ISSN: 2581-5989
PubMed - National Library of Medicine - ID: 101738774

International Journal of Dental Science and Innovative Research (IJDSIR)

IJDSIR : Dental Publication Service

Available Online at: www.ijdsir.com

Volume – 6, Issue – 3, May - 2023, Page No. : 158 – 163

A Rare Case of Single canal in a single-rooted mandibular second molar.

[1]Dr. Fathima Ishrath U K, Postgraduate, Department of Pediatric and Preventive Dentistry, A. J. Institute of Dental Sciences, Bangalore, Karnataka

[2]Dr. Megha, Postgraduate, Department of Pediatric and Preventive Dentistry, A. J. Institute of Dental Sciences, Bangalore, Karnataka

[3]Dr. Mohammad Kalandar Anwaz, Postgraduate, Department of Pediatric and Preventive Dentistry, A. J. Institute of Dental Sciences, Bangalore, Karnataka

[4]Dr. Sowmya B, HOD and Professor, Department of Pediatric and Preventive Dentistry, A. J. Institute of Dental Sciences, Bangalore, Karnataka

[5]Ashish Shetty, Assistant Professor, Department of Pediatric and Preventive Dentistry, A. J. Institute of Dental Sciences, Bangalore, Karnataka

Corresponding Author: Dr. Fathima Ishrath U K, Postgraduate, Department of Pediatric and Preventive Dentistry, A. J. Institute of Dental Sciences, Bangalore, Karnataka

Citation of this Article: Dr. Fathima Ishrath U K, Dr. Megha, Dr. Mohammad Kalandar Anwaz, Dr. Sowmya B, Ashish Shetty, "A Rare Case of Single canal in a single-rooted mandibular second molar", IJDSIR- May - 2023, Volume – 6, Issue - 3, P. No. 158 – 163.

Copyright: © 2023, Dr. Fathima Ishrath U K, et al. This is an open access journal and article distributed under the terms of the creative common's attribution non-commercial License. Which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Type of Publication: Case Report

Conflicts of Interest: Nil

Abstract

Background: The root canals of mandibular molar teeth show a wide variation in the number of canals ranging from single to multiple canals. A successful endodontic treatment depends on a thorough understanding of the variations in internal tooth anatomy. Before beginning endodontic therapy, it is important to understand the tooth anatomy, any variations in its root structure, shape, along with the number of orifices and canal arrangement. An alteration in the second mandibular molar, which is seldom mentioned in the literature, is described in the current case report.

Case Presentation: Root canal anatomy of mandibular second molars differs among individuals. With the aid of the latest dental technologies in endodontics, the present case report highlights the diagnostic tools required to confirm the morphology of the root canal, and the treatment of uncommon root anatomy of a mandibular second molar with a single root and single canal.

Conclusion: Clinicians should be aware of the various anatomic variations that each tooth may present in order

to achieve a satisfactory result. Variation may not always present in the form of extra canal, it can be in the form of lesser number of canal than what is typically observed.

Furthermore, in order to improve the quality of care delivered to their patients, practitioners must have the necessary knowledge and abilities to utilize the diagnostic and therapeutic instruments at their disposal.

Keywords: Single canal; Single Root; One canal; Mandibular second molar; Root canal variations.

Introduction

The primary goal of endodontic treatment is to aid in the treatment of pulpal diseases[1]. For the best achieving of this objective, thorough understanding of the morphology of roots of every tooth is essential[2]. Complete de bridement of the pulp chambers is obtained once the operator locates the all the canals and does mechanical cleaning along with chemical cleaning of the canals and bio mechanical shaping[3].

Endodontic treatment can become challenging when there are presence of accessory canals, varied canal configuration, bifurcation and isthmus[4]. Weine[5] classified root canal systems into four basic types. There was a much more complex classification of root canal anatomy given by Vertucci et al [6], which is divided in to 8 groups. Generally mandibular second molar contains two roots, one mesial root and one distal root, Mesial root has two canals which are closely placed, distal root can have either one or two canals.

The anatomical variations noted in the mandibular second molar are, presence of single root, single canal, two canals, four canals, C-shaped canals and Tauro dontism in single root[4]. Primary factor of failure of endodontic therapy is the improper knowledge of root canal anatomy[3].

For instance, Weine et al. Reported that only 1.3% of mandibular second molars had a single canal configuration all the way from an orifice to an apex (Vertucci Type I)[7].

Along with that, Demirbuga et al. Used advanced imaging technique and found the prevalence of these anatomic variant to be around 2%[8]. There are number of recent advances in endodontics which have contributed to safe, predictable, and efficient root canal treatment. These advancements include digital radiography, cone beam computed tomography (CBCT), micro computed Tomography (micro-CT), dental operating microscope (DOM), thermomechanical treated nickel-titanium files, and improved obturation devices.[9-11]

The aim of this case report is to describe and discuss the diagnosis and management of a mandibular second molar tooth with the single conical root with single root canal, with the usage of present advancements in endodontics.

Case Presentation

A 13-year-old girl visited the department with the chief complaint of pain in the second molar 3 weeks ago. Hard tissue examination revealed presence of deep dental caries in relation to the lower right second molar. The tooth did not respond to electric and thermal testing. Radio graphic examination revealed deep pit communicating with pulp and presence of blunderbuss canals. The diagnosis for this tooth is irreversible pulpitis with symptomatic apical periodontitis. Informed consent was obtained from the patient for publication of this case.

No significant findings were noted during the extraoral examination. The intraoral examination showed gross decayed #47, missing #48, #38, #18, #28. The patient had generalized supragingival plaque and calculus.

©2023 IJDSIR, All Rights Reserved

The radiographic investigation included IOPA (Intraoral periodical radiograph) in relation to #47, which showed single canal and periapical radiolucency. Apexification using MTA apical plug technique was opted.

Figure 1: Preoperative Intraoral periapical radiograph and CBCT of #47

Treatment was carried out in three visits. During the first visit, the inferior alveolar nerve block was locally anesthetized using one carpule (1.8 ml) of 2% lidocaine with 1:80,000 of epinephrine. Another carpule was used to give buccal and lingual infiltration. Tooth isolation was achieved using a rubber dam. A conventional endodontic access opening was established using endodontic bur size 801 round-diamond-FG with regular-shank in a high-speed handpiece. Apex locator produced inconsistent canal length reading so a check radiograph was used to confirm the actual working length.

Figure 2: Working length determination.

Minimum instrumentation using hand files was done under irrigation using 2.5% NaOCl and saline. Intracanal medicament, that is, Ca (OH)2 and iodoform combi nation dressing, was given. After 4 weeks the patient remained asymptomatic, the tooth was re-accessed, and canals were irrigated.

Figure 3: Placement of Calcium hydroxide

MTA was mixed according to the manufacturer's instructions and carried to the canal with an MTA carrier. Apical plug of about 3 mm of MTA was placed and confirmed radiographically.

MTA was mixed according to the manufacturer's instructions and carried to the canal with an MTA

©2023 IJDSIR, All Rights Reserved

carrier. Apical plug of about 3 mm of MTA was placed and confirmed radiographically.

A sterile cotton pellet moistened with sterile water was placed over the canal orifice and the access cavity was sealed with Cavit.

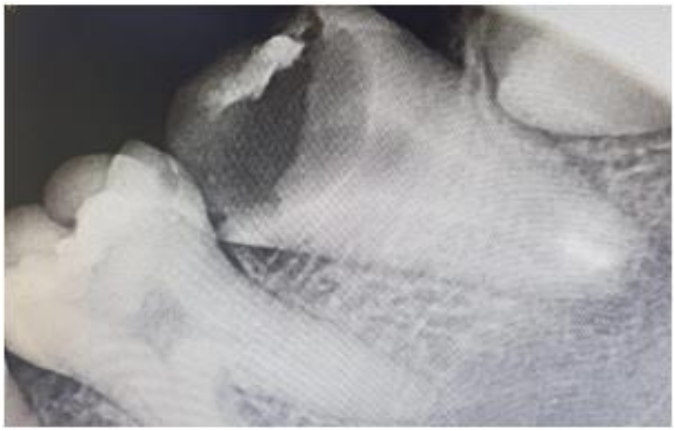

Figure 4: Mineral trioxide aggregate apical plug placed.

After 72 h, A hand plugger was lightly tapped against MTA plug to confirm a hardened set. The canals were dried using sterile paper points followed by application of endomethasonesealer. Canals were obturated with a combination of F3 size gutta percha. Excess gutta percha was removed. The tooth was temporized with Glass ionomer cement. The patient was then referred to Prosthodontic clinic for fabrication of full coverage restoration.

Figure 5: Post obturation periapical radiograph.

Discussion

The endodontic therapies of multi-rooted teeth are often challenging, mainly due to the complex root canal system. For endodontic therapy to be successful, understanding this complex root canal morphology is crucial since missing even one canal can result in failure.[12] Among mandibular molars, mandibular second molar shows a greater variation than mandibular first molar. fusion of roots is one among them. The external morphology of mandibular second molars seem to be conical or square shaped. The buccal or lingual aspect of fused roots shows presence of radicular grooves. The extensions and depth of grooves decides the internal canal anatomy. If groove is shallow, single wide canal is expected whereas if groove is deep, C-shaped anatomy is expected.[13] Pansiera & Milano found 6 out of 102 (5.88 %) mandibular second molar having single root with single root canal system.[14]

The present case describes the treatment of a rare single rooted mandibular second molar with single canal. Pre-treatment intraoral periapical radiograph was the aid in diagnosing single canal further confirmed with CBCT. Initial well planned cavity preparation for the access opening is the major factor for the successful root canal therapy. If the access opening is not done properly usage of the instruments for further treatment becomes difficult for the special anatomy of root canals. Varied anatomy can develop depending on age, sex and ethnicity in any racial group which plays a major role in deciding the morphology of root canals. There are multiple diag nosing aids used like intraoral periapical radiographs and cone beam computed tomography.

CBCT is a reliable and non-invasive radiographic technique which is used when the normal periapical radio graphs cannot provide the exact diagnosis for treatment planning. A narrow field of view, which is associated with lower radiation exposure and higher spatial resolution, is advised in circumstances where a CBCT scan is deemed appropriate[15].

©2023 IJDSIR, All Rights Reserved

Morphology of the root canal was mentioned previously in the literature. Fava et al. (2000) had published a case report with the same patient exhibiting one root and one canal in all maxillary molars and mandibular second molars[16].

Rahimi et al. Evaluated root canal configuration of mandibular second molars among Iranian sub Populations using a clearing technique and found, only 6 out of the 139 teeth (4.3%) demonstrated the presence of the Vertucci Type I configuration[17].

It can be challenging when the operator has inadequate knowledge about the special configuration of root canal anatomy. Searching for missing canals can lead to perforation of access opening. So, careful access opening of mandibular second molar is important due to the posterior placement of the same. There are studies providing information of symmetrical presence of similar root canal anatomy in the right and left side of the same patient[18].

In our case, symmetry in regarding the number of roots and canal were observed, which in accordance to the study conducted by Plotino et al.[19] in Italian population and reported 70.6% symmetry in number of roots and canal on right and left sided first mandibular molars. Similar study conducted by Felsypremila et al [20] in Indian population, examined 131 patients with right and left mandibular first molars, reported 78.6% symmetry in regards to number of roots and canals. Hence, clinicians should suspect the presence of a similar anatomic configuration on the contralateral tooth when examining the preoperative radiograph of a particular case.

A variety of materials have been proposed for induction of apical barrier formation. In this study, MTA as an apical barrier has been used. In MTA plug technique, root canal must be disinfected with calcium hydroxide before placing MTA for 2 weeks. This is because chemo-mechanical preparation alone is not effective for complete elimination of microorganisms. Hence, for the canal disinfection, calcium hydroxide has been used in between the appointments.

Conclusion

The present case report highlights the uncommon anatomy of a mandibular second molar with a single root and single canal. Careful and thorough inspection of the tooth aided with multiple radiographs helps in achieving a satisfactory result for such cases.

References

1. D. Ørstavik and T. R. Pitt Ford, “Apical Perio dontitis. Microbial infection and host responses,” in Essential endo dontology: pre vention and treatment of apical Perio dontitis, D. Ørstavik and T. R. Pitt Ford, Eds., Blackwell Science, Oxford, 1998.

2. Hess W, Zurcher E, The anatomy of the root canal of the teeth of the permanent dentition and the anatomy of the root canal of the deciduous dentition and the first molars. London: Basle, Sons and Danielson 1925

3. 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 Feb; 7 (2):46-9.

4. Root canal anatomy of the human permanent teeth. Vertucci FJ. Oral Surg Oral Med Oral Pathol. 1984; 58: 589–99.

5. Weine FS Endodontic therapy .5th ed. St. Louis: Mosby yearbook Inc, 1996,243.

6. Vertucci F, Seeling A, Gillis R, Root canal mor phology of the human maxillary second premolar. Oral surg. Oral Med Oral Pathol. 1974; 38:456-64.

7. F. S. Weine, R. A. Pasiewicz, and R. T. Rice, “Canal configuration of the mandibular second molar

©2023 IJDSIR, All Rights Reserved

using a clinically oriented in vitro method," Journal of Endo dontia,1988; 14(5):207–13.

8. S. Demirbuga, A. E. Sekerci, A. N. Dinçer, M. Cayabatmaz, and Y. O. Zorba, "Use of cone beam computed tomography to evaluate root and canal mor phology of mandibular first and second molars in Turkish individuals," Medicina Oral, Patología Oral y Cirugía Bucal, vol. 18(4), 2013; 737–44.

9. Root canal configurations of third molar teeth. A comparison with first and second molars in the Turkish population. Sert S, Sahinkesen G, Topçu FT, Eroğlu SE, Oktay EA. Aust Endod J. 2011;37:109–17.

10. Alfadley A, AL Quraishi A, AL Mazrou Y, Aljarbou F.A rare case of single-rooted mandibular second molar with single canal. Case Rep Dent. 2020.

11. F. Valenti-Obino, D. Di Nardo, L. Quero et al. Symmetry of root and root canal morphology of mandibular incisors: a cone-beam computed tomography study. Journal of Clinical and Experimental Dentistry, 2019;11(6): 527–33.

12. K. AL Fouzan, A. Alfadley, L. Alkadi, A. Alhezam, and A. Jamleh, "Detecting the second mesiobuccal canal in maxillary molars in a Saudi Arabian population: a Micro-CT study," Scanning, vol. 2019.

13. G. Gambarini, M. Seracchiani, L. Piasecki et al., "Measurement of torque generated during intracanal instru mentation in vivo," International Endodontic Journal, vol. 52, no. 5, pp. 737– 745, 2018.

14. Management of Single Rooted Mandibular Second Molar with Single Canal: Two Case Reports Indian Journal of Forensic Medicine & Toxicology, 2020; 14 (4): 6698-704

15. Fernandes M, De At aide I, Wagle R. C-shaped root canal configuration: A review of literature. Journal of conservative dentistry: JCD. 2014 Jul;17(4):312.

16. Pansiera AF, Milano NF. Morfologiaendodo Ãntica dos segundosmolaresinferiores. Revista da Faculdade Odontologia de Porto Alegre. 1995; 36: 12-14

17. AAE and AAOMR Joint Position Statement: use of cone beam computed tomography in endodontics 2015 update. Oral Surg Oral Med Oral Pathol Oral Radiol. 2015; 120:508–512.

18. Four second molars with single roots and single canals in the same patient. Fava LR, Wein Feld I, Fabri FP, Pais CR. Int Endod J. 2000;33:138–142.

19. S. Rahimi, S. Shahi, M. Lotfi, V. Zand, M. Abdol Rahimi, and R. Es'haghi, "Root canal configuration and the prevalence of C-shaped canals in mandibular second molars in an Iranian population," Journal of Oral Science,2008; 50(1):9–13.

20. M. Mashyakhy, H. R. Chourasia, E. Halboub, A. A. Almas Raqi, Y. Khubrani, and G. Gambarini, "Anato mical variations and bilateral symmetry of roots and root canal system of mandibular first permanent molars in Saudi Arabian population utilizing cone- beam com puted Tomo graphy," The Saudi Dental Journal, 2019; 31(4):481–6.

21. Plotino G., Tocci L., Grande N.M., Testarelli L., Messi neo-D., Ciotti M., Glassman G., D'Ambrosio F., Gambarini G. Symmetry of root and root canal morphology of maxillary and mandibular molars in a white population: a cone-beam computed tomography study in vivo. J. Endod. 2013; 39:1545–8

22. Felsypremila G., Vinoth Kumar T.S., Kanda swamy D. Anatomic symmetry of root and root canal morpho logy of posterior teeth in Indian subpopulation using cone beam computed tomography: a retrospective study. Eur. J. Dent. 2015; 9:500–7.

©2023 IJDSIR, All Rights Reserved