International Journal of Current Advanced Research
ISSN: O: 2319-6475, ISSN: P: 2319-6505, Impact Factor: 6.614
Available Online at www.journalijcar.org
Volume 10; Issue 01 (A); January 2021; Page No.23566-23568
DOI: http://dx.doi.org/10.24327/ijcar.2021.23568.4669

Case Report

MANDIBULAR CANINE WITH THREE CANALS, A RARE ANATOMIC VARIATION: A CASE REPORT

Krishna P. Biswas[1]., Drishti[2]., Navin Mishra[3]., Priyankar Singh[4] and Isha Narang[5]

[1]Department of Dental and Oral Surgery Lady Hardinge Medical College Delhi, INDIA
[2]Department of Pedodontics and Preventive Dentistry University College of Medical Sciences, Delhi
[3]Division of Conservative Dentistry and Endodontics IGIMS Patna, Bihar
[4]Department of Dental and Oral Surgery IGIMS Patna, Bihar
[5] Endodontist HCMS Haryana

A R T I C L E I N F O

Article History:
Received 4th October, 2020
Received in revised form 25th November, 2020
Accepted 18th December, 2020
Published online 28th January, 2021

Key words:

Anatomic variation, Mandibular canine with three canals, Endodontic treatment, Gulabivala Classification, Sealapex sealer.

A B S T R A C T

A root canal treatment requires adequate knowledge and in depth understanding of the anatomy and different anatomic variation in the teeth. Failure of which can lead to questionable prognosis of the teeth. Generally there is a single canal with single root in mandibular canine. However, many of the researchers have investigated and suggested that the occurrence of mandibular canine with two canals is in the range of 13-22% [1-3], but there are very few literatures citing the evidence of mandibular canine with three canals joining into one foramina.

The following case report depicts the treatment of three rooted mandibular canine and its successful endodontic treatment.

INTRODUCTION

Mandibular canine generally has single canal with single root, however many at times it has two canals and may be three canals and therefore thorough understanding of root canal anatomy and adequate diagnostic aids is utmost necessary to execute the root canal therapy for better prognosis. Despite the high success rate of endodontic treatment, failures do occur in a large number of cases and most of the times can be attributed to inappropriate mechanical debridement, due to missed canal or due to presence of extra canal. Inappropriate access opening often leads to missing of canals by a primary dentist and henceforth it is always necessary to take Iopa x ray both in mesial and distal angulation. As the root canal anatomy is so complex it is always wise to have a perception to search for extra canals following the Laws of pulp chamber anatomy given by Krasner and Rankow.

Researchers conducted a study on 830 extracted human mandibular canines on the internal anatomy, size, direction and number of roots and summarized that 98.3% contains single root, 92.2% consists of one canal and one foramen, 4.9% have two canals one foramen and 1.2 % contain two canals two foramen[3,4].

Corresponding author:* **Drishti
Department of Pedodontics and Preventive Dentistry University College of Medical Sciences, Delhi

The occurrence of three root canals in mandibular canine is rare to be reported and this case report describes the successful management of the same.

Case Report

A 68 year old male patient came to the department of dentistry with chief complaint of pain in lower right mandibular front tooth region past few days. On further examination there was tender on percussion in right mandibular canine. Thermal and electric pulp test showed delayed response. A diagnostic radiograph taken and it did not reveal any periapical pathology, however there was an anatomical variation which could be seen (Fig .1).

Fig 1 Preoperative radiograph

Root canal therapy was initiated after administration of local anesthesia and rubber dam was placed. Access cavity was prepared using Endo Access bur and Endo-Z tapered safe end bur (Dentsply Maillefer, Switzerland). While careful exploration revealed three orifices with the aid of DG-16 endodontic explorer (Hu-Friedy, Chicago, IL, USA) and 10 k file (Fig .2). Working length was recorded with the help of apex locator and it was confirmed radiographically as well (Fig. 3).

Fig 2 Depiction of three canals after isolation and preflaring of orifice

Fig.3 Radiograph depicting determination of working length

The root canal configuration is based on the classification given by Gulabivala k et al. (2001) where in this case there were three canals at the orifice leaving the floor of pulp chamber and converging into one canal and exiting at a single apical foramen i.e. type I (3-1) configuration.

Fig 4 Post Obturation Radiograph

Biomechanical preparation was done with step down technique and irrigation was done with 5.25% sodium hypochlorite and saline alternatively and final irrigation was done with 17% EDTA to remove any smear layer after the preparation procedure. Once the canals were dried with paper points, the three canals were obturated with combination of lateral and vertical condensation using gutta percha and sealapex sealer (Kerr, Sybron endo) (Fig.4).

DISCUSSION

The objectives of root canal treatment are to induce a favorable environment for healing of peri radicular tissues by debriding the root canals of pulp tissue remnants, microorganisms and bacterial products prior to obturation (Seltzer 1988). To execute a proper root canal treatment, it is very essential to know the root canal anatomy and possible variation within the root canal system. Locating of extra canals requires different angulations with file placed inside the canal system[5,6]. One of the reasons for root canal failure is missing canal during root canal therapy[7]. Mandibular canines having one root with single canal are common, however, two root canals and in some extraordinary cases, there may be one or two roots with three root canals have been reported. The presence of multiple root canals interconnected by anastomoses and with aberrant configurations has been investigated and reported. Many researchers have reported incidence of multiple canals in anterior teeth (Pineda & Kuttler 1972, Bellizi & Hartwell 1983, Vertucci 1984,Seltzer 1988,Caliskan et al . 1955).

Due to complexity of root canal anatomy and the fact that many root canal configurations at present cannot be classified by Vertucci's classification therefore various researchers proposed newer classifications [(8-13)] .Gulabivala K et al.(2001), conducted research on mandibular molars in a Burmese population and had to add seven additional configurations to Vertucci's classification as: Type I to Type VII. These configurations consisted of 4 or 5 canals extending from the orifice. The presence of three canals in mandibular canine having single apical foramina (3-1) configuration i.e. Gulabivala (Type 1) is certainly rare and no author have reported till date and treating such kind of complex anatomy needs thorough knowledge of the anatomy of root canal.

CONCLUSION

Even though the anatomy of mandibular canine suggest that it is a uniradicular teeth with single canal, but the clinician shall always respect the anatomy by visualizing it both clinically and radio graphically so that the chances of missing canal decreases and the outcome of root canal therapy is successful. The purpose of this case report was to show the complex anatomy of mandibular canine with three canals joining in single foramina.

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How to cite this article:

Krishna P. Biswas *et al* (2021) 'Mandibular Canine with Three Canals, A Rare Anatomic Variation: A Case Report', *International Journal of Current Advanced Research,* 10(01), pp. 23566-23568.
DOI: http://dx.doi.org/10.24327/ijcar.2021.23566-23568

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