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A CASE REPORTING MAXILLARY FIRST MOLAR WITH SEVEN ROOT CANALS

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ABSTRACT

The focus of this article was to highlight the importance of having a thorough knowledge about the root canal anatomy and treating the tooth successfully. This article presents the management of a maxillary first molar with three roots and seven canals with the detection of the seven canals using cone-beam computed tomography (CBCT) scanning. The palatal and disto-buccal roots have a Vertucci type II canal pattern and the mesio-buccal root shows a Sert and Bayirli type XV canal configuration. This article describes and discusses the different variation in canal morphology of maxillary first molar and the use of latest development in technologies in successfully diagnosing and treating them.

Key words: Cone Beam Computerized Tomography Scanning, Maxillary First Molar, Seven Root Canals, and Crowns etc.

INTRODUCTION

The root canal anatomy of maxillary first molars is generally three roots with three canals with the commonest variation in the presence of a second mesio-buccal canal. The presence of second mesio-buccal canal has been reported to be between 18% and 96.1% [1]. Case reports with five and six root canals or with a C-shaped canal configuration have also been reported earlier by different practitioners. Martı´nez-Berna´ and Ruiz-Badanelli reported six root canals with three mesio-buccal, two disto-buccal and one palatal, whereas de Almeida and Bond reported six root canals with two mesio-buccal, two disto-buccal and two palatal [2]. Alavi and Thomas reported the incidence of two canals in the disto-buccal root as 1.90% and 4.30%, respectively and few other case reports have noted two canals in the disto-buccal root [3]. The present case report discusses the successful endodontic management of a maxillary first molar presenting with three roots and seven root canals. This unusual morphology was confirmed with the help of cone beam computerized tomography (CBCT) scans.

Case Report

A 47 year old man presented with the chief complaint of continuous toothache in his right posterior maxillary region for 2 days. The patient's medical history was not significant. A clinical examination revealed a carious maxillary right first molar which was tender to percussion. A preoperative radiograph revealed mesio-occlusal radio-lucency, approaching the pulp space with periodontal ligament space widening in relation to the mesio-buccal root. From the clinical and radiographic findings, a diagnosis of symptomatic irreversible pulpitis with symptomatic apical periodontitis was made and endodontic treatment was suggested to the patient.

The tooth was anesthetized with 2% lignocaine containing 1:200,000 epinephrine followed by rubber dam isolation. An endodontic access cavity was established and canals were examined. Coronal enlargement was done with a nickel-titanium Pro-Taper series orifice shaper to improve the straight line access. The working length was determined with the help of an apex locator and later confirmed using a radiograph. To confirm this unusual

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morphology, it was decided to perform CBCT imaging of the tooth. CBCT scan revealed seven canals (three mesio-buccal, two palatal and two disto-buccal) in the right maxillary first molar. CBCT images provided the canal configuration and confirmed the seven canals that were not clearly seen in the conventional radiograph. Cleaning and shaping was performed under rubber dam isolation using Pro-Taper nickel-titanium rotary instruments with a crown down technique. The canals were dried with absorbent points and obturation was performed. The tooth was then restored with a posterior composite resin core. The patient was advised a full coverage porcelain crown and was asymptomatic during the follow-up period of 1 month.

DISCUSSION

Any endodontic problem can be identified initially by the use of radiographs [4]. The amount of information gained from conventional and digital radiographs is limited by the fact that the three dimensional anatomy of the area being radio-graphed is compressed into a two-dimensional image [5, 6]. Newer diagnostic tool such as computerized axial tomography scanning greatly helps in access to the internal root canal morphology. One of the most important advantages of CT scanning over the conventional radiograph is that it allows the operator to look at multiple slices of tooth roots and their root canal systems.

Robinson reported that CT images identified a greater number of morphologic variations than panoramic radiographs [7]. The use of spiral computerized tomography (SCT) scans in dentistry has increased dramatically in the past decades. Without additional scanning time, these data can be viewed as conventional trans-axial images such as multi-planar reconstructions or as three dimensional reconstructions. With SCT scans, it is possible to reconstruct overlapping structures at arbitrary intervals and the ability to resolve small subjects is increased. They have drastically reduced scan time and effective dosages but they still are not as accurate and do not limit the dosage as low as reasonably achievable.

A newer diagnostic tool known as the CBCT scanning has been used in endodontics for the effective evaluation of the root canal morphology nowadays. It aids in the assessing root and alveolar fractures, analysis of restorative lesions, identification of pathos is of non endodontic origin and pre-surgical assessment before root-end surgery. Baratto Filho evaluated the internal morphology of maxillary first molars by ex vivo and clinical assessments using operating microscope and CBCT scanning. He concluded that an operating microscope and CBCT scanning were important for locating and identifying root canals and CBCT scanning can be used as a good method for initial identification of maxillary first molar internal morphology [8].

Even though the use of CBCT scanning involves less radiation than conventional CT scanning, the radiation dose is still higher than regular conventional intra-oral radiographs [9]. Limitations of CBCT include medico-legal issues pertaining to the acquisition and interpretation of CBCT data [10]. In the present case, CBCT scanning was used which confirmed the presence of three roots and seven root canals, namely mesio-buccal 1 (MB1), mesio-buccal2 (MB2), mesio-buccal3 (MB3), disto-buccal1 (DB1), disto-buccal2 (DB2), mesio-palatal (MP) and disto-palatal (DP). CBCT axial images also showed that both the palatal and disto-buccal root present with a Vertucci type II canal pattern whereas the mesio-buccal root showed a Sert and Bayirli type XV canal configuration. Thus, CBCT scanning proved to be a helping tool in the diagnosis of this unusual root canal system and towards its successful endodontic management.

CONCLUSION

The present case report article highlights the endodontic management of an unusual case of a maxillary first molar with three roots and seven canals and also tells us about the role of CBCT scanning as a tool to ascertain root canal morphology. Though there are a few limitations of CBCT which includes medico-legal issues pertaining to the acquisition and interpretation of CBCT data.

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