

MANDIBULAR SECOND PREMOLAR WITH THREE CANALS: WITH A THERAPEUTIC APPROACH— TWO CASE REPORTS

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Abstract

Background: Before starting any endodontic treatment, the possibility of additional canals should be considered. Based on studies, the incidence of three canals in the mandibular second premolar is 0.1-0.4%. Normally, it consists of a canal in lingual aspect and two canals in the buccal aspect.

Case report: In the present study, two cases with three-canal mandibular second premolar were investigated and treated.

Conclusion: Through precise radiography assessment by straight tube angulation and developing changes in the horizontal angle, a 40° change in the horizontal x-ray tube angulation, and opening an optimal access hole, etc. first the three canals in the second premolar were detected and then successfully treated.

Keywords: Endodontic treatment, Mandible, Second premolar.

Introduction

To ensure the success of a long-term endodontic treatment, finding all root canals is essential.¹ The dentist should have a basic knowledge of the morphology of the root canal and should be completely aware of the changes that may occur. Accordingly, precise recognition of the anatomy and morphology of the root canal system and structure is essential for a successful endodontic treatment. The study by Slowey showed that the premolars of the lower jaw are considered as the most difficult teeth for endodontic treatment, which is due to their complex root canal anatomy.²

Studies suggest the effect of gender and ethnicity on the anatomical changes and complexity of the root canal system in the mandibular second premolars.³ The mandibular premolars with more than one canal are significantly commoner among black-skinned people as compared with their white-skinned counterparts.⁴ On the other hand, Serman and Hasselgren stated that prevalence of mandibular premolars with several roots and canals is more common among men than among women.⁵

Various studies have examined the prevalence of root canals in the mandibular second premolar.^{6, 7} However, existence of three canals was very rare. In a study by Zillich and Dowson on 938 mandibular second premolars, they found that only 0.4% of the mentioned teeth are three canalled.⁸ In another study by Cleghorn *et al.*, they observed that almost all second premolars of the lower jaw had one root (99.6%), and 0.3% of them had two roots, and only 0.1% of the second premolars of the lower jaw had three roots.³

Complete knowledge of the root canal anatomy, precise radiography interpretation, and presence of a suitable access hole of mandibular premolars are necessary to increase the success rate of endodontic treatment. In the mentioned report, therapeutic recommendations and routine stages of endodontic treatment of two cases with mandibular second premolar with three separate roots are explained.

First Case

A 28-year-old man without any special medical history for endodontic treatment of the right mandibular second premolar was referred by a general dentist to the endodontics ward of faculty of dentistry at Hamedan University of Medical Sciences. Before referring the patient, the general dentist had performed pulpotomy due to the main complaint of the patient which was severe pain in his right lower teeth. In clinical examination, no abscess, mobility, and sensitivity to percussion were observed. However, in the vitality test, sensitivity to cold and EPT was observed. After inducing anesthesia by lidocaine 2% and ensuring patient anesthesia, the bandage was removed.

Endodontic treatment was planned in teeth 29. After the administration of the local anesthetic (2% Lignocain with 1:100,000 epinephrine), under rubber dam isolation 29 were accessed. On entry into the pulp chamber 29, one main canal orifice was found which split into three different canal orifices at the mid- root level. [Figure 1]

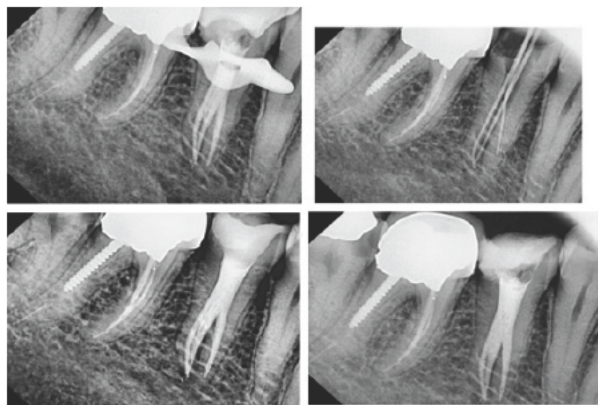


Figure 1: Stages of diagnosis and treatment of the first case.

Second case

A 22-year-old woman without medical problem with the main complaint of spontaneous pain in the right side of the

lower jaw was referred to the endodontics ward of faculty of dentistry at Hamedan University of Medical Sciences. In the clinical examination, tract sinus inflammation and sensitivity to percussion were not observed. However, in the vitality test, severe sensitivity to tooth #29 was observed. In the radiograph, decay in the distal side of the tooth #29 was observed. Pulp diagnosis demonstrated acute irreversible pulpitis. For the treatment, after anesthesia injection (lidocaine 2% with Epinephrine 0.000001) and ensuring patient anesthesia, the access hole was created.

Under rubber dam isolation #29 were accessed. On entry into the pulp chamber #29, one main canal orifice was found which split into three different canal orifices at the mid- root level. [Figure 2]

Mesiobuccal, distobuccal and lingual canals were identified. Gates Glidden drills 4, 3, 2, with a brushing motion were used in a crown down fashion to enlarge the main orifice to the level of the trifurcation to obtain straight line access to all the three canals. Also used alternately as irrigants was 0.5% sodium hypochlorite, normal saline and 17% EDTA. Working length was established with the use of an Apex locator (Root ZX, J. Morita Inc.). The canals were cleaned and shaped with hand K files and nickel titanium rotary files (protaper). Patency was achieved in all the canals and was maintained with a 10 k file. After drying the canals with paper points, they were fit with no standardized gutta-percha points. Kerr's pulp canal sealer was used as the root canal sealer. Each of the canals was obturated with both lateral and warm condensation technique.

After completing the endodontic treatment, temporary bandage was placed and the patient was referred to a restoration specialist for restorative therapy. After composite restoration, post and core and crowning were done since the tooth was weak. [Figure 2]

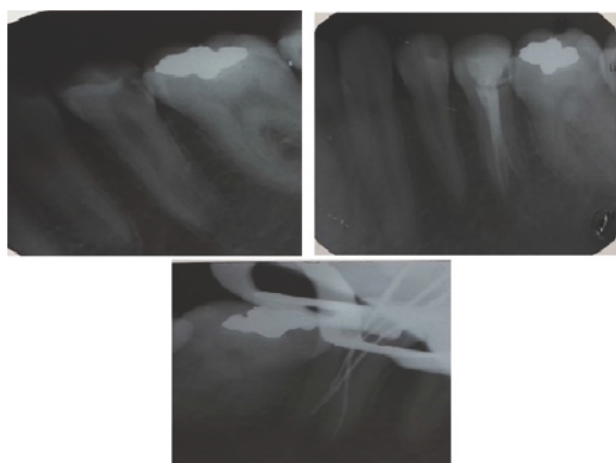


Figure 2: Stages of diagnosis and treatment of the second case.

Discussion

The mandibular second premolar is one of the most difficult teeth for endodontic treatment, which is due to

extensive changes in the morphology of the root system of this tooth.² Precise radiographic assessment using straight tube angulation and alteration of horizontal angle, as noted in other studies.⁹ were also performed in the present study, which can be of great help in precise detection of the number of roots and canals in premolar teeth. Fast break of canal in parallel radiographies can suggest presence of more than one canal.⁹

Martinez-Lozano *et al* reported that a 40° change in the horizontal x-ray tube angulation can assist in detection of an additional canal in the mandibular second premolar.¹⁰ In the present study, the mentioned method was used.

Previous studies have shown presence of a canal in the lingual aspect and two canals in the buccal aspect,¹¹ where in the present case, as with the mentioned study, one canal was also observed in the lingual aspect and two canals were observed in the buccal aspect.

Opening an optimal access hole is crucial,¹² because during primary placement of scouting files in the main root, we may face an occlusion, and the file deviates toward the buccal or lingual side before further progression. Such an event may suggest a canal division. Thus, after this incidence, it is crucial that we detect the three branches of the canals through further use of tactile sensation and routing by suitable precurved scouting files.

Conclusion

Successful and predicted treatment by an endodontist requires basic knowledge of the root canal morphology and the changes that may occur. Furthermore, in cases where radiography images are not helpful enough for anatomical description and root canal deviations, the dentist's experience is of utmost importance. Creating an optimal access hole is vital for successful endodontic treatment.

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