

## Successful endodontic management of permanent maxillary first molar with six root canals by CBCT as a diagnostic aid

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### Abstract

The possibility of morphologic variations in the tooth should never be misapprehended and thorough knowledge of their variations is the cue to a successful root canal treatment. Maxillary first molar have been studied for their canal configuration, presence of extra roots and their form with the aid of new diagnostic tools till now. This case report presents the management of Maxillary first molar with six canals with the Cone Beam Computed Tomography.

**Keywords:** Six canals, Maxillary First molar, CBCT, Distobuccal 2 canal, Distopalatal canal

### Introduction

An absolute knowledge of the anatomical variations like an uncommon root canal morphology and presence of an extra root are must as these factors contributes towards the successful root canal treatment.<sup>(1)</sup> Maxillary first molar normally contains 3 roots<sup>(2)</sup> (Mesiobuccal, Distobuccal and Palatal). The incidence of MB-2 (Second Mesiobuccal Canal) ranges from 18.6-95.8%. DB-2 (Second Distobuccal canal) varies from 1.5-9.8% and the 1.8% is the prevalence rate of Distopalatal canal in the palatal root.<sup>(3)</sup> According to previous studies in the literature, Palatal root contains the greater amount of canal width with straight root as compared with Mesiobuccal and Distobuccal canals.<sup>(4)</sup> This case report aiming towards the intricacy of three rooted maxillary first molar with six canals which was confirmed with the diagnostic aid of Cone Beam Computed Tomography scanning.

### Case Report

A 21 year old male patient came to the department of conservative dentistry and Endodontics with the complaints of pain in right maxillary back tooth region of the jaw since 1 month. The pain was continuous and was aggravated while taking food. The medical history was non contributory. Patient had undergone restoration one year ago, which was faulty with in relation to 15 & 16. On clinical examination Maxillary right second premolar and first molar had faulty restoration. Tenderness on percussion was present in relation to 16. Tooth mobility was within its physiologic limit the gingiva was also in the healthy condition. Intraoral periapical radiograph in relation to 16 revealed diffused periapical radiolucency beneath all the roots. (Fig. 1)



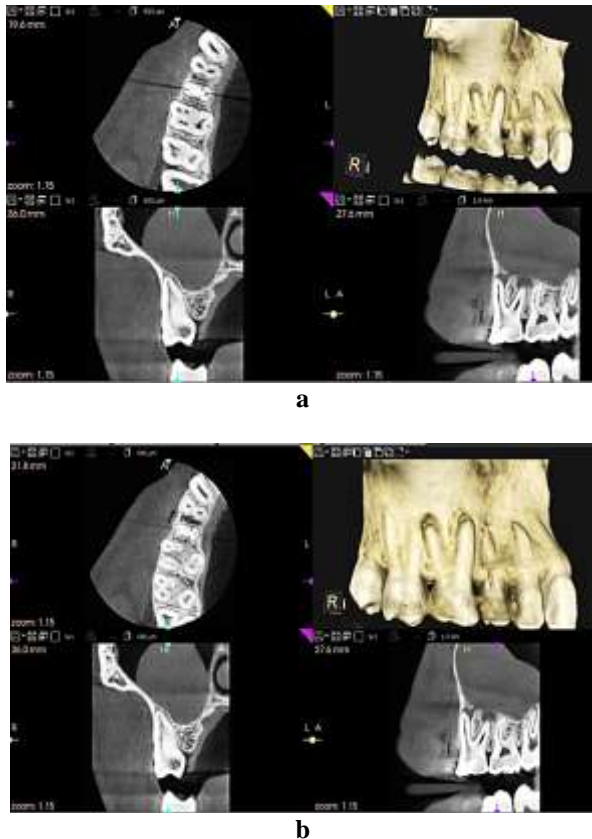
**Fig. 1: Preoperative radiograph**

After careful assessment, the diagnosis was made as chronic periapical abscess in relation to 16. Root canal treatment was planned in relation to 16. After receiving the consent of the patient, the treatment was initiated. No need for anaesthesia was there as the tooth was Non-vital. After the application of the rubber dam, the access cavity preparation was done by using Endo access bur and Endo Z bur. (Fig. 2) Canals were located by using DG-16 endodontic explorer. Firstly three canals were identified as Mesiobuccal, Distobuccal and Palatal canal. As the complete deroofting of the pulp chamber was made, abnormal dentinal map was noticed rather than conventional trapezoidal shaped map. According to this dentinal map, another three canals were present which were tried to locate again by DG-16 Endodontic Explorer.



**Fig. 2: Access opening and six canal orifices**

There were extra canals in each of its root which was confirmed by Radiovisiography. For further confirmation Cone Beam Computed Tomography scanning was done. (Fig. 3A & B) CBCT scans rendered excellent information regarding the tooth anatomy and canal configuration. Conventional radiographic technique requires multiple radiographs which leads to the higher number of radiation exposure. CBCT slice of tooth in relation to 16 showed the confirm results of the six canals: Two Mesiobuccal, Two Distobuccal, One Distopalatal and Palatal.



**Fig. 3A & B: CBCT scans showing six root canals**

In the Cone Beam Computed Tomographic Scanning, the data are attained through reciprocal detector which rotates in a single direction around the patient's head. Working length was determined using Canal Pro apex locator by # 10 k file which was confirmed by Radiovisiography. Biomechanical preparation was initiated till #25 k file. Irrigation preparation was normal saline and 2% chlorhexidine was done in between each instrumentation. Master cone was selected of #25 Gutta purcha point. All the canals were dried with paper points. Afterwards the canals were obturated with lateral and vertical compaction technique using Sealapex sealer. Core filling was done using Composite and full coverage porcelain crown was advised. (Fig. 4)



**Fig. 4: Post operative radiograph**

## Discussion

Successful root canal therapy primely depends on the thorough cleaning and shaping of all the canals. The major reason of failure of endodontic treatment is the presence of extra root or canals which are missed due to many reasons.<sup>(5)</sup> There are numbers of methods available through which the confirmation of extra canals are attained<sup>6</sup>. These methods include such as

1. Radiographs with mesial, straight and distal angulations
2. Aberrant dentinal map
3. Presence of extra tiny bleeding points
4. Adequate access cavity preparation.
5. Complete removal of calcification from the pulp chamber
6. Fibre-optic transillumination
7. Champagne bubble test with NaOCl.
8. 1% methylene blue dye staining method<sup>7</sup>

According to the literature, Maxillary first molar have significant number of anatomical variations. In the present case there were two canals in each of its roots: Two mesiobuccal canal in mesiobuccal root, two distobuccal canals in the distobuccal root and distopalatal and palatal canal in the palatal root.<sup>(8)</sup> CBCT scans render 3D diagnosis of aberrant tooth anatomy as well as root canals where as IOPA radiography provides 2D view.<sup>(9)</sup> Here, the clinician can easily observe the whole root and root canals in multiple planes and slices. Hence the maxillary first molar needs critical evaluation of the same which must be fulfilled by CBCT scans. The prevalence where distobuccal, distopalatal and palatal roots are present is >1% in the pollution, though the variance should be thoroughly scrutinized.<sup>(10)</sup> Thus diagnosis with contemporary technologies should be analysed for better treatment out come and prognosis as well.<sup>(11)</sup>

## Conclusion

Though the incident of root variance is not so common, their critical evaluation must not be missed. The thorough examination of the radiographs and root canal system are essentially needed for accurate diagnosis. The presented case is having six canals in the maxillary first molar confirms the necessity for careful observation of the pulpal floor which gets fulfilled by CBCT scans.

## References

1. Chokshi Shraddha, Jahnvi Mehta, Pallav Chokshi, and Rupal Tyndall, Donald A., and Sonali Rathore. "Cone-beam CT diagnostic applications: caries, periodontal bone assessment, and endodontic applications." *Dental Clinics of North America* 52, no. 4 (2008): 825-841.
2. Cleghorn Blaine M., William H. Christie, and Cecilia CS Dong. "Root and root canal morphology of the human permanent maxillary first molar: a literature review." *Journal of endodontics* 32, no. 9 (2006): 813-821.
3. Mamoun John Sami. "The maxillary molar endodontic access opening: A microscope-based approach." *European journal of dentistry* 10, no. 3 (2016): 439.
4. Vertucci, Frank J. "Root canal morphology and its relationship to endodontic procedures." *Endodontic topics* 10, no. 1 (2005): 3-29.
5. Cantatore Giuseppe, Elio Berutti, and Arnaldo Castellucci. "Missed anatomy: frequency and clinical impact." *Endodontic Topics* 15, no. 1 (2006): 3-31.
6. Aggarwal Vivek, Mamta Singla, Ajay Logani, and Naseem Shah. "Endodontic management of a maxillary first molar with two palatal canals with the aid of spiral computed tomography: a case report." *Journal of endodontics* 35, no. 1 (2009): 137-139.
7. Smadi Leena, and Ameen Khraisat. "Detection of a second mesiobuccal canal in the mesiobuccal roots of maxillary first molar teeth." *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology* 103, no. 3 (2007): e77-e81.
8. Bond John L., Gary Hartwell, and Frank R. Portell. "Maxillary first molar with six canals." *Journal of endodontics* 14, no. 5 (1988): 258-260.
9. Neelakantan Prasanna, Chandana Subbarao, and Chandragiri V. Subbarao. "Comparative evaluation of modified canal staining and clearing technique, cone-beam computed tomography, peripheral quantitative computed tomography, spiral computed tomography, and plain and contrast medium-enhanced digital radiography in studying root canal morphology." *Journal of Endodontics* 36, no. 9 (2010): 1547-1551.
10. Neelakantan P, Subbarao C, Ahuja R, Subbarao CV, Gutmann JL. Cone-beam computed tomography study of root and canal morphology of maxillary first and second molars in an Indian population. *Journal of Endodontics*. 2010 Oct 31;36(10):1622-7
11. Tyndall Donald A., and Sonali Rathore. "Cone-beam CT diagnostic applications: caries, periodontal bone assessment, and endodontic applications." *Dental Clinics of North America* 52, no. 4 (2008): 825-841.