Three Root Canals in Mandibular Second Premolar: Case Report

Mandibular İkinci Premolarda Üç Kök Kanalı Varlığı

Ali KELEŞ,[a]
İsmail UZUN[b]

[a]Department of Endodontics, İnönü University Faculty of Dentistry, Malatya
[b]Department of Endodontics, Atatürk University Faculty of Dentistry, Erzurum

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Yazışma Adresi/*Correspondence:*
Ali KELEŞ
İnönü University Faculty of Dentistry, Department of Endodontics, Malatya, TÜRKİYE/TURKEY
alikeles29@hotmail.com

ABSTRACT According to numerous literatures, the possibility of three canals in mandibular second premolars is quite low. Undetected extra roots, or root canals, are a major reason for the failure of root canal treatment. The following case report describes the endodontic treatment of a mandibular second premolar receiving three canals in a single root. Three separate root canal orifices were found at the same level of the pulp chamber floor. The root canals were prepared with a crown-down method using Hero 642 rotary instruments and filled with laterally condensed gutta-percha and a sealaer. After the completion of root canal treatment, the tooth was restored with a posterior composite filling material.

Key Words: Dental pulp cavity; root canal therapy

ÖZET Literatüre göre, mandibular ikinci premolarlarda üç kanalın bulunma ihtimali oldukça düşüktür. Tespit edilemeyen ekstra kökler, ya da kök kanalları kök kanal tedavisi başarısızlığının başlıca nedenlerindendir. Bu olgu sunumu, tek kökünde üç kanalı olan mandibular ikinci premoların endodontik tedavisini anlatmaktadır. Üç ayrı kök kanalı girişi pulpa odası zemininde aynı seviyede bulundu. Kök kanalları Hero 642 döner sistemi kullanılarak "crown-down" metodu ile hazırlandı ve gütta-perka ile bir kök kanal patının lateral kondansasyonuyla dolduruldu. Kök kanal tedavisinin tamamlanmasından sonra, diş posterior kompozit dolgu materyali ile restore edildi.

Anahtar Kelimeler: Diş pulpası kavitesi; kök kanalı tedavisi

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Most of the difficulties experienced in root canal treatment are due to variations in root canal morphology. It is usually difficult to diagnose the specific developmental disturbance before the formation of a treatment plan restores function and appearance.[1] The main objective of endodontic therapy is to mechanically and chemically cleanse the entire pulp cavity, and its complete obturation with an inert filling material. Some authors have pointed out that the major reasons for the failure of endodontic treatment are incorrect canal instrumentation, incomplete obturation and untreated major canals.[2-5]

The root canal morphology of the mandibular second premolar can be extremely complex and highly variable.[6] There have been reports of mandibular second premolar with 3, 4 and even 5 root canals.[7-9] These re-

ports demonstrate that such anatomic variation might occur in clinical practice, in spite of its low incidence.

The incidence of three canals in mandibular second premolars is very rare; however, it must be taken into account in clinical and radiographic evaluations during endodontic treatment. The occurrence of three canals in mandibular second premolars has been reported as 0.0% and 0.4%.[10-12] Çalışkan et al. and Sert et al. reported 0.0% incidence of three root canals in mandibular second premolar in Turkish population.[13,14]

The following case report describes the endodontic treatment of a mandibular second premolar which received three canals in a single root.

CASE REPORT

A 23-year-old male was admitted to the endodontic clinic at the University of Atatürk complaining about a moderate pain associated with the mandibular right second premolar. The tooth was symptomatic and tender to percussion. The labial cortical plate was slightly tender to palpation. An electric pulp tester and thermal tests elicited no response from the tooth. There was no swelling or sinus tract. The diagnosis of pulp necrosis with apical periodontitis was made. The medical history was noncontributory. Radiographically, the mandibular right second premolar showed a complex root canal system with two or more canals (Figure 1). The tooth was anaesthetized and isolated with a rubber dam. Three separate root canal orifices were found at the same level of the pulp chamber floor. Next, root canals were carefully instrumented with size 10 K-files. Instruments were inserted into the canals and a length-determination radiograph was taken (Figure 2). The root canals were prepared by a crown-down method using rotary Hero 642 (Micro-Mega, Besancon, France) NiTi instruments. Finally, apical preparation was finished NiTi hand files to apical size 30. For irrigation, five percent sodium hypochlorite solution and 17 percent EDTA solutions were used. The canals were dried with paper points. Calcium hydroxide paste was used as an intracanal medicament. A sterile cotton pellet was placed in the pulp chamber and Cavit (3M ESPE

FIGURE 1: Radiographically, the mandibular right second premolar showed a complex root canal system with at least two canals.

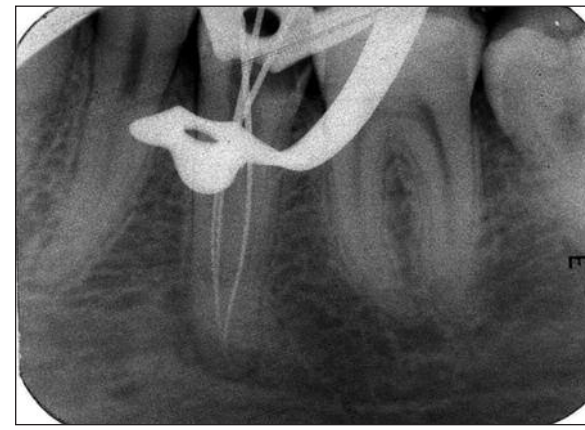

FIGURE 2: Instruments were inserted into the canals and a length-determination radiograph was taken.

AG, Seefeld, Germany) was used to seal the access cavity. After a week, all symptoms had disappeared and the root canal treatment was completed; the canals were rinsed with five percent sodium hypochlorite solution, dried with sterile paper point, and obturated with laterally condensed gutta-percha and Sealapex (Kerr, Romulus, MI USA) root canal sealer. Final radiographs were taken to establish the quality of the obturation (Figure 3). After the completion of root canal treatment, the tooth was restored with a posterior composite filling material (Z250, 3M Dental products, St. Paul, Minn.).

DISCUSSION

If an endodontic problem is diagnosed in a mandibular premolar, and root canal therapy is provided, it dental surgeons must bear in mind that a

FIGURE 3: Final radiographs were taken to establish the quality of the obturation.

second or third canal might be encountered.[15] A mandibular second premolar with two or more canals can usually be treated successfully using nonsurgical methods. This case describes endodontic treatment of a mandibular second premolar, with three canals in a single root. Because the radiograph of the mandibular right second premolar showed a complex root canal system, additional canals of the floor of the pulp chamber were revealed by carrying out a more detailed clinical examination. In this case, three canals have merged with a canal at the apex.

In order to ensure long term treatment success, it is essential to locate every root canal in an endodontic case.[16] Mandibular premolars are reputed for having aberrant anatomy.[17] For this reason, each case should be investigated carefully, clinically and radiographically to detect additional root canals.[18] Morphologic variations of the root canal have been documented and diagnosed by computed tomography and optical microscopy, but most variations in tooth anatomy can be identified radiographically.[6,19] Good quality preoperative radiographs and their careful examination are essential for the detection of additional root canals.[3] Walton recommended the use of two diagnostic radiographs, one of which was ortho-radial, and the other taken either 30 degrees mesially or distally, according to the anatomical location of the tooth being examined.[20] If a radiolucent line is present mesial or distal to the main canal, an additional canal should be suspected.[21] A third canal should be clinically suspected when the pulp chamber does not appear to be aligned in its expected buccal-lingual relationship. Additionally, if the pulp chamber appears to deviate from normal configuration, and seems to be either triangular in shape or too large in a mesiodistal plane, more than one root canal should be suspected.[8]

When performing root canal therapy, additional canals might be missed, leading to a greater failure rate, unless there is constant vigilance in locating 2 or more canal systems in the mandibular second premolar.[6] Knowledge of basic root canal morphology of the mandibular second premolar, as well as its variations, was essential in the treatment of this tooth.[8]

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