

# Aberration In Root Canal Morphology Of Maxillary First Molar -A Case Report.

A Gandhi, N Madan

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## Abstract

This is a case report of maxillary first molar that has a rare second palatal canal with a separate root apex and, thus a separate apical foramen. The importance of this case is that it demonstrates that the seemingly ordinary case can present with an anomalous root and root canal configuration. The clinician must be aware that this second palatal canal though rare, can exist and may result in treatment failure if not found and properly treated. The clinician must know not only the normal root canal anatomy but also variation from the normal. It is also paramount for the clinician to seek out every possible aberration of root canal anatomy for all teeth undergoing treatment.

## INTRODUCTION

The knowledge of root canal anatomy is the single most important aspect for the successful treatment of endodontically treated teeth. Finding all of the root canals in an endodontic case is essential to long-term treatment success. Root canals might be left untreated during endodontic therapy if the dentist fails to identify their presence, particularly in teeth with anatomic variations or extra root canals. Human molars show considerable anatomic variation and abnormalities with respect to number of roots and root canals. Unusual canal anatomy associated with the maxillary molars has been investigated in several studies (1,2).

According to wheelers (1976), first molar seldom show malformation of crown and roots. The mature formation of this tooth is typical and rarely anomalous. There can be some variation in the mesiobuccal root. Microscopically, variations from single canal principally occurs least in the palatal or distobuccal root (3). Thews et al (1979) presented two cases with two root canals in the palatal root. The first case had two distinct palatal roots with corresponding root canals; whereas, the second case had a single palatal root with two distinct root canal orifices and canal that appear to terminate in a single apical foramen. In both cases there were a total of four root canals (4).

Christie et al (1991) had reported a variation in the number of roots and an unusual morphology of root canal systems in maxillary molars (5). Wong M (1991) reported a case in

which the palatal canal had a single canal orifice but a trifurcation in the apical third with three separate foramina (6). Maggiore et al (2002) reported a case with trifurcation at apical third in the palatal canal (7).

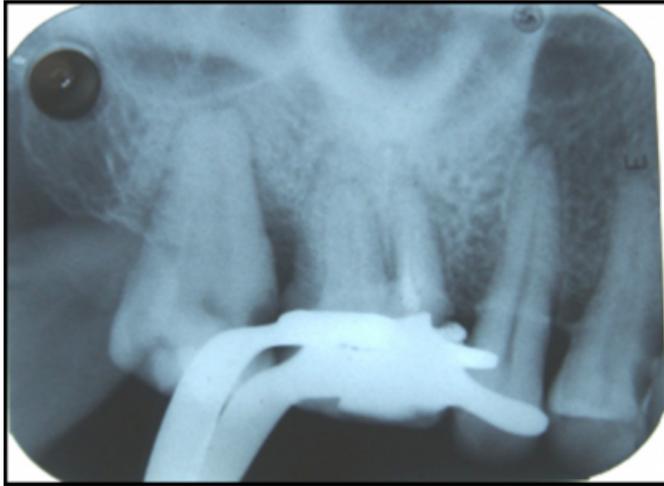
The present report describes the endodontic management of a case in which the maxillary first molar was found to have four canals, with two distinct palatal roots and canals.

## CASE REPORT

A 50-year-old male patient was referred by his family dentist to the department of conservative dentistry and endodontics at Prabhu Dayal Memorial (PDM) dental college and research institute, Bahadurgarh, Haryana, India for completion of root canal therapy of the maxillary left first molar. A preoperative radiograph was obtained (Fig. 1). Root canals had previously been located and partially instrumented. Prosthodontic consultation was obtained, and it was recommended to maintain the first molar if at all possible because of its functional value.

**Figure 1**

Fig.1: Diagnostic radiograph of maxillary left first molar



The tooth was anesthetized with 2% lidocaine with 1:100,000 epinephrine. A rubber dam was placed and the temporary restoration removed. After refining the access opening, it became apparent that previous instrumentation had been done in a mesiobuccal, distobuccal and palatal canal and some intra-canal medicament was inserted into the canals. The lingual surface of the tooth was explored more carefully and showed root contoured similar to the buccal furcation of maxillary molars. On intra-pulpal exploration palatal orifice was determined in normal position, but examination of radiograph showed that the diagnostic instrument was not centrally located. The first impression was that a perforation had been encountered on the palatal. Further debridement and exploration disclosed two distinct palatal orifices and canals (Fig.2).

**Figure 2**

Fig.2: The mesiopalatal (A) and distopalatal (B) canal orifices



All four canals were negotiated (Fig. 3) and a working length of each canals were estimated by means of an electronic apex locator (Root ZX; Morita, Tokyo, Japan) and then confirmed by a radiograph (Fig.4).

**Figure 3**

Fig.3: Files in mesiopalatal (MP), distopalatal (DP), mesiobuccal (MB) and distobuccal (DB) orifices.



**Figure 4**

Fig.4: Maxillary left first molar showing four instruments in existing root canals. Only one canal is present in mesiobuccal and distobuccal root. Note two canals in palatal roots.



The canals were initially instrumented with #15 nickel-titanium files (Dentsply Maillefer) under irrigation with 5% sodium hypochlorite. Coronal flaring was carried out by using Gates-Glidden burs (numbers 3 and 2; Dentsply Maillefer). All canals were cleaned and prepared by hand nickel-titanium files with a crown-down technique similar to that described by Saunders and Saunders (8). The canals were obturated at a second appointment using a Roth sealer (Roth drug Co.,chicago,IL) and laterally condensed gutta-percha. Final radiograph was taken to establish the quality of the obturation (Fig. 5). After completion of root canal treatment, the tooth was restored with a posterior composite filling (P60; 3M Dental Products, St Paul, MN).

**Figure 5**

Fig.5: Root canal therapy completed. Obturation of buccal canals and two palatal canals can clearly be seen.



**DISCUSSION**

This report highlights the unusual anatomy of a maxillary first molar with two separate palatal roots and canals. The majority of endodontic literature describes the maxillary first molar as having three roots with three or four root canals (1,2). The prevalence of maxillary first molars with two palatal roots and canals is rare. Also literature is scarce regarding presence of two separate palatal canals with separate orifices and separate exits. The root canal therapy of these teeth should be carried out by using x-rays from different angulations, efficient explorers, wider access openings, adequate illumination and, whenever possible, image magnification.

Shape of pulp cavity is variable, making every treatment unique. Properly designed and prepared access cavities help the clinician to diagnose and negotiate the root canal morphology (9). In the presented case, a large access was required to locate the two palatal canals. The access cavity on maxillary molars exhibiting two palatal canals should be wider than usual on the palatal aspect. The access outline will be trapezoidal rather than triangular. In the current case, the two palatal orifices were also found to be well developed and large. Treatment sequence and prognosis for molars with

two palatal canals should be considered to be the same as those for any maxillary molar. A clinician should open his/her mind to the various possible canal morphologies and should not stick only to a limited and standard number of canal patterns.

**CONCLUSION**

This case report illustrates aberrations of the root and root canal morphology of the palatal root of maxillary first molar, which was endodontically involved. The statistics of anatomic variations, which are few, are less important than the ability to recognize variants through careful exploration despite the limitation of physical and radiographic examinations. This case report helps the clinician to appreciate the complexity and variability of routine endodontic treatment, to know that aberrations may occur in a particular tooth under treatment and, more importantly to know where to look for possible aberrant canals, to ensure more predictable success of endodontically treated teeth and to avoid unnecessary periapical surgery by retreatment of failing endodontic therapy.

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**Author Information**

**Amit Gandhi, B.D.S, M.D.S**

Department Of Conservative Dentistry And Endodontics, PDM Dental College And Research Institute

**Natasha Madan, B.D.S, M.D.S**

Department Of Conservative Dentistry And Endodontics, PDM Dental College And Research Institute