

PERMANENT MAXILLARY FIRST MOLAR WITH TYPE I ROOT CANAL MORPHOLOGY: A CASE REPORT

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ABSTRACT

Maxillary molars are widely recognised as being one of the most difficult teeth to treat endodontically due to its anatomic variations of root canal morphology. The Clinician should be aware of apical ramification, presence of extra canal, lateral canal and also the fewer number of root & root canals. This paper presents an unusual root canal anatomy in a maxillary first molar tooth with a single root & single canal diagnosed with radiograph and CT scan (Denta scan software)

KEYWORDS: Maxillary First Molar, Single Root, Single Canal, CT Scan

Proper knowledge of the root canal morphology is basis of successful root canal treatment. Maxillary First Molar in majority of cases has three roots & four canals, but tooth with unusual morphology also exists (Vertucci FJ et al, 2011) (Cleghorn BM et al., 2006). Radiographic examination is an essential component of endodontic management aspects of diagnosis, treatment planning, intra operative control and outcome assessment (Saxena AS et al., 2011). CT scan is a advanced diagnostic modality to diagnose root and root canal morphology. The occurrence of a single root and single canal in the permanent Maxillary 1st molars is rare (Ackerman JL et al., 1973) (Weine FS., 1996) (Vrrtucci Fg., 2005).

Case Report

A 45 year old female patient reported to the Department of conservative Dentistry & Endodontics, with the chief complaint of pain & food impaction in right upper back tooth region since one month. Pain was intermittent in nature and aggravated with intake of hot & cold beverages.

On intra oral examination right maxillary first molar was carious, The Tooth was not tender to percussion & palpation. Thermal and electrical testing produced exaggerated response in right maxillary first molar. The radiograph showed unusual anatomy of single root & single canal. A Provisional diagnosis of chronic irreversible pulpitis was made and root canal treatment was planned [figure 1a].

Access opening was done in right maxillary first molar without rubber dam isolation due to allergic to latex. On examination, clinical presence of broader bucco palatal orifice was found. Further inspection of pulpal floor was done to search for other orifices, but they were absent. Multiple radiographs were taken in various horizontal

angulations to confirm this morphology. On instrumentation, all scouting files converged into a single broad canal, initially divided by a isthmus. Working length was calculated using an electronic apex locator (propex- II Dentsply india) & confirmed by the IOPA radiograph. Working length radiograph also suggested positioning of endodontic files in a single canal [Figure 1b].



Figure 1a: Preoperative radiograph



Figure 1b: Working length radiograph

The coronal shaping was done by protaper SX file (Dentsply, india) in crown down manner followed by step back technique with an apical enlargement upto the size of 40 k file (Dentsply, india) along with copious irrigation with 3% sodium hypochlorite solution. The canal was finally rinsed with 17% EDTA solution & dried with absorbent paper point (Dentsply, India). After that intra canal calcium hydroxide dressing was given for one week.

For confirmation of single canal, the patient was subjected to CT scan (Denta scan software) of imaging of tooth no 16 with 3D reconstruction. CT Scan also confirmed the presence of single canal [Figure 2a & 2b]. The root canal was obturated after removing of $Ca(OH)_2$ dressing by copious irrigation through 3% sodium hypochlorite & final rinse with 17% EDTA, with the help of resin based endodontic sealer and laterally condensed gutta percha, followed by restoration with Fuji IX Glass ionomer restorative capsules (GC Fuji Japan) after mixing in amalgamator.

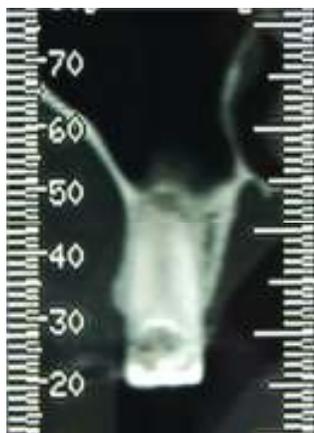


Figure 2a: Axial and coronal ct scan view

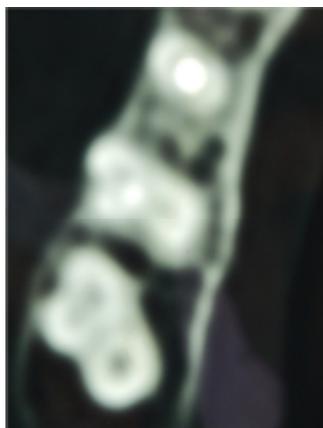


Figure 2b: Axial and coronal ct scan view

Post treatment radiograph showed the adequate sealing of the root canal system and the patient was asymptomatic [Figure 1c].



Figure 1c: Post treatment radiograph

DISCUSSION

Dental anomalies are the defects that may occur during any of the developmental stages of the tooth, which are manifested clinically in later life once the tooth is fully formed (Shigli et al., 2010). Morphologic dental anomalies may involve a single tooth, a group of teeth, or the entire dentition (Cobancara et al., 2008). Wiene divided the position of one or two canals within one root into four categories (weine I-IV) (Weine F.S., 1996). Vertucci also described a classification encompassing eight different types of canal morphology. (Vertucci Fg., 2005).

A literature search was done to ascertain the existence of such an unusual morphology. Shigli et al reported a case of 11 year old female child and used spiral CT to diagnose the permanent maxillary first molar with single root and single canal. Cobanka et al. reported a case of a 36 year-old male and used radiograph to diagnose unusual morphology of permanent maxillary molar with a single root & single canal. Gopikrishna et al have reported a case of a 48-year-old female having maxillary first molar with single root and single canal. They stated that anomalies in root canal morphology can be in the form of fewer canals and they used SCT scan to confirm the root canal morphology.

With the help of conventional radiology, it is possible to get an overview of the position of the root canals; yet problems with the diagnostic result arise due to the super imposition effects of the zygomatic bone (Slowey RR, 1974). In addition , the canals often overlap due to the anatomy and x ray viewpoint, due to which the complexity of the canal system cannot be characterized,

also radiograph are two-dimensional images of three-dimensional structure (Pineda et al., 1972) (Mikrogeorgis et al., 1999). Newer diagnostic methods such as CT and SCT have overcome the disadvantage of by providing a 3D image. These imaging techniques have emerged as a powerful tool for evaluation of root canal morphology (Peter, 2004).

The uptake of CT in endodontics has been slow for several reasons, including the high effective dose and relatively low resolution of this imaging technique (Ngan et al., 2003). However, current CT scanners have a linear array of multiple detectors, allowing “multiple slices” to be taken simultaneously. This results in faster scan times and therefore, a reduced radiation exposure to the patient (Sukovic, 2003).

CONCLUSION

Anatomical variation is the most challenging aspect for conducting successful endodontic therapy. Clinicians must have adequate knowledge about root canal morphology and its variations. They should be identified radiographically before the root canal treatment.

REFERENCES

- Vertucci F.J., Lambade P., Saxena A.S. and Patle B., 2011. Advanced diagnostic aids in endodontics. *JIAOMR*, **23**:21-24.
- Cleghorn B.M., Christie W.H. and Dong C.C., 2006. Root and root canal morphology of the human permanent maxillary first molar: a literature review. *J. Endod.*, **52**:813-20.
- Saxena A.S., Patle B. and Lambade P., 2011. Advanced diagnostic aids in endodontics. *JIAOMR*, **23**:21-24.
- Shigli A. and Ararwal A., 2010. Permanent maxillary first molar with single root and single canal: a case report of a rare morphology. *J. Indian Soc. Pedod. Prev. Dent.*, **28**: 121-5.
- Cobancara F.K., Terlemez A. and Orucoglu H., 2008. Maxillary first molar with an unusual morphology: report of a rare case. *Oral Surg. Oral Med. Oral Pathol Oral Radiol Endod*, **106**: 62-5.
- Gopikrishna V., Bhargvi N. and Kandaswamy D., 2006. Endodontic management of a maxillary first molar with a single root and a single canal diagnosed with the aid of spiral CT: a case report. *J. Endod*, **32**:687-91.
- Robbins I.M. and Keene H.J., 1964. Multiple morphologic dental anomalies. Report of a case. *Oral Surg Oral Med Oral Pathol*, **17**:683-90.
- Ackerman J.L., Ackerman A.L. and Ackerman A.B., 1973. Taurodont, Pyramidal and fused molar roots associated with other anomalies in a kindred. *Am. J. Phys. Anthropol.*, **38**:681-94.
- Weine F.S., 1996. *Endodontic Therapy*. 5th ed. St. Louis: Mosby- Year Book, Inc., p.242.
- Virtucci Fg., 2005. Root canal morphology and its relation to endodontic procedures. *Endod Top*, **10**:3-29.
- Slowey R.R., 1974. Radiographic aids in the detection of extra root canals. *Oral Surg Oral Med Oral Pathol*, **37**:762-72.
- Pineda F. and Kuttler Y., 1972. Mesiodistal and buccolingual roentgenographic investigation of 7275 root canals. *Oral Surgery Oral Med Oral Pathol*, **33**:101-10.
- Mikrogeorgis G., Lyroudia K.L., Nikopoulos N., Pitas I. and Lambrianidis T.H., 1999. 3D computer – aided reconstruction of six teeth with morphological abnormalities. *Int Endod J.*, **32**:88-93.
- Peter O.A., 2004. Current challenges and concepts in the preparation of root canal systems: A review. *J. Endod*, **30**:559-67.
- Ngan D.C., Kharbanda O.P., Geenty J.P. and Derendeliler M.A., 2003. Comparison of radiation levels from computed tomography and conventional dental radiographs. *Aust. Orthod. J.*, **19**:67-75.
- Sukovic P., 2003. Cone beam computed tomography in craniofacial imaging. *Orthod cranifac Res.*, **6**:31-6.