Endodontic Management of Mandibular Second Premolar with Three Roots: A Case Report

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Effective endodontic treatment comprises proper diagnosis, meticulous cleaning and shaping followed by three dimensional obturation. Failure to do so may lead to postoperative diseases, pain and further complications. Mandibular second premolars are usually single rooted with single root canal. Variations of having more than one canal/root also exist but variation is less as compared to mandibular first premolar. This case report describes endodontic management of mandibular second premolars with three root canals.

Keywords: mandibular premolar, three canals, root canal treatment

Introduction

The main goals of root canal treatment are proper cleaning and shaping of all root canals and its complete obturation. Thorough knowledge of the anatomy and morphology of the root canal system is essential for effective endodontic treatment. The presence of an untreated or missed canal might be a reason to disappointment of endodontic treatment [1,2]. Studies have shown that due to complicated root canal anatomy mandibular premolars are the most difficult teeth for endodontic treatment [3].

The occurrence of multiple roots and canals in mandibular second premolars is lower than those in mandibular first premolars. Mandibular second premolars with three root canals and separate foramina are very rare (0.4%-5%) [4].

Case Report

This case report describes the successful endodontic management of mandibular second premolar with three separate roots.

A 50-year-old male without any medical history referred to the Department of Endodontics, Dr. Harvansh Singh Judge Institute of Dental Sciences & Hospital, Panjab University (Chandigarh, India) with a major complaint of pain in the posterior area of the right lower arch.

Clinical examination revealed a carious lesion in mandibular second premolar. The tooth was highly sensitive to a cold test, but there was no tenderness on percussion. A diagnosis of symptomatic irreversible pulpitis was made. Radiographic assessment showed normal periodontium and presence of more than one root (Figure 1). The tooth was anesthetized with 2% lidocaine containing 1:100,000 epinephrine (Daroupakhsh, Tehran, Iran) and isolated with a rubber dam. The carious lesion was removed and access cavity was made to an ovoid outline. An apex locator (Root ZX, J Morita Inc., Mason Irvine, CA, USA) was used to determine working
length and confirmed radiographically (Figure 2). Radiograph revealed presence of more than two canals. To gain sufficient access to the canals, the conventional access opening was modified within the way that it was more extensive mesially. Cleaning and shaping of the canals were carried out using the crown-down technique by HERO Shaper rotary files (Micro Mega, Besancon, France) up to the final sizes of 0.06/25, 0.04/20, and 0.04/25 in the lingual, mesiobuccal and midbuccal canals, respectively. During instrumentation canals were irrigated with 3% sodium hypochlorite.

Final irrigation was done with normal saline solution. After that the canals were dried with paper points and obturated with gutta-percha and AH26 (Dentsply, DeTrey, Konstanz, Germany) sealer using lateral compaction technique. A post-obturation radiograph was taken (Figure 3). Patient was recalled after 3 and 6 months, tooth was asymptomatic with normal radicular conditions.

Discussion

Mandibular premolars have the highest treatment failure rate [5,6], because of its variations in root canal morphology and difficult access to irregularities [7]. The canal morphology of the mandibular first and second premolar is similar; however variations are less often found in the second premolar [8].

Most of mandibular second premolar has one root (99.6%) and one canal (91.0%) in comparison to mandibular first premolars. The occurrence of two roots (0.3%) and three roots (0.1%) of mandibular second premolars is extremely rare [7].

Root canal anatomic aberrations of mandibular second premolars includes three root canals [9-12], four root canals [13-15], five root canals [16], three separate roots with taurodontism [17], and C-type morphology [18]. The root and root canal morphology of the mandibular second premolar can be extremely complex and requires careful assessment [7,18,19].

Proper understanding of conventional periapical radiographs taken in more than one angle is required to identify any anatomical variations of teeth [20] as in our case without appropriate radiograph canal would have been missed. Moreover, utilizing advanced radiographic strategies, for example, cone-beam computed tomography is useful to detect variations if traditional radiographic methods need to give clear data and more subtleties are required [21,22].
In conclusion, intensive information of the anatomy of root canal, a fastidious radiographic interpretation, and a proper access cavity are important to build the achievement pace of endodontic treatment of mandibular premolar teeth.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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