Maxillary molar with five canals- A case report

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Abstract

The knowledge and understanding of the complexity about the root canal anatomy of maxillary molars and location of extra canals are essential for diagnosis and endodontic treatment success.

The purpose this case report is to showcase a clinical case of variable number of canals in maxillary molar, with aid of an operating microscope. The purpose of this case report is to highlight the importance of exploring the pulp chamber for the possibilities of anatomical deviations in the maxillary molars during endodontic treatment which otherwise would lead to failure.

Keywords: Dental Operating Microscope, cone beam computed tomography, Maxillary molar, Five canals

Introduction

The goal of root canal treatment is to achieve proper cleaning and shaping of the complex root canal system so as to achieve a comprehensive three dimensional obturation.[1] Therefore a thorough understanding of the anatomy of the root canal and the various deviations from the normal anatomy are mandatory as it directly affects the prognosis of the treated tooth. The main reason of failure in endodontics is loss of apical and coronal seal, inadequate shaping, disinfection protocol, and missed canals. [2]

Therefore a complete understanding of the complex anatomy and morphology will help reduce the occurrence of failures in endodontics.[3] Several case reports of variation in the number of root canals have been reported in the literature.[4,5,6] The usual anatomy of maxillary molar comprises of three or four canals where in the possibility of exploring second meiobuccal canal in addition to distobuccal and palatal is the commonest. [1]

The percentage of second mesiobuccal canal reported in the literature is 18% to 96.1%.[7,8] A case with five root canals was reported by Beatty where a maxillary molar had three canals located in the meiobuccal root.[9] In contrast, there are very few case reports of two palatal roots and canals. Christie et al evaluated the occurrence of two palatal roots and canals in vivo as well as in vitro and classified them according to their divergence and the level of root separation.[10] A maxillary second molar with two palatal roots was reported by Benenati.[11]

Case Report

A 25 year old male patient reported with a complaint of continuous pain in right maxillary first molar since 1 month. On radiographic and clinical examination the tooth revealed an extensive amalgam restoration and was tender on percussion (Fig. 1). Vitality test were performed and the tooth demonstrated exaggerated response. Considering the chief complaint of patient as well as the various diagnostic test it was decide to perform a root canal therapy. The patient was given local anaesthesia 2% lignocaine and a rubber dam was placed. After removing the extensive amalgam restoration and undermined caries, a conventional endodontic access was performed and three canals were located (mesiobuccal, ditobuccal and palatal).

After careful probing using DG16 endodontic explorer (dentsply, maillefer Ballaigues, Switzerland) and with the help of dental operating microscope with 2.5X magnification(Global Surgical Corporation, St. Louis, MO, U.S.A.) an extra canal approximately at a distance of 1.5mm from MB orifice in palatal direction and an extra palatal canal was located (Fig. 2). The access opening was refined to remove the dentinal overhangs that obstructed the additional canals. The patient was advised Cone Beam Computed Tomography (CBCT) with 16 which confirmed the presence of multiple canals(MB2 and distopalatal and mesiopalatal canals respectively) (Fig. 3).

Fig. 1: Pre-operative radiograph of 16 with extensive amalgam Restoration and undermined caries involving the pulp

Fig. 2: Microscopic image revealing MB 2 and extra palatal canal

Fig. 3: Axial view of CBCT of 16 indicative of presence of five orifices

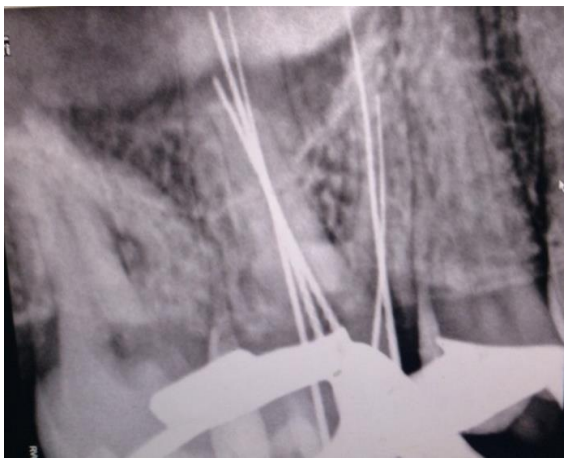

Fig. 4: Radiograph depicting working length determination

After cervical flaring with pro taper universal shaping files SX and S1 (dentsply, maillefer Ballaigues, Switzerland), apical limit was estimated using apex locator (dentsply, maillefer Ballaigues, Switzerland), which was later established with intraoral periapical radiograph.(Fig. 4) Proper shaping and cleaning was performed considering standard protocol of copious irrigation, lubrication and recapitulation. All the canals were enlarged to F2 rotary protaper file (dentsply, maillefer Ballaigues, Switzerland) followed by confirmation of master cone with radiograph and complete obturation of the root canals.(Fig. 5a and 5b). Post -endodontic restoration was performed using glass ionomer cement.

Fig. 5a

Fig. 5b
Radiograph depicting master cone selection and obturation of 16

Discussion

The vast endodontic literature describes the first maxillary molar as having three roots with three or four canals.[12] The occurrence of two palatal root canals in maxillary molars is rare. Hence, this case report highlights the rare anatomy of maxillary molar with two palatal canals. The variation in the canal anatomy and the importance of not damaging the dentinal map should be strongly considered which, otherwise would lead to failure in exploring extra canals as well as failure to achieve a good prognosis of root canal therapy.[13] In the present case, the conventional access opening was modified in order to improve access to the

additional canal. Careful clinical examination and radiographic interpretation is very essential for the operator to locate and identify the root canal orifice. The use of explorers, dental operating microscope, endodontic loupes and apex locators are very critical for the management and detection of extra canals in endodontic practice.

Clinician should be watchful in recognizing and identifying the morphological variations and the possible presence of aberrant anatomy which would definitely help in improving the prognosis of the endodontically treated tooth.[14]

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