

# Endodontic Management of Mandibular First premolar with Vertucci Type II Canal Configuration: A Case Report

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## INTRODUCTION

Successful endodontic treatment has become an important and effective method for maintaining and preserving dental health. A thorough understanding of the root canal morphology and correct evaluation of preoperative radiographs are essential parts of endodontic therapy. Variations in the form of aberrant canal configurations, accessory canals, bifurcation, isthmuses, and anastomoses are often difficult to identify, thus creating a problem for endodontic treatment<sup>1</sup>. Failure to recognize and treat an extra canal might provide a constant source of irritation, thereby compromising the long-term success of the root canal therapy<sup>2</sup>.

According to Rahimi Saeed<sup>3</sup>, 98% of mandibular first premolars had one root and only 2% had two roots; 70.6% had one canal similar to the results of the previous studies (69.3%-86%)<sup>3</sup>. Mandibular first premolars had two canals in 27.8% of cases which is also similar to the results of the previous studies (14%-25.5%)<sup>4</sup>. The goal of this case study was to demonstrate effective treatment of a mandibular second premolar with two root canals and one apical foramen (Vertucci Type II), an uncommon anatomical variant.

## CASE REPORT

An 35-years-old female patient reported to the Department of Conservative Dentistry And Endodontics, with a chief complaint of pain in her lower right back tooth region. On history taking, there was the spontaneous pain, disturbing her sleep. The pain aggravates on chewing foods. Oral examination attrition in relation to #44 (fig 1). The tooth was tender on percussion. The buccal and lingual mucosa was normal. There was no intra or extraoral swelling/sinus present. Intraoral periapical radiograph revealed pdl widening in relation to # 44. Final diagnosis was suggestive of Apical Periodontitis and root canal treatment was initiated.

The tooth was anesthetized using a 2% solution of lignocaine hydrochloride containing 1:80000 adrenaline. After local anesthesia, straight-line access was gained to the pulp chamber. Two root canals were located, one in the buccal and one in the lingual. The working lengths of the root canals were determined by using Coltene Canal Pro apex locator and checked with a radiograph, which revealed two canals with one apical foramen (fig 2). Cleaning and shaping was performed using a crown-down technique with Protaper Gold Files (Dentsply) using 5% sodium hypochlorite irrigation (F2).

Patency was achieved in the canals and was maintained with a 10 Kfile (Dentsply Maillefer, Ballaigues, Switzerland). Root canal filling was completed by using the cold lateral compaction method with AH Plus (Dentsply DeTrey, Konstanz, Germany) sealer and gutta-percha (Dentsply Maillefer, Ballaigues, Switzerland). The tooth was later restored with composite resin. A postoperative periapical radiograph showed complete filling of the two main canals (Fig 3). Following the completion of endodontic treatment of the right mandibular first premolar, the patient, who felt no obvious symptoms or signs.



**Fig: 1 Preoperative Radiograph**



**Fig: 2 Working Length Determination**



**Fig 3: Post Operative Radiograph**

## DISCUSSION

For optimal care and a better prognosis, it is essential to fully comprehend the complex anatomy of the mandibular premolar. The therapeutic significance of Vertucci Type II root canal morphology in mandibular premolars during endodontic therapy cannot be overstated. Failure of the endodontic therapy may result from this morphology, in which there are two canals with one apical foramina, and poor or no filling of the lingual root canal<sup>4</sup>. The doctor must be able to identify any changes from the anatomical morphology of a typical root canal system. In order to have a proper visualisation of root canals, specialists must be well-versed in radiographic techniques and their variants as well as the internal anatomy of teeth.

The literature has a number of research on the anatomical changes in mandibular premolar teeth. The root canals of teeth are intricate and may split and reunite while travelling several routes to the apex. The root canal system was divided into four fundamental categories by Weine<sup>5</sup>. In his research, Vertucci<sup>6</sup> discovered a number of intricate root canal networks and named eight different pulp canal topologies. According to Slowey, if the root canal shadow on a radiograph abruptly terminates in the radicular region, bifurcation or trifurcation of the canal should be assumed.

Additionally, when the root outline is hazy, has an odd contour, or when the canal deviates from its typical look on a radiograph, a second root canal may be necessary.

A thorough clinical and radiographic assessment is necessary for successful endodontic treatment in teeth with extra canals. Angled preoperative radiographs, cone beam computed tomography (CBCT) images, examination of the pulp-chamber floor with a sharp explorer, troughing of the grooves with ultrasonic tips, staining the chamber floor with 1% methylene blue dye, carrying out the sodium hypochlorite "champagne bubble test," and observing canal bleeding points are all crucial tools in locating the root canal orifices<sup>7</sup>. The use of microscopes, magnifying loupes, and fiber-optic transillumination to identify the developmental divide between the mesiobuccal and mesiolingual orifices also aids in the hunt for other orifices.

We did not need to take a CBCT in this instance because we could see two canals on a conventional periapical radiograph (20° angulation from the mesial and distal side). When instrumenting such canals, the physician should exercise caution because hasty instrumentation can result in strip or lateral perforations in these crucial locations. Due to their intricate canal networks, mandibular premolars are sometimes regarded as the hardest teeth to successfully endodontically treat<sup>8</sup>. However, a number of advancements in diagnostics, magnification, operating equipment, and methods as well as new information regarding the anatomy of mandibular premolars could undoubtedly increase the success rates of endodontic treatment in even the most difficult situations.

### **CONCLUSION**

The current case report demonstrated the significance of understanding the root canal system and the most frequent alterations before beginning an endodontic treatment of mandibular premolar teeth.

### **REFERENCES**

- [1]. Daokar SG, Kalekar Yadao AS, Ghunawat DB, Kakde DD. All the mandibular incisors with double canals in a single patient: A rare case. *J Int Oral Health* 2015;7:46–9.
- [2]. Mohan AG, Rajesh EA, George L, Sujathan, Josy SA. Maxillary lateral incisors with two canals and two separate curved roots. *Contemp Clin Dent* 2012;3:519–21.
- [3]. Pineda F, Kutler Y. Mesiodistal and buccolingual roengenographic investigation of 7275 root canals. *Oral Surg Med Oral Pathol*. 1972;33:101–10.
- [4]. Green D. Double canals in single roots. *Oral Surg Oral Med Oral Pathol*. 1973;35:689–96.
- [5]. Weine FS. *Endodontic Therapy*. 5th ed., St. Louis: Mosby – Yearbook Inc; 1996. p. 243.
- [6]. Vertucci FJ. Root canal anatomy of the human permanent teeth. *Oral Surg Oral Med Oral Pathol* 1984;58(5):589–599. DOI: 10.1016/0030- 4220(84)90085-9 .
- [7]. Vertucci FJ. Root canal morphology and its relationship to endodontic procedures. *Endodontic Topics* 2005;10:3–29.
- [8]. Sert S, Bayirli GS. Evaluation of the root canal configurations of the mandibular and maxillary permanent teeth by gender in the Turkish population. *J Endod* 2004;30:391–8