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PRESSENCE OF AN EXTRA ROOT IN MANDIBULAR SECOND MOLAR

Dr Bonny Paul[1], Dr Kavita Dube[2*], Dr Pallavi Sinha[3], Dr Charu Kapur[4]

[1,2,3,4]Hitkarini Dental College , Jabalpur

***Corresponding Author-** Dr Kavita Dube
*Email: drkdube@gmail.com

Abstract
An awareness and thorough knowledge of internal and external root canal morphology contribute to the successful root canal treatment. A mandibular second molar Radix Entomolaris (Additional lingual root) and Radix Paramolaris (Additional Buccal root) with two distal roots is an interesting example of anatomic variation. This paper describes a case report of mandibular second molar with three roots (one mesial and two distal) and four canals (two in mesial and one in each distobuccal and distolingual root). RE was identified with preoperative radiograph, modifying the access cavity preparation, locating the canals followed by cleaning, and shaping of canals with nickel-titanium instruments. Obturation was done with respective master cones and sealapex sealer.

Keywords: Endodontic treatment, mandibular second molar, anatomical variations, radix entomolaris, radix paramolaris, C shaped canals

Introduction

The goal of endodontic therapy is to create a three-dimensional, fluid-tight barrier by effectively removing all microbes from diseased root canals1. A good endodontic treatment requires a detailed understanding of the internal architecture of the teeth and its variations. A poor grasp of how the complexity of the root canal system varies might have an impact on the prognosis and ultimately lead to endodontic therapy failure.

The two roots of mandibular molars are typically mesial and distal. Typically, a root contains one or two canals. Nevertheless, there have also been reports of variations such as a single canal, two canals, three to five canals, and a C-shaped canal2.

Another variety documented in literature is the existence of an additional root, as noted by Carabelli in 1844 called as radix entomolaris if found lingually or if found facially called as radix paramolaris[3]. This root's prevalence is typically linked to specific geographic regions andethnic groupings.A close examination of the preoperative radiograph aids in our comprehension of the anatomical variances. This case study describes the treatment of a mandibular second molar with two roots and four separ ate canals. Cone beam computed tomography verified that the distal root canal bifurcated into two r oots. The prevalence of this root is usually associated with ethnic groups and geographical areas. Careful observation of preoperative radiograph helps us in understanding the anatomic variations.

The present case report is about management of a mandibular second molar with 2 roots and 4 independent canals, with the distal root canal bifurcating into 2 roots which was confirmed by Cone beam computed tomography.

Case Report

A 35 year old male patient reported to the department of conservative dentistry and endodontics with severe pain in his mandibular teeth on the left side. Pain used to increase on lying down and it was extremely sensitive to hot and cold food. A careful clinical examination revealed a deep carious lesion in his mandibular second molar on the left side. There was no presence of sinus tract or swelling. Slight pain on percussion was present. Radiographic examination revealed a deep carious lesion in the same tooth. Careful examination of radiograph revealed an additional root on the distal side.

A diagnosis of acute irreversible pulpitis with acute apical periodontitis was made and it was decided of carry out endodontic treatment in lower left second molar. After an informed consent was taken, local anaesthesia was given. Access opening was done after application of rubber dam. Four independent orifices were located (two mesial two distal). A working length radiograph revealed 4 separate canals with 4 separate apical foramina (Fig 1). The working length was confirmed with an apex locater. Each of these canals were instrumented with rotary file system(K3 Sybron endo) to an apical size of 4% 25. The canals were irrigated alternately with 5 % sodium hypochlorite and saline. The canals were dried with paper points and a temporary dressing was placed. After a week the patient was recalled and was found to be asymptomatic. A master cone radiograph (Fig 2) was taken and obturation was carried out with gutta percha cones and seal apex sealer (Sybron endo) using lateral condensation technique. A radiograph was taken to evaluate the obturation. (Fig 3)

CBCT revealed two separate roots one mesial and one distal. The distal root showed bifurcation in the apical third (Fig 4) with two separate apical foramina similar to the findings of the post obturation radiograph.

Fig 1

Fig 2

Fig 3

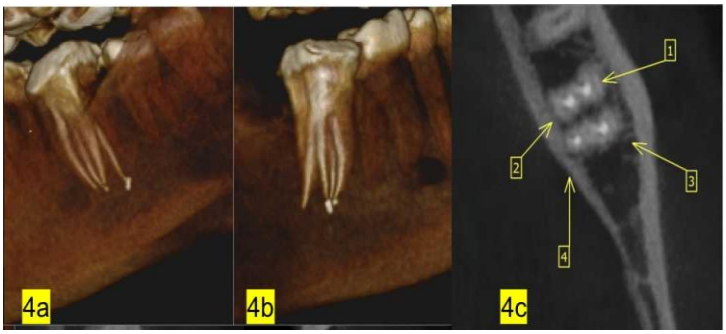

Fig 4

Discussion

First and second mandibular molars typically have three canals and two roots, the distal and mesial. In certain instances, there may also be a third root, which is typically lingual. First identified as radix entomolaris (RE) by Bolk5 in 1915, this additional root was first noted by Carabelli in 1844.[4]Usually shorter and slightly bent than other roots, this root might be autonomous or connected to others. Re's curvature in buccolingual orientation led to a classification into three categories. A type 1 root canal is referred to as a straight root. A type III root canal has a curvature in the coronal third, followed by a second curve after the original curvature, while a type II root canal has a straight root that continues after the initial curvature.

A type III root canal has a second curve that extends from the middle third to the apical third, while a type II root canal has an initial curvature that continues a straight root. Three types of radiographic classifications for RE were proposed by Wang et al. (2007). The image of Type I was the most recognizable. To identify Type II, a sizable beam has to be mesially or distally angular. Because the adjacent distobuccal root of type III overlapped, identification was challenging.

The development of an auxiliary root has been linked to several etiological variables. Usually, they appear as a result of any metabolic issues that arise during root formation[8]. A mature root of a regular length can be distinguished from an accessory root by its short conical root extension3. An atavistic gene or polygenic system's penetration may also be connected to an atypical lower molar morphology[3,9] A situation known as atavism occurs when a trait reemerges after going extinct for multiple generations.

Sheath disruptions in Hertwig's epithelial root system may also be connected to the production of accessory roots (Hers). Folding the Hers produces a separate root, while dividing the Hers produces two roots that are similar[10]. They could be primitive roots or fully formed ones. They may occasionally be split off following a bifurcation or joined to other roots. Mandibular molar roots taken from Indian skulls were examined by Onda et al. (2011). Teeth with extra roots were defined as having all additional roots, whether they were fused or independent. Bifurcations were further divided into cervical, intermediate, and apical categories. Lastly, whether they are fused or detached, all root bifurcations with their own root canals were identified as additional roots.

Bifurcations were further divided into cervical, intermediate, and apical categories. Ultimately, whether they are fused or divided, all root bifurcations with separate root canals were identified as additional roots. The distal root in this instance also had two channels. The radiography image appeared to show a second root farther away with a different pdl contour. But the Cbct image unmistakably displayed a single distal root with two distinct canals leaving at different times. Additionally, the distal root split into two distinct root apices close to the apical third.

This resembled the examples that Peiris et al. observed in certain ways. He looked closely at a mandibular second tooth that had been extracted and had four roots—two mesial and two distal. While the distal divided in the middle third, the mesial root bifurcated close to the cervical one third. However, in our instance, the apical third was not where the distal root divided.

In their examination of the root canal morphology of 345 mandibular second molars in the Indian population, Prasanna Neelakantan et al. (2013) found that just 8.98% of the teeth had three roots. But in all three of these rooted teeth, the distal root was single, whereas the mesially located two roots. The incidence of three-rooted second molars was also more common than in the populations of Thai and White people.

In order to determine the prevalence of three rooted mandibular permanent first and second molars in the Saudi population, Abdullah Mahmoud Riyahi etal14 conducted a study. A CBCT of 379 Saudi patients receiving standard dental care was evaluated. In mandibular second molars, the incidence of additional roots was 3.04% in male patients and 1.81% in female patients, for a total prevalence of 1.48%.

The teeth with the lowest frequency of RE are the mandibular second molars, which range from 0 to 1.3%. An alteration in the occlusal anatomy was occasionally linked to the existence of an additional root. The number of mandibular first molars with additional roots showed an increase in tubercles. In their investigation of radix entomolaris in mandibular first and second molars utilizing cbct, Suayip Burak Duman et al. (2015) discovered an extra tubercle in 23 percent of teeth with RE. According to Sperber et al., 20% of molars with an extra root also had an extra cusp between the two lingual roots, which may indicate the possibility of a distolingual root. In their investigation, they also discovered that all molars with an extra cusp had an extra root.[14]

In accordance to several studies aforementioned, it is doubtful if an additional tubercle is present on the mandibular first molars, indicating the presence of an extra root. Additionally, the contralateral tooth should be thoroughly examined because there is a good chance that both teeth would exhibit this variance, which would enable us to identify the presence of the extra root.[15]

Because of their overlap with other roots, third roots are difficult to find on two-dimensional radiographs. CBCT offers a three-dimensional picture with excellent resolution that is helpful for evaluating anatomical changes in vivo. They assist us in enhancing the results of endodontic therapy.

Conclusion

A clinician should always be aware of how crucial it is to comprehend the structural differences in the root canal system. There is always a chance that a mandibular second molar has three roots. Because digital and conventional radiographs only show one dimension of a three-dimensional root canal system, they are limited in scope. High magnification combined with lighting and CT scanning are effective methods for diagnosing and comprehending root canal anatomical aberrations, which in turn increases the likelihood that endodontic treatment will be successful.

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