



ENDODONTIC MANAGEMENT OF AN UNCOMMON ANATOMIC VARIATION OF MANDIBULAR SECOND PREMOLARS: A CASE REPORT

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ABSTRACT

In the literature we found that approximately 98% of the mandibular second teeth premolars are single-rooted. The incidence of two roots was 1.8%. Three roots were found in 0.2% of the teeth studied. Four roots were rare and were found in less than 0.1% of the teeth studied.

Studies of the internal canal morphology revealed that a single canal was present in 75.8% of the teeth. Two or more canals were found in 24.2% of the evaluated teeth. A single apical foramen was found in 78.9% of the teeth, whereas 21.1% had two or more apical foramina.

Major reason for failure of root canal treatment is miss canals. The premolars are difficult for endodontic treatment and have higher failure rate. This may be due to their anatomic variations of the root canal morphology. The buccal canal is easier to be founded while the lingual is more often missed when the tooth has two canals presented. The complications may occur if the endodontist does not use the latest diagnostic equipment which decrease the chances of success.

This article reports and discusses the successful treatment of a mandibular second premolar with two canals in a 43-year old Bulgarian male. Clinical examination showed a large carious lesion with pulp exposure. Radiographs showed no periapical changes. An endodontic treatment with TF-system was made and the canals were obturated with the method - cold lateral condensation and a sealer.

Key words: Root canal morphology, mandibular first premolar, number of canals, number of roots;

INTRODUCTION

Mandibular premolars usually have a single root and a single canal. The occurrence of two roots with two separate root canals is extremely rare. Literature showed a fair percentage of teeth to have more than one canal. A series of studies conducted on extracted teeth reported 2.5% incidence of a second canal [1]. The standard method of radiographic appraisal was maintained as the criteria for determining the presence of extra roots.

The presence of more than one root canal can be recognized when there is persistent permanent pain after the endodontic treatment.

The use of X-ray in this rare case greatly contributed toward making a confirmatory diagnosis and successful endodontic management [2]. The additional canals can also be found by clinical investigation of the pulpal floor. The good knowledge of the tooth morphology and anatomy is obligatory to achieve good results after the root canal treatment.

Tzu-Yi Lu et al. [3] assess the canal anatomy and morphology of mandibular first premolars in a Chinese population. They found that that 54% of the mandibular first premolars have a single canal. Twenty-two percent demonstrated two canals and 18% percent had C-shaped configuration. The C-shaped root canal occurred predominantly in the 3 and 6 mm sections with one or two canals coronally.

S. Robinson et al. [4] evaluated one hundred and twenty dental CT examinations for mandibular first premolar root configurations and canal variations. Only in 2 teeth, they found a single canal divided into 2 canals, but merged into 1 apical foramen. None of the examined teeth had two roots with two root canals.

Mandibular second premolars have been reported with four roots and four root canals with the aid of spiral computed tomography (SCT) [5].

CASE REPORT

This case report illustrates the relatively uncommon anatomic variation of a mandibular second premolar with two roots and two separated root canals. Successful non-surgical endodontic management of a mandibular second premolar with two separate roots and root canals has been presented. The patient is a 43-year old Bulgarian male reported to the Department of Conservative Dentistry and Oral Pathology, Faculty of Dental Medicine, MU – Varna, Bulgaria. The chief complaint was of a fractured tooth crown of the mandibular left second premolar. Radiographic evaluation of the involved tooth (# 35) revealed an unusual, complex root canal anatomy and vague outlines of two roots identified with two different root canals-lingual and buccal (fig.1). An endodontic treatment with TF-system was made and the canals were obturated with lateral condensation and sealer (fig. 2, 3). A fiber post was put in the lingual canal and the tooth was restored with a ceramic crown.

Fig. 1. Initial radiograph



Fig. 2. A radiograph during the endodontic treatment



Fig. 3. Final result



A radiograph of the mandibular right second premolar (#45) was made (fig. 4). It revealed that tooth (#45) has also two different roots with a furcation between them and two different root canals. Because of the lack of a diagnostic radiograph from the colleague a poor endodontic treatment was made. The mandibular right second premolar will be retreated in the future.

Fig. 4. A radiograph of tooth #45



DISCUSSION

In this paper we report an anatomic variation of a mandibular second premolar with two roots and two separated root canals of a 43-year old Bulgarian male. The diagnosis and the endodontic treatment of extra roots and root canals in mandibular premolars is a real endodontic challenge. Failure in the endodontic treatment of these teeth may result not only in unsuccessful treatment but also in flare ups during and after treatment. In the literature there are a very few reports about the variations of the roots and root canals in mandibular premolars [6 - 10]. Radiographs produce only a two-dimensional image of a three-dimensional object, resulting in the superimposition of images. Multiple canals can often be missed. That is why is necessary for every clinician to have knowledge of the root canal anatomy and its variations, to know how to interpret the radiographs, to inspect carefully the pulp chamber and to work with a good magnification to visualize and access canals. Using 3D images (CBCT) will also help for effective visualisation of root canal morphology.

Because of the fact that there are so many variations of the roots and root canals in mandibular premolars reported it becomes mandatory that when a patient comes with endodontic pain or sensitivity thermal irritants after root canal treatment the clinician must suspect the presence of missed canals [11 - 13].

CONCLUSION

Successful nonsurgical endodontic management of a mandibular second premolar with two separate roots and root canals has been presented. It is a well-established fact that the presence of extra roots and root canals in these teeth may be far more than one can expect [14, 15]. In this case the exact root canal anatomy could be confirmed by using radiographs [16, 17]. Conventional intraoral periapical radiographs are an important diagnostic tool in endodontics for assessing the root and canal configuration [18]. The use of computed tomography will help us in making a confirmatory diagnosis.

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