

# Mandibular lateral incisors with vertucci type III root canal configuration- a case report

## Abstract

**Background:** Variations in the external morphologic features of the teeth occur in individuals and so does the internal morphology of the crown and the root. Mandibular anteriors are known to have aberrant canals. Based on the possible branching of the root canal system, root canal configurations of permanent teeth were divided into eight different types by Vertucci.

**Aim:** This paper presents a rare case of successful endodontic treatment of mandibular lateral incisors with Vertucci type III canal morphology.

**Methods:** Conventional root canal treatment was done for the mandibular anterior teeth.

**Results:** The treatment was successful and the patient was asymptomatic on follow up, suggesting that conventional methods for root canal treatment are sufficient if proper diagnosis of canal anatomy is done.

**Conclusion:** This case report highlights the importance of adequate pre-operative radiograph evaluation to treat any mandibular anterior tooth with variable anatomy.

**Keywords:** lateral incisor, endodontics, treatment, vertucci

Volume 12 Issue 1 - 2021

Prabheleen Kaur Brar,<sup>1</sup> Rajdeep Brar,<sup>2</sup> Saurabh Gupta,<sup>3</sup> Ramandeep Singh Gambhir<sup>4</sup>

<sup>1</sup>Department of Conservative Dentistry and Endodontics, Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, India

<sup>2</sup>Department of Oral Medicine and Radiology, Dr. Harvansh Singh Judge Institute of Dental Sciences and Hospital, Panjab University, India

<sup>3</sup>Department of Conservative Dentistry and Endodontics, DAV Dental College, India

<sup>4</sup>Department of Public Health Dentistry, Rayat and Bahra Dental College and Hospital, India

**Correspondence:** Dr. Ramandeep Singh Gambhir, Professor, Department of Public Health Dentistry, Rayat and Bahra Dental College and Hospital, Mohali, Punjab, India, 140103, Tel +91-99156-46007, Email raman2g@yahoo.com

**Received:** February 10, 2021 | **Published:** February 22, 2021

## Introduction

Successful endodontic treatment involves accurate diagnosis, good understanding of the biological principles and excellent execution of treatment. Many outcome studies conducted over the past few decades showed incomplete debridement and disinfection of root canal space as the most important factor in endodontic treatment failure. Root canal treatment failure often results due to non-treatment of missed canal during the initial treatment.<sup>1,2</sup> To be able to execute an excellent treatment, it is imperative that the clinician has comprehensive knowledge of the root canal anatomy and how to locate and treat this anatomy.<sup>3-5</sup> Vertucci<sup>3,6</sup> has classified the morphological pattern of the root canal systems into eight types:-

Type I 1-1, Type II 2-1, Type III 1-2-1, Type IV 2-2

Type V 1-2, Type VI 2-1-2, Type VII 1-2-1-2, Type VIII 3-3

The mandibular incisors usually have one root canal with one apical foramen (Vertucci Type I) or two root canals with one apical foramen (Vertucci Type II).<sup>7-9</sup> However, the occurrence of root canals with one canal bifurcating into two and then again uniting to exit as one canal (Vertucci type III ) anatomy in mandibular incisors is very rare (3%).<sup>4,10</sup> We hereby report a very rare case of successful endodontic treatment of mandibular lateral incisors with Vertucci type III root canal system.

## Case report

A 24 year old male patient reported to the department of Conservative dentistry and Endodontics with the chief complaint of badly decayed lower anterior (front) teeth (Figure 1). The medical history of the patient was not significant. The clinical examination revealed tenderness on percussion and there was negative response to thermal and electric pulp testing. The radiographs showed carious lower anterior teeth with caries approaching the pulp (Figure 2).

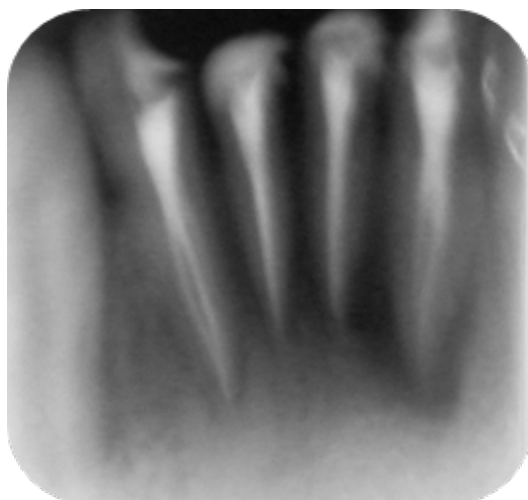


**Figure 1** Preoperative image showing badly decayed 31,32,41,42.



**Figure 2** Preoperative radiograph showing Vertucci type III canal anatomy in 32 and 42.

Final diagnosis confirmed necrosed pulp with chronic apical periodontitis with respect to lower central and lateral incisors. The pre-operative radiograph revealed Vertucci type III anatomy in lateral incisor. Root canal treatment was initiated. Access was gained with number 4 round bur (S.S. WHITE USA) in an air turbine handpiece (Kavo) after removal of decay. The canals were negotiated with a no.10 K file (Densply, USA) and a working length radiograph was obtained. Copious irrigation was done with sodium hypochlorite 5.25% and saline while doing the biomechanical preparation. Calcium hydroxide was used as an intracanal medicament (Cal-excel, Amdent). In the subsequent appointment, the canals were dried and a master cone X-ray was obtained. Zinc oxide eugenol (Kemdent, UK) sealer was placed using a lentulospiral. The obturation was done with standardised gutta-percha (Densply, USA) and the final radiograph was taken (Figure 3). After about ten days, the post endodontic restoration was done with prefabricated post and core and finally the teeth were restored with Porcelain fused to metal crowns (Figure 4).



**Figure 3** Postoperative radiograph showing completion of root canal treatment.



**Figure 4** Post endodontic restoration.

## Discussion

The success of root canal treatment depends on the thorough knowledge of the root canal configurations and clinical diagnosis of the same. One of the major factors contributing towards failure of root canal treatment is the non-treatment of a missed canal. The

mandibular anterior teeth reveal a high incidence of variations in canal anatomy. Carious involvement of the mandibular anterior teeth is not commonly seen, but there are situations when they require endodontic treatment. However, studies have revealed high variation of root canal morphology among mandibular anterior teeth. Vertucci,<sup>6</sup> in his study on root canal morphology of 300 mandibular anterior teeth observed a second canal in 27.5% of mandibular incisors. In a similar study, Miyashita et al observed that 12.4% of mandibular incisors had two canals; but only 3% had two foramina.<sup>1</sup> Mauger et al.<sup>11</sup> evaluated the canal morphology at different levels of the root in 100 mandibular incisors and reported 98-100% of teeth had one canal in the apical portion.<sup>11</sup>

In the present case, the Vertucci type III canal configuration was distinctly visible on the pre-operative radiograph. Thus, this case report demonstrates that conventional root canal treatment can be a treatment modality for teeth with Vertucci type III anatomy provided the canals are adequately located, bio-mechanically cleaned and obturated.

## Conclusion

This case report highlights the importance of adequate pre-operative radiograph evaluation to treat any mandibular anterior tooth with variable anatomy.

## Acknowledgments

None.

## Conflicts of interest

None.

## References

1. Miyashita M, Kasahara E, Yasuda E, et al. Root canal system of the mandibular incisor. *J Endod.* 1997;23(8):479-484.
2. Aggarwal K. Mandibular lateral incisor with Vertucci type IV root canal morphological system. A rare case report. *J Nat Sci Biol Med.* 2016;7(1):101-104.
3. Vertucci F J. Root canal anatomy of the human permanent teeth. *Oral Surg Oral Med Oral Pathol.* 1984;58(5):589-599.
4. Kartal N, Yanikoglu FC. Root canal morphology of mandibular incisors. *J Endodon.* 1992;18(11):562-564.
5. Kerekes K, Tronstad L. Morphometric observations on root canals of human anterior teeth. *J Endodon.* 1977;3(1):74-79.
6. Vertucci FJ. Root canal anatomy of the mandibular anterior teeth. *J Am Dent Assoc.* 1974;89(2):369-371.
7. Weine SF. Endodontic therapy. 4<sup>th</sup> ed. St Louis: CV Mosby, 1989:222-223.
8. Seltzer S, Bender IB. The dental pulp. 3<sup>rd</sup> ed. Philadelphia: Lippincott, 1984:349-84.
9. Manoj A, Meetu M, Pramod J, et al. Endodontic management of mandibular incisors with 2 root canals: Report of 2 cases. *Indian J Stomatol.* 2013;4:61-63.
10. Tiku M, Kalaskar RR, Damle SG. An unusual presentation of all the mandibular anterior teeth with two root canals—A case report. *J Indian Soc Pedod Prev Dent.* 2005;23(4):204-206.
11. Mauger MJ, Schindler WG, Walker WA 3<sup>rd</sup>. Evaluation of canal morphology at different levels of root resection in mandibular incisors. *J Endodon.* 1998;24(9):607-609.