

Inexplicable Maxillary First Molar with Five Canals: Case Report

Thimmanagowda N Patil^{1*} Anand Kumar Vallabhdas² Pradeep K³ Vijay Kumar C. N⁴

¹Assistant Professor, Department of Conservative Dentistry and Endodontics, Subbaiah Institute of Dental Sciences, Shimoga, Karnataka, India.

²Assistant Professor, Department of Conservative Dentistry and Endodontics, Subbaiah Institute of Dental Sciences, Shimoga, Karnataka, India.

³Professor, Department of Conservative Dentistry and Endodontics, Subbaiah Institute of Dental Sciences, Shimoga, Karnataka, India.

⁴Professor and Head, Department of Conservative Dentistry and Endodontics, Subbaiah Institute of Dental Sciences, Shimoga, Karnataka, India.

ABSTRACT

Background: The Purpose of this Case Presentation is to report the successful management of maxillary first molar with five canals. This case report presents management of maxillary first molar with independent second mesiobuccal canal and second distobuccal canal merging with the main distobuccal canal, revealing an rare morphology of maxillary first molar with five canals. Knowledge to identify and locate all the root canals are the most vital part of any endodontic therapy.

Keywords: DB2 Canal, Five Canals, Independent MB2 Canal, Maxillary First Molar, Nonsurgical Endodontics.

INTRODUCTION

A major cause of failure of the root canal treatment is the inability to locate, debride or adequately fill all canals of the root canal system. A successful root canal treatment depends on the diagnosis, treatment planning, good knowledge of the root canal system and its frequent variations.¹

There are numerous studies that examined the root and root canal anatomy of different populations. The morphology of permanent maxillary first molar has been reviewed extensively and the most common root canal anatomy has been described as three roots and three canals and the commonest variation is the presence of second mesiobuccal canal.² There are case reports of the incidence of second mesiobuccal canals ranging between 18 and 96.1%. So, generally the permanent maxillary first molar has three roots and four canals in majority of the cases.¹

Apart from the frequent variation with second mesiobuccal canal, other rare variations include one, two, four and five roots and unusual morphology of root canals within individual roots, up to eight canals.³ The incidence of five canals has been reported to be 2.25-2.4%^{4, 5} and the presence

of second distobuccal canal has been reported to be as low as 1.7-1.25%.^{6, 7}

This case report discusses the diagnosis and successful endodontic management of an unusual root canal configuration in a maxillary first molar (26) showing three roots and five canals: two canals each in the mesiobuccal and distobuccal root and one in the palatal root.

CASE REPORT

A 36 year old male patient reported to the Department of Conservative Dentistry and Endodontics with a chief complaint of pain in upper left back tooth region since one month. The patient revealed a history of mild intermittent pain for the past one month, which has increased in intensity during the past one week. The patient reported prolonged sensitivity to hot and cold and the pain was spontaneous and aggravated particularly at night.

Clinical examination revealed a deep disto-occlusal and mesio-occlusal carious lesions on the left maxillary first (tooth 26) and second molar (tooth

Received: Aug. 16, 2019; Accepted: Oct. 29, 2019

*Correspondence Dr. Thimmanagowda N Patil.

Department of Conservative Dentistry and Endodontics, Subbaiah Institute of Dental Sciences, Shimoga, Karnataka, India.

Email: dr.tnpatil@yahoo.in

27) respectively. The tooth 26 and 27 was tender to vertical percussion. The preoperative radiograph revealed radiolucency of carious lesions involving the pulp with respect to 26 and 27. Based on the clinical and radiographic findings, a diagnosis of symptomatic irreversible pulpitis with symptomatic apical periodontitis with respect to 26 and 27 was made and endodontic treatment was initiated.



Fig 1: Pre operative radiograph.



Fig 2: Clinical Picture of Access Opening and Orifice Location.

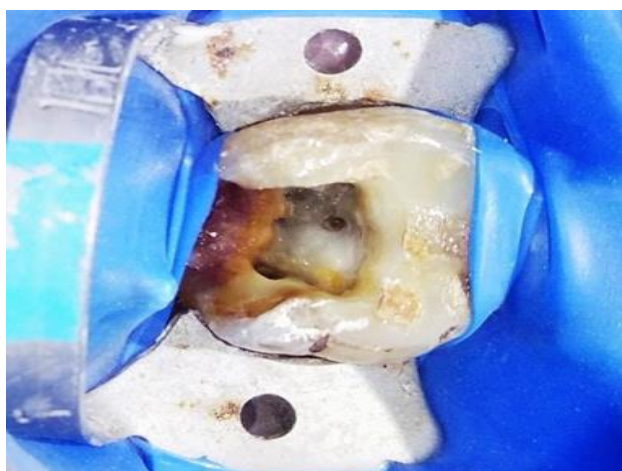


Fig 3: Clinical Picture of Access Opening and Rubber Dam Isolation.



Fig 4: Working length radiograph.



Fig 6: Master Cone Radiograph.



Fig 6: Post Operative Radiograph.

Radiographic evaluation of the involved teeth revealed three completely formed roots with no indication of any variation in the root canal anatomy in 26 and 27 but periapical radiolucency in relation to 27 was evident (Figure1). The tooth was anesthetized using lignocaine. After caries

excavation, identification of the canals, orifices were enlarged and rubber dam isolation was done and access cavity was preparation was completed on tooth 26 and 27.

On inspection the pulp chamber floor of 26 revealed one canal openings in the mesiobuccal, distobuccal and palatal root. A search for the second mesiobuccal canal was made by further exploration of the pulpal floor with DG-16 endodontic explorer on the line connecting the orifices of mesiobuccal and palatal canal. A catch just palatally unveiled the second mesiobuccal canal. In addition, catch was also detected on the line connecting the distobuccal and palatal canal orifice which led to the detection of second distobuccal canal. Thus five canal orifices were located in 26 (Figure 2 & 3).

Negotiation of the canals were carried out with ISO size 06, 08 and 10 K files. Working length was determined using the Raypex 6 (VDW) apex locator with 15 No. K file and was verified using periapical radiograph (Figure 4). The working length radiograph revealed that there was an independent second mesiobuccal canal and the second distobuccal canal merged with the distobuccal canal to form a single apical foramen. Cleaning and shaping was done using Protaper (Dentsply Maillifer) rotary files with respect to 26. All the canals were irrigated using 3% sodium hypochlorite solution and 17% EDTA solution. The canals were finally flushed with sterile saline. Master cones were inserted to the working length and were confirmed radiographically (Figure 5). The canals were dried with paper points and obturation was performed followed by postobturation restoration. All the procedures were completed in the same appointment in relation to 26 (Figure 6). The treatment of maxillary second molar (27) was continued in the subsequent appointments.

DISCUSSION

Anatomical variations are not uncommon in molars. Each individual root has a unique canal system. Studies on maxillary first molar have reported that fourth canal occurred more frequently than those with three canals (51.5% v/s 48.5%). Fourth canal being the second mesiobuccal canal has a high incidence and was present in 80% of specimens and was independent only in 42% of these cases.⁸

Studies on maxillary first molar have reported the most common canal system morphology of the distobuccal root to be single canal (93.3%). The incidence of second distobuccal canal in maxillary first molar is only in 1.7%. Hence presence of second distobuccal canal is a rare occurrence.⁷

Thorough knowledge and careful examination of the floor of the pulp chamber with conventional radiographs with different angulations to determine the root canal anatomy, in clinical conditions are an essential part of endodontic treatment.⁹

In the present case, the location and identification of the canal orifices were done by conventional methods using the DG-16 endodontic explorer, knowledge of the roots and root canal anatomy along with that of the conventional periapical radiographs to determine the canal configuration. One canal on the palatal and two canals each in mesiobuccal and distobuccal root were identified, the second mesiobuccal canal was found to be independent of the mesiobuccal canal whereas, the second distobuccal was observed merging with that of the distobuccal canal to form a single apical foramen.

CONCLUSION

Thorough knowledge of the root canal anatomy is a prerequisite for endodontic success. The knowledge that aberrant canals are more common than earlier assumed is increasingly being proven.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

REFERENCES

1. Raghavendra SS, Hindlekar AN, Desai NN, Vyabahare NK, Napte BD. Endodontic management of maxillary first molar with seven root canals diagnosed using cone beam computed tomography scanning. Indian Journal of Dentistry 2014;5:152-156
2. Kottor J, Velmurugan N, Sudha R, Hemamalathi S. Maxillary first molar with seven root canals diagnosed with cone beam computed tomography scanning: A case report J Endod 2010;36:915-921

3. Shetty K, YAdav A Babu VM. Endodontic management of maxillary first molar having five root canals with the aid of spiral computed tomography. Saudi Endodontic Journal 2014; 4:149-153
4. Gray R. the maxillary first molar. In: Bjorndal A, Skidmore E editors. Anatomy and Morphology of the Human teeth. Iowa City: University of Iowa College of Dentistry 1983. P. 31-40
5. Acosta Vigouroux SA, Trugeda Bosaans SA, Anatomy of the pulp chamber floor of the permanent maxillary first molar. J Endod 1978; 4:214-219
6. Kim Y, Lee SJ, Woo J. Morphology of maxillary first and second molars analyzed by cone beam computed tomography in a Korean population: Variations in the number of roots and canals and the incidence of fusion. J Endod 2012; 38:1063-8
7. Cleghorn BM, Christie WH, Dong CC. Root and root canal morphology of the human permanent maxillary first molar: A literature review. J Endod 2006;32: 813-21
8. Chalker A, Bhagwat S, Mandke L. Endodontic management of maxillary first molar with three mesiobuccal root canals using cone beam computerized tomography. European Journal of General Dentistry 2015;4:16-20.
9. Patel S, Sawood A, Whaites E, Pitt Ford T. New dimensions in endodontic imaging: Part 1. Conventional and alternative radiographic systems. Int Endod J 2009;42:447-62.