

MORPHOLOGIC ABERRATIONS OF MANDIBULAR CANINE- TWO ROOT CANALS: CASE REPORT

Running title: Mandibular canine with 2 root canals

**Paramasivam Vivekanandhan¹, Sahithi Reddy², Newbegin Selvakumar Gold
Pearlin Mary³, Balasubramaniam Anuradha⁴**

¹M.D.S, Professor, ²B.D.S., third year pg student, ^{3,4}M.D.S, Reader, Department of Conservative Dentistry and Endodontics, Sree Balaji Dental College and Hospital, Bharath Institute of Higher Education and Research, Narayanapuram, Pallikaranai, Chennai -600100. Tamilnadu, India.

Corresponding Author:

Dr. Sahithi Reddy, B.D.S., third year pg student.

Address:

Department of Conservative Dentistry and Endodontics,
Sree Balaji Dental College and Hospital,
Bharath Institute of Higher Education and Research,
Narayanapuram, Pallikaranai, Chennai -600100.
Tamilnadu, India.

ABSTRACT

The morphologic aberrations of root canals include bifurcation and trifurcation of canals which makes it difficult to diagnose and manage. The difficulty in identifying and treating such aberrations make it more prone to re-infection and persistence of infection in the root canal. Therefore the clinician should know the various morphologic aberrations occurring in the tooth before starting the treatment. The present case report is made to provide a clinical insight of one such variation. The case presents with mandibular left canine with 2 root canals and one root in a Vertucci type II canal morphology. The tooth was treated endodontically and successfully managed.

Keywords: Mandibular canine, two root canals, Vertucci classification, root canal morphology. .

INTRODUCTION

A good knowledge of root canal anatomy and its variations is essential for the success and predictability of endodontic treatment. Additionally proper armamentaria and knowledge about them helps in a quick and efficient treatment. Especially in teeth with extra roots and/or canals the inability to identify and treat may adversely affect endodontic procedures. The clinician should be aware of the complex root canal system and should know how to identify the variations ⁽¹⁾. Mandibular canines are known to have one root and one root canal in the majority of the people. But it has been reported that 3.2% of mandibular canines have two canals with one foramina (Vertucci type II) based on a CBCT study on Indian population ⁽²⁾. The incidence can be as high as 15% ⁽³⁻⁵⁾. Various morphologic studies have reinstated the occurrence of extra canals in mandibular canines in different population groups ⁽⁶⁻⁸⁾. Following case report describes endodontic management of right mandibular canine with two root canals.

CASE REPORT

A 58-year-old female patient reported with a chief complaint of pain in the lower left front tooth since 3 months. Pain was gnawing and aggravated on chewing. On intraoral examination, there previously restored tooth with a secondary carious exposure of the pulp and was tender to percussion. A provisional diagnosis of irreversible pulpitis with periapical abscess was made. Radiographic evaluation of the involved tooth (# 33) revealed outlines of two canals [Figure 1a]. Access preparation was made in the left mandibular canine and two orifices were located (buccal and lingual) with the help of operating microscope and careful manual exploration [Figure 1b]. With size 10 K-file negotiation was done and working length was determined by electronic apex locator and confirmed with radiograph [Figure 1c]. Both the canals were prepared using hand K-file till size 20 followed by NeoEndo file (Orikam, India) till 25, 0.06. During preparation, the canals were lubricated and irrigated with EDTA and 2.5% NaOCl. Calcium hydroxide dressing was placed in the canals and temporary restoration was done [figure 1d]. After two weeks, the canals were coated with AH plus sealer and obturated in the lateral Compaction technique and the tooth was restored with composite resin [Figure 1e, 1f]. A follow up was done after 12 months and peri-apical lesion shows healing [Figure 1g].

DISCUSSION

The general perception that a given tooth will contain a specific number of roots and/or canals should be rewritten based on the research material and also it should be understood that the variations in tooth morphology are common. Mandibular canine is one such tooth which has a great incidence of having extra root canals and many investigators have reported it⁽²⁻⁸⁾ (Table 1). In a study by Sikri and Kumar⁽⁹⁾ by decalcification and clearing of permanent human mandibular canines, they have observed Vertucci canal configuration Type I in 70% , Type II in 12%, Type III in 6%, Type IV in 10% and Type V in 2% of the total teeth. , straight canals in 60.71%, curved canals in 46, apical foramen centrally located in 57.14%, and apical foramen laterally located in 42.85%. The varied canal morphology can be understood with knowledge of the development and root formation. The aberrations that occur during root development are known to have genetic and racial predilection. The incidence of Vertucci type II canal configurations vary based on the population.

Mandibular canines presenting with two canals need modifications in the access preparation to preserve the tooth structure. In the present case, the carious lesion was on the mesial aspect so the access preparation was made in bucco-mesial aspect to obtain straight line access without excess removal of tooth structure. The present case report also describes management of type II vertucci canal configuration. The challenge with such canal morphology is that the two canals merge making it difficult to reach and remove necrotic pulp from the canal. Hence, the coronal pulpal tissue was removed with hand instruments as possible and a crown down approach is used⁽¹⁰⁾. There is also a high chance of instrument separation at the junction of the canals⁽¹¹⁾, therefore gold treated NiTi instruments are used. During obturation the main canal (straighter canal- buccal) is obturated first and the second canal (lingual) was obturated later to the point of confluence⁽¹²⁾.

CONCLUSION

The basics of endodontic therapy begin with appropriate diagnosis and treatment plan. Proper knowledge of root canal system is of great importance in treatment planning. With the advent of advanced microscope and NiTi file system, detection of aberrant anatomical variation is rather a norm than an exception.

SOURCE OF FUNDING: Nil

ETHICAL CLEARANCE: Not required

CONFLICT OF INTEREST: Nil

REFERENCES

- 1) Cohen S, Berman LH, Blanco L, Bakland L, Kim JS. A demographic analysis of vertical root fractures. *Journal of endodontics*. 2006 Dec 1;32(12):1160-3.
- 2) Amardeep NS, Raghu S, Natanasabapathy V. Root canal morphology of permanent maxillary and mandibular canines in Indian population using cone beam computed tomography. *Anatomy Research International*. 2014;2014.
- 3) Pineda F, Kuttler Y. Mesiodistal and buccolingual roentgenographic investigation of 7,275 root canals. *Oral Surgery, Oral Medicine, Oral Pathology*. 1972 Jan 1;33(1):101-10.
- 4) Vertucci FJ. Root canal anatomy of the human permanent teeth. *Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology*. 1984 Nov 1;58(5):589-99.
- 5) Sert S, Bayirli GS. Evaluation of the root canal configurations of the mandibular and maxillary permanent teeth by gender in the Turkish population. *Journal of endodontics*. 2004 Jun 1;30(6):391-8.
- 6) Çalışkan MK, Pehlivan Y, Sepetçioğlu F, Türkün M, Tuncer SŞ. Root canal morphology of human permanent teeth in a Turkish population. *Journal of endodontics*. 1995 Apr 1;21(4):200-4.
- 7) Pécora JD, Sousa Neto MD, Saquy PC. Internal anatomy, direction and number of roots and size of human mandibular canines. *Braz dent J*. 1993 Jan;4(1):53-7.
- 8) 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 Journal of dental research*. 2013 Mar 1;24(2):234.
- 9) Sikri VK, Kumar V. Permanent human canines: configuration and deviations of root canals: an in-vitro study. *Journal of Conservative Dentistry*. 2003 Oct 1;6(4):151.
- 10) Warren RK. Endodontic management of the mandibular second molar. *Dentistry today*. 2009 Feb;28(2):118-20.
- 11) Furri M, Tocchio C, Bonaccorso A, Tripi TR, Cantatore G. Apical canal confluency in mandibular molars. *Endodontic Practice Today*. 2007 Mar 1;1(1).
- 12) Castellucci A. Two canals in a single root: clinical and practical considerations. *Endodontic Practice*. 2001 Feb:17-23.

TABLES AND FIGURES

Table 1: Incidence of vertucci type II canal morphology in permanent mandibular canine in various populations.

Investigator	Year	Ethnicity	Incidence
PINEDA ⁽³⁾	1972	Hispanic	14%
VERTUCCI ⁽⁴⁾	1978	Caucasians	13.5%
SERT ⁽⁵⁾	2004	Turkish	9 to 22%
CALISCAN ⁽⁶⁾	1995	Turkish	3.92%
PECORA ⁽⁷⁾	1993	Brazil	4.9%
NIKITHA ⁽²⁾	2014	Indian	3.2%
RAHIMI ⁽⁸⁾	2013	Iranian	6.1%

Figure 1:(a): pre-operative radiograph, (b): orifice location (buccal and lingual), (c): working length determination, (d): calcium hydroxide dressing, (e): master cone, (f): obturation and post endo restoration, (g): follow-up radiograph.

