red line test and white line test, and ultrasonic troughning to name a few.

S.No	Name Of The Author	Year	No.Of Roots	No.of Canals
1.	OKUMARA.T	1927	3	3,4,5
2.	WEINE FS	1969	3	3,4,5
3.	A.MARTÍNEZ-BERNÁ	1983	3	3,4,5,6
4.	J. L. BOND	1988	3	6
5.	J. C. KULID	1990	3	3
6.	R. P. THOMAS	1993	3	3,4
7.	R. P. THOMAS	1994	3	3,4
8.	STEPHEN JOHAL	2001	3	4,5,6
9.	MAGGIORE F	2002	3	6
10.	B.M CLEGHORN	2006	2,3	2,3,4
11.	G. HARTWELL	2007	3	3,4,
12.	FÁBIO DE ALMEIDA-GOMES	2009	3	6
13.	F. BARATTO FILHO	2009	3	2,4,5,6,7

Table 1: List of Multiple canal findings by different researchers.

CONCLUSION

This case, reports the incidence of variable root canal morphology, with three roots and two canals in each root. A precise understanding of pulpal morphology coupled with angled radiographs becomes essential for the endodontic process. With the progress in technology, aid from advanced diagnostic aids like RVG can be taken to confirm the canal morphology and observe the anatomy in fine details.

REFERENCES

1. V. Malagnino, L. Gallottini, and P. Passariello. Some unusual clinical cases on root anatomy of permanent maxillary molars. *Journal of Endodontics* 1997;23(2):127–128.
2. O. A. Peters. Current challenges and concepts in the preparation of root canal systems: A review. *Journal of Endodontics* 2004;30(8):559–567.
3. 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* 2009;35(3), 337–342.
4. J.L.Bond, G.Hartwell, and F.R. portell. Maxillary first molar with six canals. *Journal of Endodontics* 1988;14(5):258–260.
5. Y.-Y.Lee, P.-Y. Yeh, S.-F. Pai, and S.-F. Yang. Maxillary first molar with six canals. *Journal of Dental Sciences* 2009;4(4):198–201.
6. Stephen johal, DMD. Unusual maxillary first molar with 2 palatal canals within a single root: A case report. *J Can Dent Assoc* 2001; 67:211-4.
7. Fabio de Almeida-Gomes, DDS, msc, Claudio Maniglia-Ferreira, DDS, msc, phd, Bruno Carvalho de Sousa, DDS, msc, Roberto Alves Dos Santos, DDS, msc, phd. Six root canals in maxillary first molar. *Oral surgery, oral medicine, oral pathology, oral radiology, and endodontology* 2009;108: 157-159.
8. B. M. Cleghorn, W. H. Christie, and C. C. S. Dong. Root and root canal morphology of the human permanent maxillary first molar: A literature review. *Journal of Endodontics* 2006;32(9):813–821.
9. R. P. Thomas, A. J. Moule, and R. Bryant. Root canal morphology of maxillary permanent first molar teeth at various ages. *International Endodontic Journal* 1993;26(5):257–267.
10. J. C. Kulid and D. D. Peters. Incidence and configuration of canal systems in the mesiobuccal root of maxillary first and second molars. *Journal of Endodontics* 1990;16(7):311–317.
11. G. Hartwell, C. M. Appelstein, W. W. Lyons, and M. E. Guzek. The incidence of four canals in maxillary first molars—A clinical determination. *Journal of the American Dental Association* 2007;138(10):1344–1346.
12. 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* 1994;20(3):135–137.
13. A.Martínez-berná and P.Ruiz-badanelli. Maxillary first molars with six canals. *Journal of Endodontics* 1983;9(9):375–381.
14. J. L. Bond, G. Hartwell, and F. R. Portell. Maxillary first molar with six canals. *Journal of Endodontics* 1988;14(5):258–260.

15. Weine FS, Healey HJ, Gerstein H, Evanson L. Canal configuration in the mesiobuccal root of the maxillary first molar and its endodontic significance. *Oral surg oral med oral pathol* 1969;28:419-25.
16. Okumara T. Anatomy of the root canals. *J Am Dent Assoc* 1927;632-6.
17. Maggiore F, Jou YT, Kim S. A six-canal maxillary first molar: case report. *Int Endodontic Journal* 2002 May;35(5), 486-491.

Source of Support: Nil
Conflict of Interest: Nil