

Mandibular second premolar an endodontic dilemma: 2 case reports

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Abstract

Successful root canal therapy requires an accurate diagnosis and management of complex root canal morphology. Although the occurrence of three root canals in mandibular premolars is very rare, the clinician must be able to identify it clinically and radiographically to make the necessary changes in root canal shaping and obturation techniques. We present the 2 case reports on endodontic management of mandibular premolar with three root canals and fused roots, which were diagnosed radiographically, is presented.

Keywords: Anatomic variation, mandibular second premolar, endodontic treatment.

Introduction: Consistent, high levels of success in endodontic treatment require an understanding of root canal anatomy and morphology. To achieve endodontic success, the entire root canal system must be debrided, disinfected and obturated. The clinician must have a

thorough understanding of normal anatomy, and of common variations from the norm. The clinician must also be prepared to identify those teeth that tend to vary greatly from the norm, e.g. mandibular premolars.

Quite a few studies were published in endodontic literature that studied the common reasons for endodontic failures (1–3). Hoen and Pink found a 42% incidence of missed roots or canals in the teeth that needed retreatment in their investigations (4). They concluded that the clinical application of a thorough knowledge of canal anatomy and meticulous attention to treatment detail are essential to minimizing failure and the need for subsequent endodontic retreatment.

Mandibular premolars have gained a reputation for having aberrant anatomy. Different studies have looked at the root canal morphology of mandibular premolars over the years and reported a fairly high percentage of these teeth to have more than one canal (6 –9).

The occurrence of three canals with three separate (type V, Vertucci) foramina in mandibular premolars is very rare. e. Vertucci and Zillich et al. reported the occurrence of three canals in mandibular second premolars at 0.0% and 0.4% respectively. If one is to treat mandibular premolar teeth with three canals, predictably, it is necessary to be aware of their clinical and radiographic anatomy. These teeth may also require special shaping and obturating techniques.

The purpose of this article is to report, as well as discuss, treatment recommendations for an unusual occurrence of three canals with three separate foramina in mandibular second premolar.

Case Report 1

A 20 yr-old male named Mr Akshay Vanare with a non contributory medical history was referred to the department of Conservative Dentistry and Endodontics, School of Dental Sciences, Karad. The chief complaint of the patient was pain in the lower right back teeth since one month. Vitality tests showed no response to cold and EPT. Radiographic examination revealed periradicular radiolucencies in relation to 45. More than one root canal was suspected in 45. (Fig. 1A). A pulpal diagnosis of necrotic pulp and a periradicular diagnosis was made. Nonsurgical endodontic treatment was planned with 45 over two visits with the use of calcium hydroxide as inter-appointment, intra-canal medicament.

After the administration of the local anesthetic (2% Lignocaine with 1:100,000 epinephrine), under rubber dam isolation with 45 was accessed. On entry into the pulp chamber with 45, 3 different canal orifices were observed i.e. mesiobuccal, distobuccal and lingual canals were identified. 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 (NeoEndo).

Patency was achieved in all the canals and was maintained with a 10 k file. Calcium Hydroxide (Ultracal, Ultradent.com) was used as an intracanal medicament and the access cavities were sealed with cavit. The patient was seen after 4 wk for the completion of the treatment. All the symptoms had ceased. After drying the canals with paper points, they were fit with nonstandardized gutta-percha points. AH Plus canal sealer was used and each of the canals were obturated.

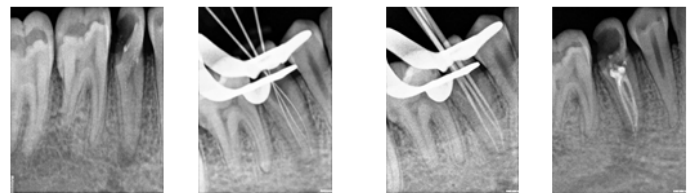


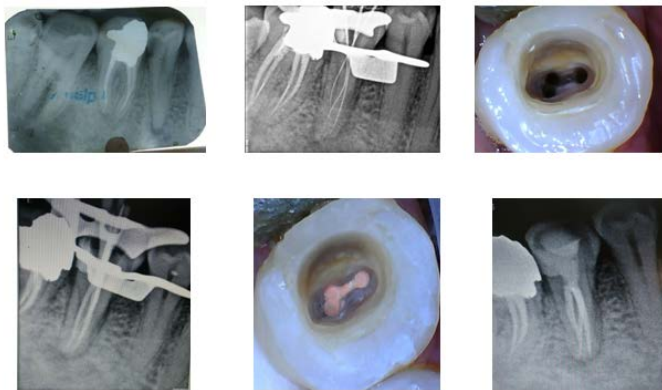
Figure 1

Case report 2

A 37-year-old male patient Shankar sonar reported to department of conservative dentistry and endodontics with chief complain of pain in lower right posterior region. Intraoral examination revealed distoproximal caries with respect to righth mandibular second premolar. Radiographic examination revealed disto-coronal radiolucency approaching pulp along with Periradicular radiolucency. The preoperative IOPAR revealed a sudden disappearance of the main canal at middle one thirds of the root, indicative of splitting of root canals at that level. A radiolucent line running vertically from midroot level to the apex, Indicated evidence of another root.

Nonsurgical endodontic treatment was started for 45 and on entering the pulp chamber a large canal orifice was observed. Canal was carefully scouted using a 10k file where a lingual canal was easily located, while straight line access to the mesiobuccal and distobuccal canals were difficult. Hence, the access was re-evaluated and modified mesiodistally. This improved the access for the buccal canals. The canals were then negotiated up to working length using 10 size k files. Working length was

established using apex locator (Root ZX mini, J. Morita Inc) and radiograph was taken which revealed type II root canal morphology according to gulabiwala et al (9). The canals were cleaned and shaped with hand K files and rotary Neoendo flex files (orikam). Irrigation was done using 3% sodium hypochlorite and normal saline in between instrumentation and 17% EDTA (RC help) was used during instrumentation. Intracanal medicament calcium hydroxide (RC cal) was given for 2 weeks and the access cavities were sealed with cavit. During 3rd appointment patient was asymptomatic and Obturation was carried out using GP and AH plus sealer (dentsply) using single cone obturation technique followed by post endodontic restoration using composite restorative material.



Discussion

Accurate preoperative radiographs, straight and angled, using parallel technique are essential in providing clues as to the number of roots that exist.

In mandibular premolars with three canals, the cervical half of the root is generally wider than usual, with little or no taper. Root canals may not be evident radiographically or may look unusual. Root canal space may disappear halfway through the roots. Careful interpretation of the periodontal ligament space may suggest the presence of an extra root or canal. Mesial and distal angled views will often reveal the presence of a bi/trifurcation of the root canal.

Optimum opening of the access cavity is absolutely necessary. During the initial placement of scouting files (hand k files 6, 8, or 10) in the main canal, one may encounter an obstruction and the file may deflect to the buccal or lingual before it travels any further. This may indicate a canal division. It is important, thereafter, to develop a sense of tactile feel and direction with appropriately precurved scouting files to detect the trifurcation.

Once it has been established that there are three canals, it is important to obtain straight line access to all the canals. The working length may be determined using radiographs and electronic apex locators. Small, slightly pre-curved k-files or nickel titanium hand files are used to debride the canals and to establish a glide path to the working length.

Despite the existence of complicated dental anatomy, shaping outcomes with nickel-titanium instruments are mostly predictable (18). Cautious use of rotary or hand nickel-titanium files prepares the canals to a predetermined shape. After gauging the apical third of the canals, additional preparation is performed, if necessary, before obturation. After the master cones are selected and fit, the canals are dried with paper points.

Successful and predictable endodontic treatment requires knowledge of biology, physiology and root canal anatomy. It also requires proper instruments and the knowledge to use these instruments effectively. Teeth with extra roots and/or canals pose a particular challenge. This article discusses how to identify mandibular premolars with three canals and some modifications to standard clinical techniques that can help produce successful treatment outcomes.

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