Endodontic Management of Maxillary First Molar with 7 Root Canals with Post-Treatment Adjunct of Cone Beam ST: A Case Report

Hamza Al-Sharief*, Adnan Alattas, Mohammed Nabeel and Feras Aalam

Department of Dentistry, Alnoor Specialised Hospital, Dental Centre, Makkah, Saudi Arabia

Abstract

The internal morphology of the maxillary first molar has been heavily studied and reported in the literature. In classic literature, the root canal anatomy of maxillary first molars has been described as three roots with three canals and the most common variation is the presence of a second mesiobuccal canal (MB2).

Keywords: Root Canals • Endodontics • Tooth

Introduction

The incidence of MB2 has been reported to be between 56.8% and 96.1% [1-5]. Cleghorn et al. found that the incidence of a second root canal in the distobuccal root is 1.7% and less than 1.0% in the palatal root [6]. Palatine root canal variations were well established by Christie et al., who reported the endodontic treatment of maxillary molars with two palatine roots and classified these teeth as types I, II, and III, according to root degree of divergence [7].

In literature, numerous cases reported of varying root canal configuration from one to eight root-canals [8-10]. This article will discuss the nonsurgical endodontic management of permanent maxillary first molar presenting with the anatomical variation of 3 roots and six canals.

Case Report

A 42-year-old male patient was referred to the Department of Endodontics at Alnoor dental centre from primary health care unit for complete root canal treatment of upper left 1st molar tooth. He gave a history of severing toothache before seeking emergency dental treatment of primary health care one week before. The clinical examination of tooth #16 revealed extensive occluso-mesial temporary restoration and the Probing depths and mobility were within normal limits. The tooth was slightly tender to percussion and palpation. Electrical and thermal tests are not indicated as the pulp previously treated. Radiographic examination revealed unusual root canal anatomy with localised loss of PDL space. The diagnosis confirmed as previously initiated root canal treatment with asymptomatic apical periodontitis. Treatment plan discussed and complexity of root canal treatment, patient refereed to Um-Alqura University, the dental school for Cone-Beam Computed Tomography (CBCT). CBCT axial images confirmed the presence of three roots and seven root canals, namely MB1, MB2, MB3, DB1 and DB2 and two palatal canals DP and MP are joining together at the middle root (class 1 canal configuration). The MB2 is, usually, located palatally and mesially to the MB1, but in this case, additional MB3 was identified. CBCT is vital for understanding tooth morphology, internally and externally, and surrounding tooth structure [14]. It is usually, obtained before treatment or during treatment procedures when the endodontist faces quarry situation [15]. CBCT scanning, in our case, was helpful as a post-treatment radiograph. It is guided for evaluation of the quality root canal obturation and predicts the outcome of the treatment of this unusual root canal system [15]. CBCT scan slices show seven canals three mesiobuccal, (MB1, MB2, MB3)), two distobuccal (DB1, DB2) and two palatal canals (MP and DP) in the right maxillary first molar. MB2 and MB3, DB1 and DB2 and MP and DP show Vertucci class ii canal configuration (Figures 1-5).

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*Address for Correspondence: Al-Sharief H, Department of Dentistry, Alnoor Specialised Hospital, Dental Centre, Makkah, Saudi Arabia, E-mail: Hamza978@hotmail.com

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Figure 1. Pre-operative radiograph.
Discussion

Traditionally, root canal morphology of upper 1st molar has three roots of 4 root canals [16]. It is distributed as the following, MB1, MB2, DB and P [17]. As the operator experience has a significant role in the identification and management of complex root canals [18]. Other factors, such as Dental Operating Microscope (DOM) [19,20], ultrasonic tip instrument [20] and 3-dimensional radiograph (cone-beam computed tomography) [21] have ultimate benefit in such cases. In the first appointment, we explore four root canals. In the second appointment, we can locate two more root canals. The total root canals shaped and cleaned is six in the third appointment at just before obturation we discovered the DP root canals, the seventh one. Unfortunately, in our center, at the time of case management, no DOM, or ultrasonic or CBCT. The dental loupe of 2.5X power is very helpful in the exploration of canal orifices. In a clinical study, 312 cases of root canal treatment on the first and second maxillary molars. The endodontists, who used the microscope, identified 57% of the MB2 versus 55% who used dental loupes [2]. This result shows the importance of any magnification power in the location and management of the root canal system. In this case, counting numbers of root canals come with the problem as MB1 and MB2 and DB1 and DB2 are joint shortly to form single canal about 3-4 mm from pulpal floor. According to Stropko description in his meticulous work, these canals count as a separate root canal [22]. In our case, Post-treatment CBCT shows some difficulty in clarity of the pulpal floor and coronal anatomy of the tooth, due to beam hardening phenomena, that result in image distortion [23]. The traditional radiograph of two-dimensional view of limited help in such case. We relay in to determine the working length on apex locator. In published case reports, there is a limited number of upper 1st molar with more than five root canals.

Conclusion

This case provides evidence of variations in the root canals of the mesiobuccal, distobuccal and palatal roots of a maxillary first molar tooth. Complete clinical and adequate knowledge of morphology with an advanced diagnostic and management tools are necessary for successful clinical outcome.

References


