

# ENDODONTIC TREATMENT OF A MANDIBULAR SECOND PREMOLAR WITH TYPE IV VERTUCCI ROOT CANAL CONFIGURATION: A CASE REPORT

Vivek Kumar Pathak<sup>1</sup>, Shashank Soni<sup>2</sup>, Astha Singh Chouhan<sup>3</sup>, Saurabh Mankeliya<sup>4</sup>  
Private Consultant, Gwalior<sup>1,4</sup>, Post Graduate Student<sup>2,3</sup>

2- Department of Orthodontic Dentofacial Orthopedic, Maharana Pratap College of Dentistry & Research Centre, Gwalior.  
3- Department of Conservative Dentistry & Endodontics, Maharana Pratap College of Dentistry & Research Centre, Gwalior.

## Abstract

In this case report of mandibular 2<sup>nd</sup> premolar with an atypical canal configuration. Careful learning of root canal configuration with chamber floor map and radiographic finding is fundamental for better outcome of non surgical endotreatment. Due to variable and complex canal internal anatomy of mandibular 2<sup>nd</sup> premolars, they are a standout amongst the most troublesome cases to treat endodontically. Vertucci's conducted a study on extracted mandibular premolar teeth reported 2.5 percent of a second canal<sup>1</sup>. Case article gives information about the effective treatment of mandibular 2<sup>nd</sup> premolar with two separate canals.

**Keywords:** Configuration of Vertucci's, mandibular 2<sup>nd</sup> premolars, floor map, non surgical treatment.

## INTRODUCTION

Successful and predictable endodontic treatment stands on the complete shaping and cleaning of the canal path to create a proper fluid tight seal of apex. To do this, careful information of tooth anatomy as well as root canal configuration is a essential. The configuration of teeth is often extremely complex and highly variable.<sup>2,3,4</sup> Varieties in canal configuration of permanent teeth depend on factors like ethnic background, age, and gender of the population studied. The most difficult teeth to treat endodontically is mandibular second premolars which exhibit a high frequency of complex and variable root canal morphology.<sup>5,6,7</sup> Over the years, various canal path designs have been recognized. Weine *et al*<sup>8</sup> in 1969 gave the clinical findings of more than one canal path in a single root utilizing the mesiobuccal root of maxillary first molar as the example. Pineda and Kuttler<sup>9</sup> and Vertucci<sup>1</sup> further make a system for canal path anatomy division for teeth and classified them as Type I through Type V. These articles report a surprising case of a mandibular 2<sup>nd</sup> premolar with Type IV canal path design that was effectively treated with endodontic therapy.

## CASE REPORT

A 25 year patient was referred to our postgraduate department and complaint of pain in lower right back teeth region with non-contributory medical history. Clinical observation uncovered a carious lesion on the mesioocclusal surface of right mandibular 2<sup>nd</sup> premolar and delicate on percussion & pre-operative radiograph of the tooth revealed a deep carious lesion approaching pulp with apical periodontitis. The digital x-ray finding was like Vertucci's type IV canal configuration, that is, there was a wide orifice buccolingually that divided into two canals with independent apical foramen (Figure 1).

In light of the clinical and x-ray diagnosis, final diagnosis was made irreversible pulpitis with apical

periodontitis and it was chosen to do two visit endodontic treatments. The treatment after the wake of acquiring Her consent; the tooth was anaesthetized with 2% lidocaine (Lignox A, Warren Indoco) solution by way of inferior alveolar nerve block of the right side with rubber dam for isolation of tooth. Cavity prepared with endo access bur kit (Dentsply, Maillefer) in a high speed airtor handpiece for proper cavity form. After extirpation of the pulpal tissue, endometricing radiograph was taken with K files (Dentsply, Maillefer) placed in the root canals (Figure 2)



Figure 1: Pre-treatment radiograph & Figure 2: Working length determination

Following the endometrics determination, the canal were prepare with crown down procedure with copious irrigation utilizing 5% sodium hypochlorite solution. After completion of cleaning and shaping with Sx, S1, S2, F1 Protaper file (Dentsply, Maillefer) (Figure 3), the canal path system was obturated with single F1 guttapercha cones utilizing a resin-based sealer (AH plus, Dentsply).

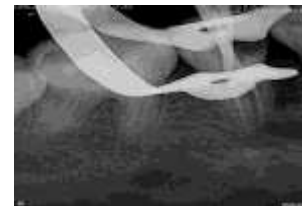


Figure 3: Final preparation by F1 Protaper

A post-obturation radiograph was acquired and the coronal access cavity was reestablished with miracle GIC (GC) (Figure 4)

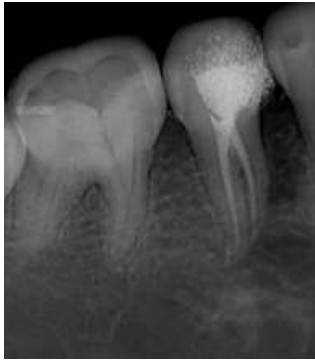


Figure 4: Post-obturation radiograph

## DISCUSSION

The configuration of mandibular 2<sup>nd</sup> premolars can be exceptional factor or complex and usually a challenging work to carry out effective root canal procedure. Thusly, the important in canal therapy is the distinctive confirmation of internal canal path configuration.<sup>10</sup> Better pre-treatment radiographs should be obtained at 20° mesial and distal angulations for identify the presence of additional canal and successful retreatment.<sup>11,12</sup> Zaatar, et al reported that the prevalence of two root canals in mandibular premolars about 4.7 percent.<sup>13</sup> In such cases, angled radiographic view will reveal the true dimensions of the root canal. As we know radiographs are a two-dimensional representation of three-dimensional objects, at times it is difficult to clearly and completely determine the root canal configuration.<sup>10</sup> In such cases, advanced imaging techniques like cone-beam computed tomography are very helpful. Using this technique, images can be obtained in almost any plane of section in the entire three dimensions. Even in the presence of such technology, the careful tactile exploration of the root canal system with hand files is imperative. In this case, although the root canal configuration was variable, it was clearly determined on the preoperative radiograph. After proper identification, biomechanical preparation of the root canals should be carried out followed by complete obturation of all the canals to achieve a predictable long-term endodontic prognosis.<sup>10</sup>

## Conclusion

The clinician ought to be sufficiently gifted to distinguish the presence of surprising numbers of canal path and their configurations. Learning of canal path systems and its variations, appropriate radiographic interpretation, proper assessment of floor map and cavity opening are basic for an effective treatment result.

## References

- 1.Vertucci FJ. Root canal morphology of mandibular premolars. *J Am Dent Asso* 1978;97:47-50.
- 2.Ash M, Nelson S. Wheeler's Dental Anatomy, Physiology and Occlusion. 8th ed. Philadelphia: Saunders; 2003.

- 3.Brown P, Herbranson E. Dental Anatomy and 3D Tooth Atlas Version3.0. 2nd ed. Illinois: Quintessence; 2005.
- 4.Taylor R. Variations in Morphology of Teeth. Springfield, IL: Charles C. Thomas Pub.; 1978.
- 5.Slowey RR. Root Canal Anatomy: Road map to successful endodontics. *Dent Clin North Am* 1979; 23:555-73.
- 6.Nallapati S. Three canal mandibular first and second premolars: A treatment approach. *J Endod* 2005;31:474-6.
- 7.Poorni S, Karumaran CS, Indira R. Mandibular first premolar with two roots and three canals. *AustEndod J* 2010; 36:32-4.
- 8.Weine FS, Healey HJ, Gerstein H, Evanson L. Canal configuration in the mesiobuccal root of the maxillary first molar and its endodontic significance. *Oral Surg Oral Med Oral Pathol* 1969; 28:419-25.
- 9.Pineda F, Kuttler Y. Mesiodistal and buccolingualroentgenographic investigation of 7,275 root canals. *Oral Surg Oral Med Oral Pathol* 1972; 33:101-10.
- 10.Kararia N, Kararia V. Root canal treatment of a mandibular premolar with atypical canal pattern. *J Conserv Dent* 2012;15:392-4
- 11.England MC Jr, Hartwell GR, Lance JR. Detection and treatment of multiple canals in mandibular premolars. *J Endod* 1991; 17:174-8.
- 12.Hulsmann M. Mandibular first premolar with three root canals. *Endod Dent Traumatol* 1990; 6:189-91.
13. Zaatar EI, al-Kandari AM, Alhomaidah S, al-Yasin IM. Frequency of endodontic treatment in Kuwait: radiographic evaluation of 846 endodontically treated teeth. *J Endod* 1997; 23:453-6.

## Corresponding Author:

Dr. Vivek kumar pathak  
Private consultant,  
Pathak Dental Clinic, Gwalior  
Email id- [vivekpathak786@gmail.com](mailto:vivekpathak786@gmail.com)  
Mobile - +918871275429

**How to cite this article:** Pathak VK, Soni S, Chouhan AS, Mankeliya S. Endodontic Treatment of A Mandibular Second Premolar With Type IVVertucci Root Canal Configuration: A Case Report. *TMU J DENT* 2018;5(3):23-24