Treating The Three Rooted Bicuspid A Clinical Challenge

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Abstract

Maxillary premolars have highly variable root canal morphology, but it is rare, to find three root canals. This article describes the diagnosis and clinical management of a maxillary first premolar with three canals and three separate roots emphasizing on radiographic interpretation and access refinements.

Introduction

Much of the dilemma related to endodontic treatment is due to the different variations in root canal morphology. Knowledge of the most frequent anatomical formations and of possible variations is a must in the treatment of each and every tooth requiring endodontic intervention. Extra roots are an additional challenge, which begins at case assessment and involves all operative stages, including cavity design, canal access, and localization, cleaning and shaping of the root canal system.[6] In the case of the maxillary first premolar, three root canals are found at a frequency of 0.5-6% (Hess 1925, Pineda & Kutler 1972, Carns & Skidmore 1973, Bellizzi & Hartwll 1985). Generally there is one canal in each of three roots (Vertucci & Gegauff 1979). Maxillary premolars with three root canals, mesio-buccal, disto-buccal and palatal are sometimes called small molars or "radiculous" (Maibaum 1989, Goon 1993), as their root anatomy is similar to that of the adjacent molars.

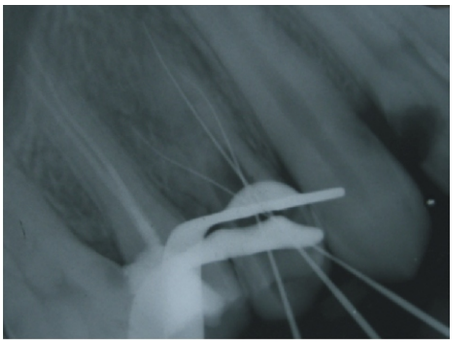
Case report

A 26-year-old male patient was referred to Department of Conservative Dentistry & Endodontics at IDS & SUM Hospital, Orissa, with a history of incomplete root canal treatment in the maxillary left first premolar. Clinically it was observed that the endodontic access cavity was prepared which appeared incomplete with only the palatal canal explored.

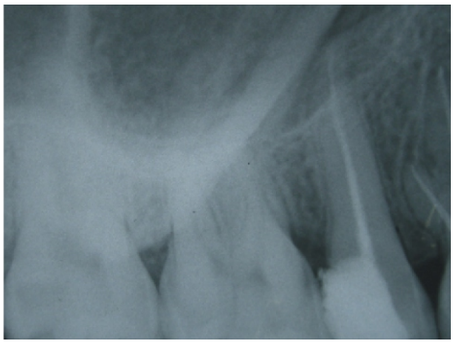
A radiograph with an instrument in the palatal canal was made. The abrupt loss of radiolucency in the pulp cavity, and externally a greater mesio-distal root diameter in the middle third was observed indicating complex root morphology. In straight-on radiographs of maxillary premolars, Sieraski et al. (1985) found that whenever the mesio-diatal width of the mid-root image was equal to or greater than the mesio-distal width of the crowns, the roots most likely had three roots.[4] We also noted a more apical position of the pulp chamber floor, which, according to Pinheiro et al. (1993), tends to make it more difficult to locate and obtain access to the root canals. Based on this information, we diagnosed and proceeded with root canal treatment of the patient assuming the involved tooth to be a three canalled and three rooted maxillary first premolar.

Root canal treatment

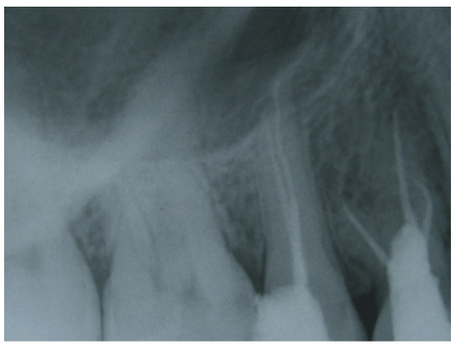
The buccal canals in three-rooted premolars normally lie close to each other and are often covered by a projection of cervical dentin. An Endo Access bur (Dentsply Maillefer) was used to modify the edges of the access opening in tooth 24, in order to make a triangular conformation with the base in the buccal direction (Sieraski et al. 1985). Additionally, a uniform cut was made with a slow speed diamond at the bucco-proximal angle from the entrance of the buccal canals to the cavo-surface angle, resulting in a cavity with a T-shaped outline (Sieraski et al. 1985). After completing the access cavity, the buccal canals were explored with size 8 & 10 K-files and the palatal with a size 15 K-file resulting in clinical and radiographic confirmation of the three canals (Fig.1 & 4).

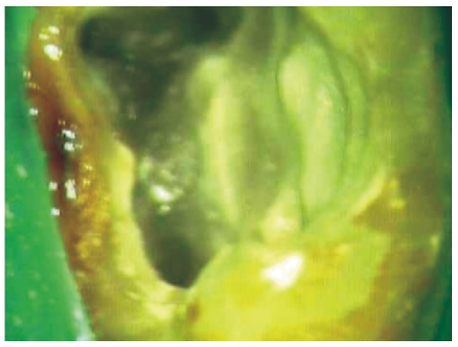


The buccal canals were prepared manually to a size 15 K-file. The restricted dentin in the cervical and middle thirds was removed with GG # 1 and SX ProTaper. Biomechanical preparation of all the three canals was completed manually with hand ProTaper System to size F1 for buccal canals and F2 for the palatal canal, with copious irrigation with 2.5% NaoCl.



The root canals were filled with 6% no. 20 GP{in mesial canals}and 6% no. 25 GP {in the palatal canal}with sealer {AH Plus, Dentsply Maillefer}. A post operative radiograph was taken (Fig.3).





Discussion

Clinically, precise 3-D determination of the internal structure of teeth, their form and no. of root canals is a challenge. Root canal treatment has shown that the pulp cavity is highly variable making every canal configuration unique. In the treatment of a three rooted maxillary first premolar, the buccal orifices are close to each other and can be hard to locate. The preparation of the cut at the bucco-proximal angle from the entrance of the buccal canals to the cavosurface angle, as suggested by Balleri et al {1997}creates a helpful, T- shaped access outline. Correctly negotiating all the root canals, cleaning and shaping, followed by thorough obturation with an adequate seal are necessary for successful root canal treatment. The possible anatomic configuration of maxillary premolars is well documented in the literature, except for the small incidents of the maxillary premolars with three canals and three roots. Whenever there is an indication of abnormal anatomy, additional periapical radiographs should be made at different angulations. This should be followed by a detailed examination of the radiograhs.

Conclusion

The clinician should be aware of anatomical variations in the maxillary premolars and should be able to apply this knowledge in radiographic and clinical interpretation. Access cavity refinements maybe required for unimpeded entry to complex anatomy. Complex premolar anatomy may be predictably managed following canal identification and negotiation.

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