

Case Report

Endodontic Management of Type V Canal Configuration in Palatal Root of Maxillary First Molar: A Case Report

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ABSTRACT

Anatomical variations in the human teeth are not unusual. Among them, molars present high anatomical variations in relation to number of roots and root canals. Clinician while performing root canal therapy of molars must be aware of the rare anatomical variations which when treated cautiously will increase the long-term success of endodontic therapy. As the missed canals are the most common causes of failure of endodontic treatment, a thorough knowledge of anatomy of tooth and their roots is must. This case report is an example of careful evaluation and treatment of a missed bifurcation in palatal root of maxillary first molar.

Key words: Bifurcated palatal canal, palatal root of maxillary first molar, Vertucci class V

INTRODUCTION

Human molars present with relatively high anatomic variations and abnormalities with respect to number of roots and root canals.^[1] The frequency of a maxillary first molar with two roots or two palatal canals is very low, 3.9 and 1%, respectively.^[2] A brief review of recent case reports of extra palatal canals in maxillary first molars is presented in Table 1.

Thews *et al.* (1979) reported two cases of atypical variations of the root canal system in the palatal root of maxillary first molars.^[3] The first case had two distinct palatal roots with corresponding root canals; the second case had a single palatal root with two distinct root canal orifices and canals that appeared to terminate in a common apical foramen. Previous papers have reported cases of maxillary molars with a single palatal root containing two separate orifices and root canals.^[4,5] The following clinical case is a report of a variation of the palatal root canal anatomy of a maxillary molar in which the palatal root contained one orifice, a bifurcated canal, and two foramina.^[4]

CASE REPORT

A 29-year-old male patient reported to the Department of Conservative Dentistry and Endodontics, Institute of Dental Sciences Bareilly, Bareilly (Uttar Pradesh), with the chief complaint of sharp pain which occurred both spontaneous and on thermal stimulation specially to hot beverages and food in the upper right maxillary first molar after a few days of completion of root canal therapy. The patient's medical history was non-contributory.

Based on the chief complaint, possibility of missed canals was suspected. Radiographs taken from an angulation revealed a broad palatal root and a bifurcation at the apical third level of the root with two separate apical foramina suggestive of Vertucci type V canal configuration [Figure 1a]. Based on clinical and radiographic findings, a diagnosis was made and the treatment plan decided was to repeat the endodontic treatment of the same tooth.

The patient received local anesthesia with 2% lidocaine with 1:100,000 epinephrine. A rubber dam was placed than all the filling was removed and the bifurcation in the palatal canal was negotiated. The working length was than reestablished using electronic apex locator and confirmed radiographically [Figure 1b]. Canal was instrumented up to No. 30 hand K-file. Master cone radiograph was taken [Figure 1c]. The palatal canal was obturated using 2% 30 no. gutta-percha cones up to the level of bifurcation and the remainder of the canal was filled with thermoplasticized gutta-percha (Backfill 3D obturation technique) up to the canal orifice. Mesio Buccal and distobuccal canals were also obturated using gutta-percha cones (25/0.04%). A temporary seal was placed using cavity [Figure 1d]. In the second visit (after a week), the patient was asymptomatic. Temporary filling was removed and final restoration was done with composite [Figure 1e]. The tooth was asymptomatic after 1 year follow-up visit [Figure 1f and g].

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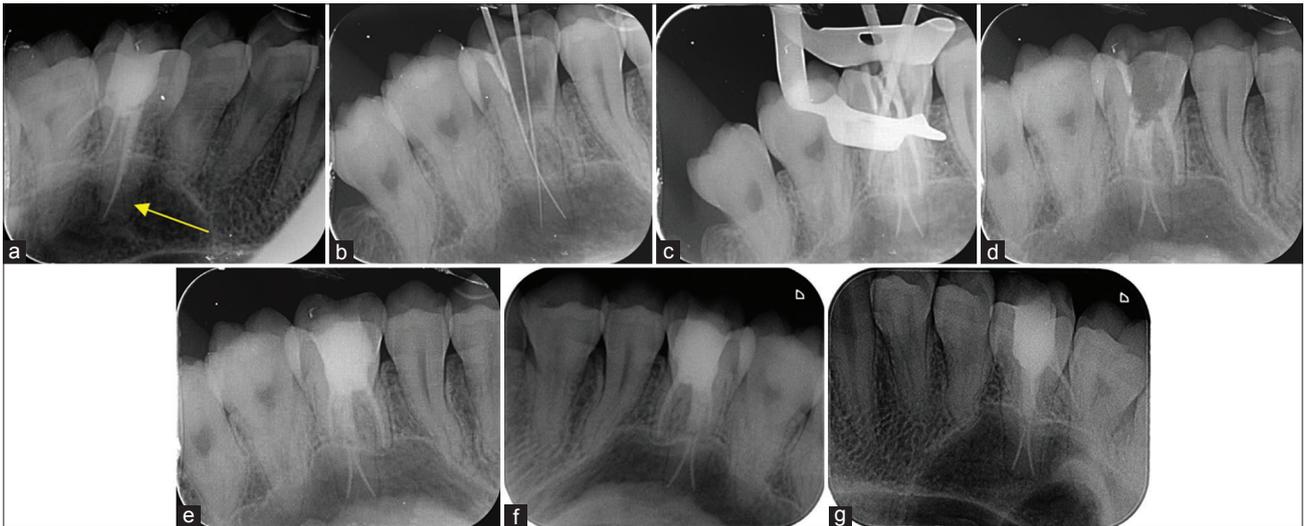


Figure 1: (a) Pre-operative radiograph showing missed canal at apical third level of the root. (b): Working length radiograph of palatal canals, (c): Master cone radiograph, (d): Post-obturation radiograph, (e): Post-endodontic restoration, (f): Six months follow-up, (g): One year follow-up

Table 1: Review of case reports of more than 1 palatal root or canal in maxillary first molar

Investigators	Study type	Key information
Wong (1991) ^[5]	Clinical RCT	1MB, 1DB, 3P
Johal (2001) ^[6]	Clinical RCT	2MB, 1DB, 2P
Holderrieth and Gernhardt (2009) ^[7]	Clinical RCT	2 cases: 2MB, 1DB, 2P
Aggarwal <i>et al.</i> (2009) ^[8]	Spiral CT	1MB, 1DB, 2P
Deepalakshmi <i>et al.</i> (2009) ^[9]	Spiral CT	2MB, 1DB, 2P
Biz Yeganeh <i>et al.</i> (2012) ^[11]	CBCT	1B, 2P

RCT: Randomized controlled trials, CT: Computed tomography, CBCT: Cone-beam computed tomography

DISCUSSION

This paper highlights the unusual and rare anatomy of palatal root canal of maxillary first molar. The incidence of maxillary first molar with more than 1 palatal root and root canals is rare.^[5] The present case report confirms the presence of a palatal canal with single orifice and the bifurcation of the root canal with two distinct foramina.^[4,10] The location of canal orifices in this case was of usual occurrence which did not lead the clinician to suspect for further exploration. Moreover, the radiographs previously taken might not be interpreted in context to the presented scenario. The clinician should always look for the shape and size of the roots and radiographs with different angulations helps revealing the anatomy if one suspects it unusual. Although radiographs produce only a two-dimensional image, three-dimensional imaging such as Denta Scan or cone-beam computed tomography can be of clinical value for diagnosing such anatomical variations in the tooth.^[8] The sequence of treatment and the prognosis for molars with bifurcated palatal canals should be considered to

be the same as those for any maxillary molar.^[1] The undetected or missed canals are a major reason for failure of endodontic treatment.

CONCLUSION

Variation in the anatomy can occur in any tooth with no exception for maxillary first molars. Although the incidence of bifurcation of a palatal canal is very rare, it is important to take these variations into consideration during endodontic therapy of maxillary molars to ensure a long-term successful outcome.

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