

Mandibular Canine with Type II Canal Configuration under Endodontic Management: A Case Study

Anil K. Tomer¹, Swati Saurabh^{2*}, Geetika Sabharwal³, Ayan Guin⁴

¹Professor, Department of Conservative Dentistry and Endodontics, Divya Jyoti College of Dental Sciences and Research, Modinagar, India

^{2,3,4}Postgraduate Student, Department of Conservative Dentistry and Endodontics, Divya Jyoti College of Dental Sciences and Research, Modinagar, India

Abstract: Typically, mandibular canines have just one root and one canal. With a 15% prevalence, the occurrence of two canals linking to one foramen is a rare phenomenon. Correct diagnosis, meticulous cleaning, shape, and three-dimensional obturation are essential components of a successful endodontic procedure. It also relies on how well-versed in managing abnormal anatomy the clinician is. Post endodontic issues come from failure to accomplish this. A case study of a bilateral mandibular canine with two root canals that merge into one canal and one foramen is shown in this publication.

Keywords: Mandibular canine, Vertucci type II canal configuration, Endodontic treatment.

1. Introduction

The goal of successful endodontic treatment is the eradication of infection from the root canal system and the avoidance of reinfection [1]. One of the main causes of root canal therapy failing is a lack of understanding of the anatomy of the pulp cavity and failure to completely navigate and obturate the canals. The dentist must take into account the tooth's anatomy before beginning the procedure to prevent these failures [2].

Vertucci's classification of root canal configurations states that there are different types of tooth anatomy in human permanent teeth, ranging from a single canal to three distinct canals. Numerous studies have examined the morphology of pulp, which has revealed a wide range of shapes and the presence of two or three canals in a single root. Fins that run longitudinally within the canal walls are more common in single root teeth, which may be due to many root canals [3].

Most people's mandibular canines are known to have one root and one root canal. However, a CBCT research on an Indian population found that 3.2% of mandibular canines have two canals and one foramen (Vertucci type II) [4]. Numerous researchers have reported the anatomical changes linked to permanent mandibular canine. According to Pineda and Kuttler, Green and Vertucci, 15% of mandibular canines have one root and two root canals. At the same period, up to 5% of mandibular canines were said to have two roots and two canals [5].

2. Case Report

A 48 years old female came to the department of conservative Dentistry and endodontics with chief complain of broken tooth in her lower right anterior tooth region. On Oral examination attrition in relation to #43. There was no tender on percussion. The buccal and lingual mucosa was normal. There was no intra or extraoral swelling/sinus present. Intraoral periapical radiograph revealed pdl widening and radiolucency in periapical area in relation to #43. Final diagnosis was suggestive of Apical Periodontitis with periapical abscess and root canal treatment was initiated.

A 2% lignocaine hydrochloride solution with 1:80000 adrenaline was used to anaesthetize the tooth. Straight-line access to the pulp chamber was made possible after local anaesthetic. One in the lingual and one in the buccal root canals were found. The root canals' working lengths were measured using the apex locator and confirmed with a radiograph, which showed two canals and one apical foramen (Fig. 1). Using Protaper Gold Files(F2) (Dentsply) and 5% sodium hypochlorite irrigation, cleaning and shaping were done from the crown down. The canals were kept open with a 10 K file after achieving patency (Dentsply Maillefer, Ballaigues, Switzerland). The Ca(OH)₂ dressing were placed in the canals and the patient was called after 1 week. After a week, the patient had no symptoms, so the canals were irrigated with 3% NaOCl and saline and dried with paper points. The AH Plus (Dentsply De Trey, Konstanz, Germany) sealer and gutta-percha were used to complete the root canal filling utilising the cold lateral compaction technique (Dentsply Maillefer, Ballaigues, Switzerland). Composite resin was subsequently used to repair the tooth. The two major canals were fully filled on a postoperative periapical radiograph (Fig. 3). After finishing the endodontic procedure on the right mandibular canine, the patient, who had no overt symptoms or indicators.

*Corresponding author: swatisaurabh22@gmail.com



Fig. 1. Working length determination



Fig. 2. Master cone

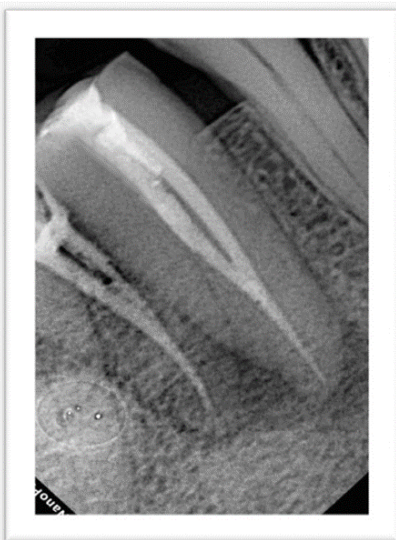


Fig. 3. Post operative radiograph

3. Discussion

Endodontic success in teeth with differences in the number and form of canals can be anticipated with a clear diagnosis and

rigorous clinical and radiographic assessment. Understanding the intricate root canal anatomy in depth is essential for success. Prior to receiving endodontic treatment, a thorough radiographic assessment is crucial. An additional canal can be found during endodontic research utilising magnifying instruments like a dental operating microscope. The primary cause of endodontic failure is the failure to detect new root canals [6]. Mandibular canines typically have a single root and a single canal, but there have been reports of variations in the number of roots and root canals.

Vertucci canal configuration Type I was found in 70%, Type II in 12%, Type III in 6%, Type IV in 10%, and Type V in 2% of the total teeth in a study by Sikri and Kumar [7]. Other findings included straight canals in 60.71%, curved canals in 46, apical foramen centrally located in 57.14%, and apical foramen laterally located in 42.85%.

In order to assess teeth before beginning root canal therapy, endodontists frequently employ conventional radiographs as one of their key tools. To find any morphological changes in teeth, periapical radiographs taken from various angles are required. In contrast to traditional computed tomography scans, however, CBCT has the ability to deliver images with good diagnostic quality while having shorter scanning periods and lower dosages. It is a practical tool for endodontic practise that uses non-invasive 3D reconstruction imaging [8].

4. Conclusion

The proper diagnosis and treatment strategy are the foundational elements of endodontic therapy. A thorough understanding of the root canal system is crucial for treatment planning. With the development of sophisticated microscopes and the NiTi file system, finding abnormal anatomical variations has become more common than unusual.

References

- [1] Sjogren U, Hagglund B, Sundqvist G, Wing K. Factors affecting the long-term results of endodontic treatment. *J Endod* 1990;16:498-504.
- [2] Ingle JI, Simon JH, Machtou P, Bogaerts P. Outcome of endodontic treatment and re treatment. In: Ingle JI, Bakland LK, editors. *Endodontics*. 5th ed. Hamilton, Ontario (Canada): B.C. Decker; 2002. pp. 747-753
- [3] V. K. Ashwath et al., Endodontic management of mandibular canine with type two canal configuration: A case report. *International Journal of Applied Dental Sciences* 2020; 6(1):233-235.
- [4] Amardeep N. S., 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.
- [5] Pécora J. D., Sousa Neto M.D, Saquy P.C., Internal anatomy, direction and number of roots and size of human mandibular canines. *Braz Dent J* 1993;4:53-57.
- [6] Haapasalo M., Udnaes T., Endal U., Persistent, recurrent, and acquired infection of the root canal system post treatment. *Endod Topics*. 2003; 6:29-56.
- [7] Sikri V, Kumar V. Permanent human canines: Configuration and deviations of root canals: An in-vitro study. *J Conserv Dent*. 2003; 6:151-152.
- [8] Yılmaz F., Kamburoglu K., Yeta N. Y., Öztan M.D., Cone beam computed tomography aided diagnosis and treatment of endodontic cases: Critical analysis. *World J Radiol* 2016;8:716-725.