Maxillary second molar with morphologic variation of the palatal root canal - A Case Report
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Abstract
Maxillary second molar with two palatal roots or root canals is a rare dental anatomy. The diagnosis and treatment of the extra root may create challenges for clinician. This case report presents the endodontic management of a maxillary second molar with two palatal canals with separate orifices and apical foramen.

Key Words: Maxillary molar; Access cavity; Palatal canals; Root canal morphology

Introduction
Human molars show considerable anatomic variation and abnormalities with respect to number of roots and root canal system. Most of the reports have focused on the morphology of the mesiobuccal root and particularly on its mesiopalatal canal. This paper reports an unusual anatomy of maxillary second molar with two palatal canals.

Case Report
A 37 year old patient reported to our outpatient clinic with a chief complains of mild pain and pus discharge from his upper left posterior region. Clinical examination revealed sinus tract in left maxillary vestibule in relation to 27. A preoperative intraoral periapical radiograph was taken with gutta percha point placed in the sinus tract (Fig 1). The radiograph revealed the gutta percha pointing at the apex of 27. There was negative response to heat and cold test. Tooth mobility was within normal range. Hence a diagnosis of chronic suppurative apical periodontitis with 27 was made.

The tooth was anaesthetized with 2% lidocaine in 1:100000 epinephrine and endodontic treatment was initiated under rubber dam. Access to the pulp chamber was achieved using a # 4 round bur. In the pulp chamber floor, the three primary canal orifices were identified. After through debridement of the pulp chamber a small hemorrhagic spot was noticed mesial to the explored palatal canal. The pulpal floor was then explored with a Hu-friedy DG-16 endodontic explorer which confirmed the presence of fourth root canal orifice.

The outline of access cavity was modified from triangular to a more trapezoidal form (Fig 2). Working length radiograph was taken to reconfirm the presence of second palatal canal. Examination of the chamber floor with the explorer revealed fairly well separated two palatal orifices exiting from the floor.

The canals were initially instrumented with #15 NiTi files. Gates glidden drills #2 and #3 were used to flare the coronal portion of the canal to improve straight line access. Frequent irrigation with 3% NaOCl was carried out. The chemo-mechanical preparation was completed with Protaper rotary files. Master cone radiograph was taken (Fig 3) followed by obturation with AH Plus sealer and cold lateral condensation technique. Immediate post-operative radiograph was taken which showed unique palatal morphology. Access cavity was restored with posterior composite restoration (Fig 4). The tooth has been asymptomatic thereafter.

Discussion
This report highlights the unusual anatomy of the maxillary second molar with two

Figure 1. Preop IOPA, 2. Access Cavity, 3. Master Cones in place, 4. After obturation
palatal canals. The incidence of four rooted maxillary second molar is rare in the literature. In 2007 Su Jung Shin et al reported two cases of second molar with two palatal roots. The presence of extra canals or roots is readily determined using routine radiographic techniques like modified paralleling technique. However teeth with extra canals and a normal number of roots, present a greater challenge in terms of diagnosis and treatment. Careful examination of the pre-operative radiograph will aid in the detection of extra canals. Knowledge of anatomic aberrations, such as root position, root shape and relative root outline will also help decrease the failure rate of root canal therapy.

This case report emphasizes the importance of looking for extra canals and of ensuring adequate access to improve the likelihood that additional canals will be located. It is important for the access cavity to have smooth externally diverging walls to improve visibility and prevent debris from migrating into the canal system. The traditional triangular access opening, the MB, DB and palatal roots representing the apex of each point of the triangle is often too constricted to allow straight line access in the maxillary molars. We believe that trapezoidal outline provides better access for searching for additional canals, therefore improving endodontic access.

Diagnostic measures are important aids in the location of root canal orifices. Recent advances in technology like dental operating microscope (DOM) has added a new prospective for effectively locating and treating extra canals. DOM makes canals easier to locate by magnifying and illuminating the grooves in the pulpal floor and by distinguishing the color differences of dentin of the floor and the walls.

**Conclusion**

In conclusion the possibility of palatal root with one or more canals, as well as the existence of two palatal roots should be considered when treating maxillary second molars. Examination of clear radiographs taken from two different angulations and through evaluation of the internal anatomy of the teeth is essential. Root canal treatment is likely to fail if extra root or root canals are not detected.

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