



ISSN: 0975-833X

Available online at <http://www.journalcra.com>

International Journal of Current Research
Vol. 11, Issue, 08, pp.6584-6586, August, 2019

DOI: <https://doi.org/10.24941/ijcr.36500.08.2019>

INTERNATIONAL JOURNAL
OF CURRENT RESEARCH

CASE REPORT

C-SHAPED CANAL –MANDIBULAR SECOND MOLAR RARE ANOMALY – A CASE REPORT

^{1,*}Dr. Choudhary Alka, ²Dr. Rajput Poonam, ³Dr. Sidhu S. Simran, ¹Dr. Gupta Rajeev and ¹Dr. Kaprate Tanmay

¹Department of Prosthodontics Crown and Bridge and Implantology, Himachal dental college Sundernagar, Himachal Pradesh, India

²Department of Periodontics, Himachal Dental College, Sundernagar, Himachal Pradesh, India

³Private Practitioner, Department of Orthodontics and Dentofacial Orthopaedics, Punjab, India

ARTICLE INFO

Article History:

Received 10th May, 2019

Received in revised form

12th June, 2019

Accepted 15th July, 2019

Published online 31st August, 2019

Key Words:

Shaped canal,
Mandibular molars,
Tooth anatomy.

*Corresponding author: Dr. Choudhary Alka

Copyright ©2019, Choudhary Alka et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Citation: Dr. Choudhary Alka, Dr. Rajput Poonam, Dr. Sidhu S. Simran, Dr. Gupta Rajeev and Dr. Kaprate Tanmay, 2019. "C-shaped canal –Mandibular Second Molar Rare Anomaly –A Case Report", *International Journal of Current Research*, 11, (08), 6584-6586.

ABSTRACT

Complexities of the root canal anatomy make it complex for dental practitioner to correctly diagnose. The c-shaped canal is one of the rare anatomic variation which is mostly seen in mandibular second molars because of the shape of the canal and root. A profound expertise of the tooth, root and root canal anatomy is essential for the success of the endodontic treatment. This case report presents a rare root canal system in a mandibular second molar tooth, a single root with a single canal. Shaped canals with varying configuration are commonly observed in single rooted mandibular second molars.

INTRODUCTION

A profound expertise of the tooth, root and root canal anatomy is essential for the success of the endodontic treatment (Jafarzadeh and Wu, 2007). It plays a vital role in the diagnosis and treatment planning. In depth, knowledge of the root and canal anatomy has endodontic (Vertucci, 1984) and anthropologic significance (Jerome, 1994; Manning, 1990; Tratman, 1950; Dahlberg, 1965; Walker, 1988). It is vital for dental practitioner to be well acknowledged with the discrepancy in root and root canal anatomy also to be well known with the distinguishing characteristics of various racial groups as it can facilitate in location of variation in tooth anatomy along with subsequent management. One of the rare anatomic variation is c shaped canal configuration. it is called so because of the shape of the root and root canal. The occurrence rate of c-shaped configuration is higher in mandibular second molars but can be seen in mandibular premolars, maxillary molars. There is no gender predilection. The first documented case of c-shaped was reported in 1979 by cooke and cox (Cooke, 1979). The peculiarity of c-shaped canal is that in lieu of having many distinct orifices, the pulp chamber is single and is ribbon shaped orifice with 180° arc or it can be more than 180°. C-shaped canal in manibular second molar start from the tip of the mesiolingual line angle and goes around buccally and usually terminate at the distal aspect of the pulp chamber. Wide range of root structure configuration can be seen below the orifice level.

Two types of variations can be seen in the configuration of c-shaped canal is, that it can have single ribbon shaped canal along the whole length of root (orifice to apex) or more than 3 canals below the orifice (Cohen and Burns, 2002). The Hertwig epithelial root sheath is responsible for the determination of number and shape of the roots (Jerome, 1994; Manning, 1990; Fan et al., 2004; Orban and Mueller, 1929). C-shaped canal is formed because of the failure of the fusion of buccal and Lingual root surface or it can be due to fusion of buccal and lingual aspect of the mesial and distal roots. Various classification are given to simplify diagnosis and management of c-shaped canals. Melton et al. in 1991 gave classification on the basis of cross sectional shape. Fam in 2004 gave anatomic and radiographic classification of the c-shaped canal. Vertucci type 1 canals were most frequently seen in these c-shaped molars (Cohen and Burns, 2002). Diagnosis of the c-shaped canal can be done with the help of the preoperative radiographs but may face difficult to locate c-shaped as it with conventional radiopgraps as they are 2-dimensional image of 3 d dimensional image same is supported by cooke and cox in their study which say it is difficult to diagnose the c-shaped canal with preoperative 2d radiographs (De Moor, 2002). But had (Haddad et al., 1999) different opinion. He stated that almost all preoperative radiographs show same characteristics so the R.V.G a 3 – dimensional diagnostic tool can be used for the diagnosis of the c-shaped canal as it can manipulate the captured image. Another way in which c-shaped canal can be located is by additional radiograph from 20° mesial and diatal projection.

Once found, it is difficult for the clinician to deride,oburate the canal because of the vague anatomy as it is not clear whether the canal is continuous from floor of pulp chamber to apical third of the root. The purpose of this case report is to report the c shaped canal in single rooted mandibular second molar that required endodontic therapy.

CASE REPORT

A 47 year old female reported to the Department of Prosthodontics, crown and bridge in Himachal dental college Sundernager with pain in relation to her mandibular left second molar, with non contributing medical history. The tooth on clinical examination revealed a deep carious lesion. It was revealed that tooth responded positively to percussion but not on palpation. Intraoral periapical radiograph showed radiolucency in the crown involving the pulp suggesting of a pulpal involvement but no periapical infection. The root canal morphology confirmed the presence of a single root with a linear canal, constricting toward the apex with slight inter-radicular changes that were appreciable. A detailed examination of the radiograph revealed the presence of a single root with a wide canal. Therefore, C-shaped canal configuration was anticipated as seen in figure 1. Clinical and radio graphical examination revealed irreversible pulpitis due to dental caries. After the administration of local anesthesia, the access cavity was prepared. The pulp chamber was irrigated with 5% sodium hypochlorite to debride the chamber fully and to identify the nature of the canal system present. In the present case, a single round orifice was located in the middle portion of the floor of the pulp chamber. Working length was determined using a profile (densply) and confirmed by the radiographs (Figure 2).

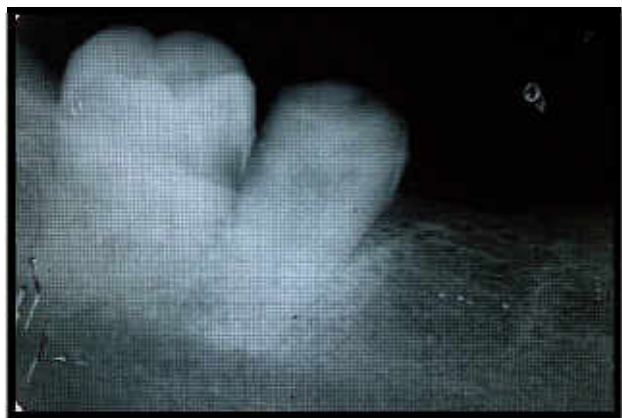


Figure 1. Preoperative radiograph



Figure 2. Radiograph with BMP

Cleaning and shaping was done by crown down technique using pro-taper gold files in between the instrumentation, thorough irrigation with sodium hypochlorite and saline was done throughout the procedure. Gutta percha (GP) Pro –Taper was selected as a master apical cone to obtain apical tug back. The canal was then obturated with AH-Plus sealer. A post obturation radiograph showed a well-obturated canal (Figure 3).



Figure 3. Radiograph With Gutta Percha

DISCUSSION

C-shaped configuration shows an indigenous predilection and most commonly seen in Asian continent. Predilection of c-shaped canal in East Asian population is more than south Asian countries. In East Asian population occurrence rate in Chinese is 0.6-41.2% and Koreans is 31.3-45.5% (Haddad *et al.*, 1999; Yang *et al.*, 1988; Seo *et al.*, 2004; Jin *et al.*, 2006; Zhang *et al.*, 2011; Zheng *et al.*, 2011; Wang *et al.*, 2012; Yu *et al.*, 2012; Kuzekanani *et al.*, 2012). whereas in south Asian countries such as Burmese showed 22.4% occurrence which is much higher than Indian, Thai or Sri Lankan population (Gulabivala *et al.*, 2001 & 2002; Peiris *et al.*, 2007 & 2008; Neelakantan *et al.*, 2010; Velmurugan *et al.*, 2009; Weine *et al.*, 1988). Out of the west Asian population groups Iranian, Jordanian, Saudi Arabian and Lebanese. The Lebanese has documented higher incidence rate around 19.1%.lowest occurrence rate of c-shaped canal is seen in Sudanese population (10%). C–canal configuration have high incidence rate in mandibular second molars (2.7%-45.5%) then in mandibular premolars (29.7%)seen in Chinese, Iranian population, less incidence rate of c-shape canal is seen in maxillary first molars (0.12%), maxillary third molars (4.7%), mandibular third molars(3.5%-4%) and mandibular second premolars (1%). There is no gender predilection and no correlation with tooth position and age of the occurrence of c shaped canal configuration. In literature bilateral c –shaped canals are reported in 70-81% cases. The diagnosis of the c-shaped canal is difficult because it doesn't show any characteristic feature for identification, in some cases longitudinal groove on buccal and lingual surface may be present which may be the first indication of c-shaped canal. Presence of canal irregularities such as lateral canals, accessory canals, apical canals make it more difficult to debride the canal completely and additional wide fins and wide surface area can impede the Proper use of hand instruments for cleaning and shaping properly and can eventually lead to endodontic therapy failure. Thus it is very essential to diagnose and locate the canal through thorough understanding of the anatomy of the root canal. Endodontic surgical microscopes

are helpful supplemental tool which may disclose the c-shaped canal and help to manage c-shaped canal complexity.

Financial support and sponsorship: Nil.

Conflicts of interest: There are no conflicts of interest

REFERENCES

- Jafarzadeh H, Wu YN. The C-shaped root canal configuration: A review. *Endod.*, 2007; 33:517-23.
- Vertucci FJ. 1984. Root canal anatomy of the human permanent teeth. *Oral Surg Oral Med Oral Pathol.*, 58:589-99.
- Jerome CE. 1994. C-shaped root canal systems: diagnosis, treatment, and restoration. *Gen Dent.*, 42:424-7.
- Manning SA. 1990. Root canal anatomy of mandibular second molars. Part II. C-shaped canals. *Int Endod J.*, 23:40-5.
- Tratman EK. 1950. A comparison of the teeth of people Indo-European racial stock with the mongoloid racial stock. *Dent Rec.*, 70:31-53.
- Dahlberg A. 1965. Geographic distribution and origin of dentitions. *Int Dent J.*, 15:348-55.
- Walker RT. 1988. Root form and canal anatomy of mandibular second molars in a southern Chinese population. *J Endod.*, 14:325-9
- Cooke HG 3rd, Cox FL. 1979. C-shaped canal configurations in mandibular molars. *J Am Dent Assoc.*, 99:836-9.
- Cohen S, Burns RC. 2002. Pathways of the pulp. 8th ed. St. Louis: Mosby, 196-229
- Fan B, Cheung GS, Fan M, Gutmann JL, Fan W. 2004. C-shaped canal system in mandibular second molars: Part II- Radiographic features. *J Endod.*, 30:904-8
- Orban B, Mueller E. 1929. The development of bifurcation of multirrooted teeth. *J Am Dent Assoc.*, 16:297-319
- Melton DC, Krell KV, Fuller MW. 1991. Anatomical and histological features of C-shaped canals in mandibular second molars. *J Endod.*, 17:384-8.
- Fan B, Cheung GS, Fan M, Gutmann JL, Bian Z. 2004. C-shaped canal system in mandibular second molars: Part I- Anatomical features. *J Endod.*, 30:899-903.
- De Moor RJ. 2002. C-shaped root canal configuration in maxillary first molars. *Int Endod J.*, 35:200-8.
- Haddad GY, Nehme WB, Ounsi HF. 1999. Diagnosis, classification, and frequency of C-shaped canals in mandibular second molars in the Lebanese population. *J Endod.*, 25:268-71
- Yang ZP, Yang SF, Lin YC, Shay JC, Chi CY. 1988. C-shaped root canals in mandibular second molars in a Chinese population. *Endod Dent Traumatol.*, 4:160-3. [PubMed] [Google Scholar]
- Seo MS, Park DS. 2004. C-shaped root canals of mandibular second molars in a Korean population: Clinical observation and in vitro analysis. *Int Endod J.*, 37:139-44. [PubMed] [Google Scholar]
- Jin GC, Lee SJ, Roh BD. 2006. Anatomical study of C-shaped canals in mandibular second molars by analysis of computed tomography. *J Endod.*, 32:10-3. [PubMed] [Google Scholar]
- Zhang R, Wang H, Tian YY, Yu X, Hu T, Dummer PM. 2011. Use of cone-beam computed tomography to evaluate root and canal morphology of mandibular molars in Chinese individuals. *Int Endod J.*, 44:990-9. [PubMed] [Google Scholar]
- Zheng Q, Zhang L, Zhou X, Wang Q, Wang Y, Tang L, et al. 2011. C-shaped root canal system in mandibular second molars in a Chinese population evaluated by cone beam computed tomography. *Int Endod J.*, 44:857-62. [PubMed] [Google Scholar]
- Wang Y, Guo J, Yang HB, Han X, Yu Y. 2012. Incidence of C-shaped root canal systems in mandibular second molars in the native Chinese population by analysis of clinical methods. *Int J Oral Sci.*, 4:161-5. [PMC free article] [PubMed] [Google Scholar]
- Yu X, Guo B, Li KZ, Zhang R, Tian YY, Wang H, et al. 2012. Cone-beam computed tomography study of root and canal morphology of mandibular premolars in a western Chinese population. *BMC Med Imaging*, 12:18. [PMC free article] [PubMed] [Google Scholar]
- Kuzekanani M, Haghani J, Nosrati H. 2012. Root and canal morphology of mandibular third molars in an Iranian population. *J Dent Res Dent Clin Dent Prospects*, 6:85-8. [PMC free article] [PubMed] [Google Scholar]
- Gulabivala K, Aung TH, Alavi A, Ng YL. 2001. Root and canal morphology of Burmese mandibular molars. *Int Endod J.*, 34:359-70. [PubMed] [Google Scholar]
- Gulabivala K, Opasanon A, Ng YL, Alavi A. 2002. Root and canal morphology of Thai mandibular molars. *Int Endod J.*, 35:56-62. [PubMed] [Google Scholar]
- Peiris R, Takahashi M, Sasaki K, Kanazawa E. 2007. Root and canal morphology of permanent mandibular molars in a Sri Lankan population. *Odontology*, 95:16-23. [PubMed] [Google Scholar]
- Peiris HR, Pitakotuwage TN, Takahashi M, Sasaki K, Kanazawa E. 2008. Root canal morphology of mandibular permanent molars at different ages. *Int Endod J.*, 41:828-35. [PubMed] [Google Scholar]
- Neelakantan P, Subbarao C, Subbarao CV, Ravindranath M. 2010. Root and canal morphology of mandibular second molars in an Indian population. *J Endod.*, 36:1319-22. [PubMed] [Google Scholar]
- Velmurugan N, Sandhya R. 2009. Root canal morphology of mandibular first premolars in an Indian population: A laboratory study. *Int Endod J.*, 42:54-8. [PubMed] [Google Scholar]
- Weine FS, Pasiewicz RA, Rice RT. 1988. Canal configuration of the mandibular second molar using a clinically oriented in vitro method. *J Endod.*, 14:207-13. [PubMed] [Google Scholar].
