



Case Report

ISSN: 2581-3218

IJDR 2025; 10(3): 86-88

Received: 21-11-2025

Accepted: 08-01-2026

Published: 17-01-2026

© 2025, All rights reserved

www.dentistryscience.com

doi: 10.31254/dentistry.2025.10302

Endodontic Management of Vertucci Type III Root Canal Configuration in Permanent Mandibular Lateral Incisor: A Case Report

Priyadharshini S Babu¹, Daya Srinivasan², Pragadesh Ganesan¹, Dhaaran S.S¹

¹ Post Graduate Student, Department of Pedodontics & Preventive Dentistry, Chettinad Dental College & Research Institute, Kelambakkam - 603103 Chennai, India

² Professor and HOD, Department of Pedodontics & Preventive Dentistry, Chettinad Dental College & Research Institute, Kelambakkam - 603103 Chennai, India

Abstract

Endodontic treatment of mandibular incisors can be challenging due to variations in root canal morphology. While these teeth are typically present with a single canal, some can exhibit two canals that merge near the apex. This case report describes a 12-year-old boy, with a mandibular right lateral incisor demonstrating a Vertucci Type III canal configuration. The patient presented with the complaint of pain and swelling following trauma, and radiographic evaluation confirmed the presence of bifurcated canals. The tooth underwent thorough chemo-mechanical debridement and was medicated with triple antibiotic paste. After two weeks, it remained asymptomatic and was subsequently obturated using the single cone technique. Follow-up assessments showed no clinical or radiographic abnormalities, confirming treatment success. This case highlights the importance of recognizing and managing root canal variations in mandibular incisors. Precise access cavity preparation and comprehensive radiographic evaluation are essential to prevent missed canals and ensure favourable endodontic outcomes.

Keywords: Trauma, Mandibular incisor, Root Canal Variation, Vertucci classification, Radiograph.

INTRODUCTION

Endodontic treatment of single-rooted teeth is usually least complex, but root canal variations can complicate diagnosis and treatment. Understanding bifurcations, anastomosis, accessory canals, and isthmus is crucial to prevent treatment failure^[1-3].

While mandibular incisors typically have a single root and canal, anatomical variations exist. Vertucci Type III configuration, found in 1.2% of cases, features two distinct canals merging at the apical foramen^[4,5]. This case study presents such a variation, where two separate canals combine into one at the apex, highlighting the complexity of root canal morphology and the need for precise diagnosis and treatment planning.

CASE REPORT

A 12 years old boy reported to the Department of Paediatric Dentistry, with the chief complaint of pain in the lower anterior tooth and swelling in the gums which occurred due to trauma one week ago. No past history of dental treatment. No significant past medical history The clinical and radiographic examination showed a fracture in the middle third of the crown structure of 42 and 31, with swelling around the gums of 31, 41, and 42. Tender on percussion in 31 and 42 was positive. Grade 1 mobility was noted in 31. Radiograph revealed widening of the periodontal ligament space around 31 (Figure 1) and presence of two canals in 42, a rare variation. Careful evaluation of preoperative radiographs and measuring the working length from multiple horizontal angles confirmed the presence of two canals in 42. Local anaesthesia of lidocaine was administered. Isolation of the tooth was done with rubber dam. Access cavities preparation was done. Upon careful examination of the root canals, A single canal dividing into two and then merging back together at the apical foramen with Vertucci type III root canal morphology were found buccally and lingually in tooth 42. Radiographically, the working length of both canals was determined to be 17 mm (Figure 2) .

*Corresponding author:

Dr. Priyadharshini S Babu

Post Graduate Student,
Department of Pedodontics &
Preventive Dentistry, Chettinad
Dental College & Research
Institute, Kelambakkam-
603103, Chennai, India

Email:

drpriyasuresh516@gmail.com

Initial preparation of the canals was prepared using 10 and 15 size K files. The canals were prepared using Endo-motor with rotary files. A 2.5% of sodium hypochlorite and normal saline were used alternatively as irrigant during biomechanical preparation of canals. The canals were dried with sterile paper points and were dressed with triple antibiotic paste (main components included metronidazole, ciprofloxacin and minocycline). The access cavities were sealed with IRM temporarily.

After 2 weeks of follow up, the teeth were asymptomatic. Master cone radiograph was taken (Figure 3). Obturation of the root canals were done using single cone obturation technique. Post obturation radiograph was taken and the access cavities were sealed with GIC (Figure 4). The patient was followed-up at one- and three-months intervals after endodontic treatment. Clinical examination revealed no pain on percussion, normal gingival tissue with periodontal probing depth of 2-3mm with no mobility. Periapical radiography revealed that the periodontal ligament in relation to 31 was continuous.

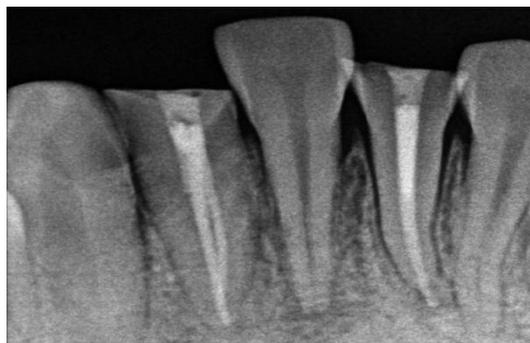


Figure 4: Radiograph showing obturation of 31,42

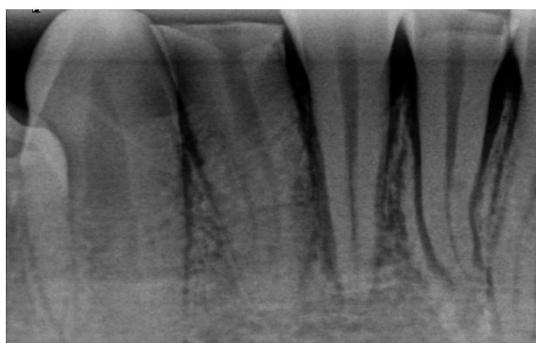


Figure 1: Pre-radiograph of 31,41,42



Figure 2: Radiograph depicting working length of right mandibular central incisor



Figure 3: Radiograph depicting master cone of right mandibular lateral incisor

DISCUSSION

Proper access cavity preparation ensures a clear, straight path to the apical foramina, or at least to the initial curve of the canal, enabling the identification of all root canal orifices while preserving the healthy tooth structure. Vertucci divided the root canal systems morphological patterns into eight categories [6]. According to the Vertucci classification, the root canal morphology of incisors typically falls under-

Type I: One root canal with one apical foramen.

Type II: Two canals merging into one canal near the apex.

Type III: A single canal dividing into two and then merging back together.

Type IV: Two root canals with two separate foramina.

Understanding these variations is crucial, as mandibular incisors are difficult to access due to their small size and complex anatomy. Complete removal of the lingual shoulder is essential to ensure adequate access and visibility, as the mandibular incisors often present with two canals oriented in a buccolingual direction. The lingual canal is commonly missed, which can compromise treatment outcomes [7]. When two canals are present, the buccal canal is typically easier to locate and tends to be straight, while the lingual canal is often concealed by the lingual shelf [8]. In such cases, extending the access cavity beneath the cingulum helps to reveal the missed lingual canals in all mandibular incisors.

In this case report, a single canal dividing into two and then merging back together was observed in the mandibular right lateral incisor. The prevalence of two root canals in mandibular incisors is 45%. 6.11% to 68% of mandibular incisor contain two canals albeit in many cases, they tend to merge at the apical third of the root [9]. Triple antibiotic paste as an intracanal medicament in necrotic teeth effectively controls postoperative pain [10].

In the present case, triple antibiotic paste was used as an intracanal medicament. After 2 weeks, when the patient was recalled, the teeth were found to be asymptomatic and planned for obturation. A thorough radiographic examination of the root canal system is crucial before preparing for root canal treatment to identify variations in canal anatomy. Additionally, it is essential to periodically review the endodontically treated tooth to ensure ongoing healing and to detect any potential complications [6].

Clinical significance

This case highlights the importance of recognizing anatomical variations, such as multiple canals, in mandibular lateral incisors. Accurate radiographic evaluation and thorough access cavity preparation ensure complete debridement and prevents treatment failure. Post-treatment follow-up and infection control with triple antibiotic paste enhance long-term success and prognosis.

CONCLUSION

This rare case of a mandibular permanent incisor with two canals, highlights the importance of detailed clinical assessment and advanced radiographic evaluation in identifying and managing atypical root canal morphology. Precise endodontic intervention was crucial for the successful treatment of this anatomical variation, ensuring long-term tooth preservation and function. This case contributes to the limited literature on root canal variations in mandibular incisors and highlights the need for heightened clinician awareness, the integration of advanced imaging modalities, and meticulous documentation to enhance endodontic treatment outcomes.

Conflicts of Interest

The author reports no conflicts of interest.

Funding

None declared.

ORCID ID

Priyadharshini S Babu: <https://orcid.org/0000-0003-4950-4165>

Daya Srinivasan: <https://orcid.org/0000-0001-5453-4380>

Pragadesh Ganesan: <https://orcid.org/0009-0007-7234-5728>

REFERENCES

1. Acharya N, Hasan R, Kafle D, Badruddoza Dithi A, Saito T. A rare morphological variation of mandibular anterior teeth with double canals. *Ann Clin Case Rep.* 2019;4:1701.
2. Daokar SG, Kalekar 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(2):46-9.
3. Vertucci FJ, Haddix JE. Tooth morphology and access cavity preparation. In: Cohen S, Hargreaves KM, editors. *Cohen's Pathways of the Pulp.* 4th ed. St. Louis: Mosby; 2011. p. 136-222.
4. Rahimi S, Milani AS, Shahi S, Sergiz Y, Nezafati S, Lotfi M. Prevalence of two root canals in human mandibular anterior teeth in an Iranian population. *Indian J Dent Res.* 2013;24(2):234-6.
5. Perlea P, Nistor CC, Toma C, Dimitriu B. Endodontic configuration of the lower incisors in a Romanian population: a radiological study. *Rom J Morphol Embryol.* 2013;54(3 Suppl):775-8.
6. Tiku AM, 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):204-6.
7. Kokane VB, Patil SN, Gunwal MK, Kubde R, Atre S. Treatment of two canals in all mandibular incisor teeth in the same patient. *Case Rep Dent.* 2014;2014:893980.
8. Shaikh MA, Kalhor FA, Sangi L. Frequency of second canal in mandibular lateral incisors (*in vitro*). *Pak Oral Dent J.* 2014;34(1).
9. Joon A, Arya A, Grewal MS, Thapak G. Management of mandibular central incisor with two canals. *IP Indian Journal of Conservative and Endodontics* 2023;8(2):115-117.
10. Khan AM, Gangoo IKA, Ali NA, Khan M, Javed MQ, AlAttas MH, et al. The effect of calcium hydroxide, triple antibiotic paste and chlorhexidine on pain in teeth with symptomatic apical periodontitis: a randomised

controlled trial. *Int J Environ Res Public Health.* 2023;20(4):3091.

HOW TO CITE THIS ARTICLE-

Babu PS, Srinivasan D, Ganesan P, Dhaaranee SS. Endodontic Management of Vertucci Type III Root Canal Configuration in Permanent Mandibular Lateral Incisor: A Case Report. *Int J Dent Res* 2025; 10(3):86-88. doi: 10.31254/dentistry.2025.10302

Creative Commons (CC) License-

This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY 4.0) license. This license permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited. (<http://creativecommons.org/licenses/by/4.0/>).