



Case of the Month – December 2017

TITLE: Endodontic Treatment of a Mandibular Second Premolar with Type III and IV Wiene's Root Canal: A Case Report

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Introduction:

The successful outcome of an endodontic treatment demands the thorough knowledge of the internal anatomy and morphology of the root canal system.[1,2] The risk of missing anatomy during root canal treatment is high because of the complexity of the root canal system. Hoen and Pink[3] reported 42% incidence of missed canals or roots in teeth requiring retreatment.

Variations in root canal morphology were suggested as most likely reason of flare ups and failures. Untreated canals may be associated with a remarkable variety of symptoms ranging from asymptomatic teeth to



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acute responses to hot and cold stimuli and from slight sensitivity to percussion and/or palpation to acute abscesses.

Slowey et al., (1979)[4] stated that variations in root canal anatomy of mandibular premolars presents an endodontic challenge to treat them successfully. The incidence of roots and root canals in these teeth varies considerably in the literature. Zillich and Dowson[5] in 1973 analyzed that 23.1% of mandibular first premolars had two or three root canals radio graphically. Vertucci[6] found 25.5% of 400 mandibular premolars had two apical openings and 0.5% of the teeth had three apical openings. Root canal morphology varies in different ethnic groups.

The endodontic treatment of mandibular premolars with aberrant canal configuration can be diagnostically and technically challenging. In light of these observations this case reports insight different case of mandibular premolars with variable canal pattern treated successfully by conventional endodontic treatment.



Case Report 1

Mandibular second premolar with Weine's type III pattern:

A 28-year-old male patient reported to the Department of Conservative dentistry and Endodontics with a chief complaint of pain in mandibular left back tooth region. Clinical examination revealed deep dental caries were present with intra oral swelling in respect to left mandibular second premolar. Tooth was tender on percussion. Radiographic examination revealed pulpal involvement, diffuse radiolucency apical to root apex without margins and widening of periodontal ligament with respect to mandibular left second premolar. Based on the clinical and radiographic findings, a diagnosis of “peri apical abscess” was made for these teeth. Endodontic treatment was planned. The preoperative radiograph showed two separate root canals in second premolar (Weine Type III) [Figure 1A].

The treatment plan was explained to the patient and after obtaining his consent, the tooth was anesthetized. Subsequently, the tooth was isolated with rubber dam. Endodontic access cavity was prepared with round diamond burs in a high-speed air rotor handpiece. After extirpation of



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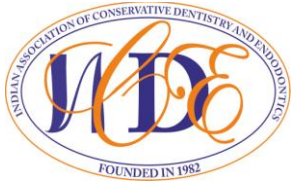
the pulpal tissue, access cavity design clinical picture was taken [Figure 1B] and working length determination radiograph was obtained with K files placed in the root canals (buccal and lingual canals) [Figure 1C]. The root canals were prepared with a crown down technique with copious irrigation using 5.25% sodium hypochlorite solution, Disinfection carried out using calcium hydroxide.

In the next visit after a week master cone radiograph was taken [Figure 1D], the root canal system was obturated with cold lateral compaction of gutta percha cones using AH+ resin sealer. A post obturation radiograph was obtained and the coronal access cavity was restored [Figure 1E].

Case Report 2

Mandibular second premolar with Weine's type IV pattern:

A 25-year-old female patient reported to the Department of Conservative dentistry and Endodontics for endodontic evaluation of lower right second premolar. Intra oral periapical radiograph revealed aberrant canal pattern with respect to this tooth [Figure 2A].

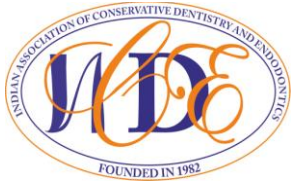


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After local anesthesia administration and rubber dam isolation, access opening was performed and canals were located. Working length determination radiograph was obtained with K files placed in the root canals (buccal and lingual canals) [Figure 2B]. Biomechanical preparation was done using crown down approach. The canal divided into two different canals at the mid-level of root. So the canal was coronally flared till the midroot level for achieving ease of instrumentation. After sealer application in all the canals using lentulospiral, mastercones [Figure 2C] were placed in two canals and obturated [Figure 2D]. The patient was asymptomatic during the follow up period of six months (figure 2E).

Illustrations:





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Fig 1a: Pre-operative radiograph

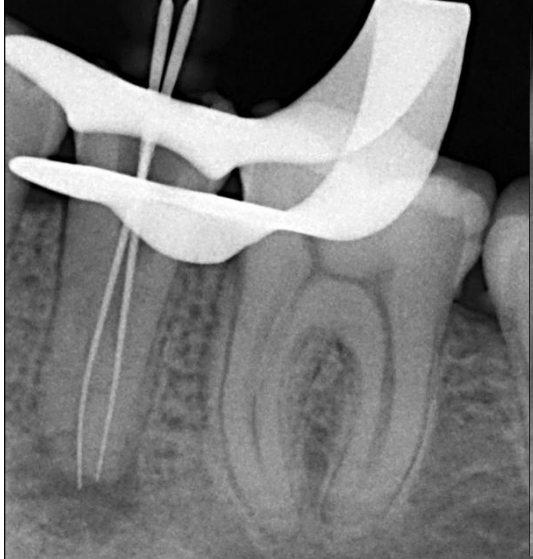


Fig 1b: intra oral photograph



Fig 1c: working length radiograph

Fig 1d: master cone radiograph

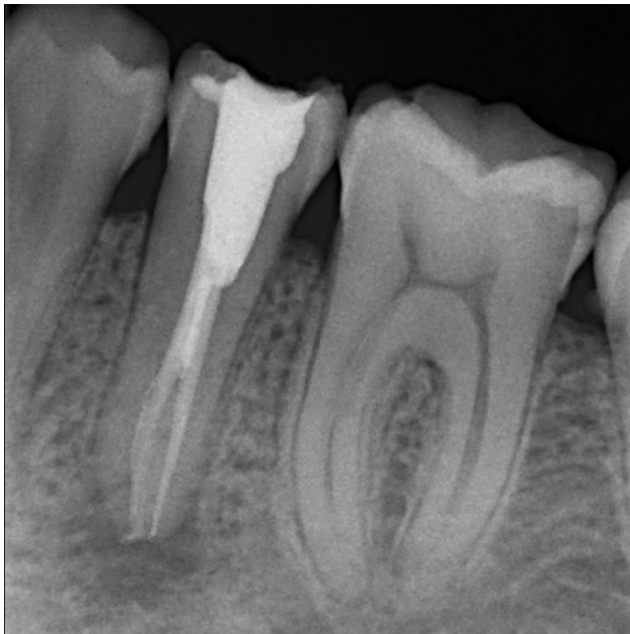


Fig 1e: post-operative radiograph

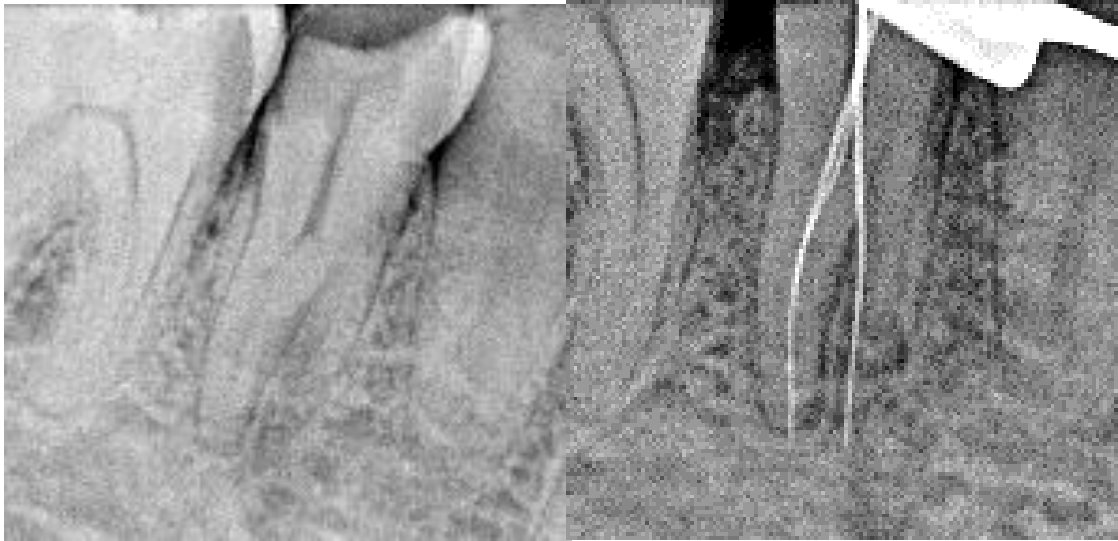


Fig 2a: Pre-operative radiograph

Fig 2b: working length radiograph



Fig 2c: master cone radiograph

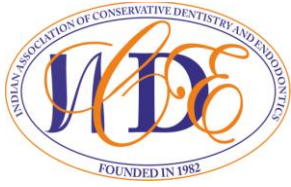
Fig 2d: post-operative radiograph



Fig 2e: 6 months follow-up radiograph

Discussion:

The root canal morphology of mandibular premolars can be highly variable and complex and it is often a challenging task to carry out successful endodontic therapy with such teeth.[10, 11] The primary step in root canal treatment is the identification of the internal morphology of canal system as precisely as possible. The anatomical landmark of the



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pulp chamber floor may help to identify supplementary root canals or root canal aberrations. [12] The careful tactile exploration of the root canal system with hand files is also imperative. To obtain predictable results, high-quality pre-operative radiographs should be obtained at different horizontal angulations and carefully evaluated to detect the presence of extra root canal.[11,12] According to Hasheminia and Hashemi (2005) 11.2% of the mandibular second premolars had 2 or more canals.[13]

The root shape, root position, and relative root outline should be carefully determined from the radiograph. The observations made in a study concluded that broad, flat roots are much more likely to contain multiple canals and intracanal ramifications. In such cases, angled radiographic view will reveal the true dimensions of the root canal. [14] The sudden radiographic disappearance of a canal may be evidence of a dividing canal. Reports have shown that mandibular premolars are possibly

The most difficult teeth to treat endodontically due to wide variation in root canal morphology. [15] One of the most difficult aspects of treating this anatomy is the predictable removal of pulp tissue in the isthmus. This article describes a case reports with aberrant morphology of root



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canals of mandibular premolars and their successful endodontic management.

Conclusion:

Successful and predictable endodontic treatment requires knowledge of biology, physiology, and root canal anatomy. The clinician should be astute enough to identify the presence of unusual numbers of roots and their morphology. A thorough knowledge of root canal anatomy and its variations, careful interpretation of the radiograph, close clinical inspection of the floor of pulp chamber and proper modification of access opening are essential for a successful treatment outcome.

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