Mandibular lateral incisor with Vertucci Type IV root canal morphological system: A rare case report

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Abstract

Abnormalities in the root canal anatomy are commonly occurring phenomenon. A thorough knowledge of root canal anatomy and its variation is necessary for successful completion of endodontic treatment. Mandibular anteriors are known for having extra canals. The role of genetics and racial variations may result in difference of incidence of root number and canal number. This paper attempts at explaining a rare case of successful endodontic management of two-rooted lateral incisor with awareness of data pertaining to number of canals, knowledge of canal morphology, correct radiographic interpretation, and tactile examination of canal wall which are important in detecting the presence of multiple canals.

Key words: Anatomy, endodontics, mandibular, two root canals

INTRODUCTION

A complete knowledge of the root canal anatomy and its variations of human teeth becomes an essential prerequisite to achieving the objectives of access, thorough cleaning, disinfection, and three-dimensional obturation of the pulp space. Variations in the form of aberrant canal configurations, accessory canals, bifurcation, isthmuses, and anastomoses are often difficult to identify, thus creating a problem for endodontic
treatment. Failure to recognize and treat an extra canal might provide a constant source of irritation, thereby compromising the long-term success of the root canal therapy. Vertucci has classified morphological patterns of the root canal systems into eight types. In general, the mandibular incisors have one root canal with one apical foramen (Vertucci Type I) or two root canals with one apical foramen (Vertucci Type II). However, the occurrence of two root canals with two separate foramina (Vertucci Type IV) in the mandibular incisors is very rare viz., 3% and 2% in the mandibular central incisors and lateral incisors, respectively, and in canines, it is 6%. We hereby report a very rare case of successful endodontic treatment of a mandibular lateral incisor having Vertucci Type IV root canal morphological system.

CASE REPORT

A 30-year-old female patient reported to the Department of Conservative Dentistry and Endodontics with the chief complaint of moderate pain in the lower front tooth since past 20 days. The medical history was noncontributory. The clinical examination revealed tenderness on percussion; and no response to thermal and electrical pulp sensitivity tests. Preoperative radiographic examination revealed two roots with two canals [Figure 1]. The diagnosis of pulpal necrosis with chronic apical periodontitis of the mandibular lateral incisor was made. The radiographs revealed bifurcation at the level of middle third of root suggesting two roots with two canals having Type IV configuration according to Vertucci. Root canal treatment was indicated.

Endodontic intervention

Under local anesthesia administration and rubber dam isolation, access was gained with number four round bur (SS White Burs, Inc., Lakewood, New Jersey, USA) in air turbine handpiece (NSK, Chicago, IL, USA). Entry was made into the pulp chamber, and access cavity was modified to an oval shape. Both canals were negotiated with 10 k-file (Dentsply, York, PA, USA). Subsequent to copious irrigation with 5.25% sodium hypochlorite (KMC Pharmacy, Manipal, India), 15 k-file (Dentsply, York, PA, USA) was used with watch winding motion to create a glide path for both canals. Working length radiograph was made [Figure 2]. Canals were sequentially irrigated using 5.25% sodium hypochlorite (KMC Pharmacy, Manipal, India) and 17% ethylenediaminetetraacetic acid (EDTA) (Ultradent Products Inc., South Jordan, UT, USA) during cleaning and shaping procedure. Biomechanical preparation was done, and calcium hydroxide (Ultracal XS, Ultradent, South Jordan, UT, USA) intracanal medicament was placed inside the canal. In next appointment, canals were cleaned once again with 5.25% sodium hypochlorite and 17% EDTA and normal saline. The canals were thoroughly dried and master cone was inserted [Figure 3] and obturation was done using standardized Gutta-percha (Dentsply, York, PA, USA) and a zinc oxide eugenol sealer (Kemdent, Associated Dental Products Ltd., Wiltshire, UK). Occlusal access opening was temporized with Cavit G (3M ESPE, Seefeld, Germany) and final radiograph was made [Figure 4]. The patient was reviewed for 1-week, and postendodontic permanent restoration was completed with composite resin (3M ESPE Dental Products, St. Paul, MN, USA).

DISCUSSION

The success of endodontic treatment depends on the thorough knowledge about root canal morphology and its possible anatomical variations. Ignorance of internal tooth anatomy leads to the failure of endodontic treatment because of lack of proper cleansing and sealing. Many of the problems encountered during endodontic treatment occur because of an inadequate understanding of the pulp

Figure 1: Preoperative intraoral periapical radiograph of the right mandibular lateral incisor showing two roots with two root canals with bifurcation at the middle third of the root

Figure 2: The radiograph for working length determination
The precise identification of the internal anatomy is the primary step in root canal treatment. A complex root canal anatomy requires modifications in the access cavity.[1]

The mandibular anterior teeth are not frequently cariously involved, but there are many situations where these teeth require endodontic treatment. It was first believed that mandibular incisors generally have only one root canal. However, studies have revealed high variation of root canal morphology among mandibular anterior teeth.[8] Existing literature reveals that 11-68% of mandibular incisors possess two canals, although in a number of cases, the canals merge into one in the apical 1-3 mm of the root.[9-12] Vertucci[10] in his study on root canal morphology of 300 mandibular anterior teeth observed a second canal in 27.5% of mandibular incisors. In a similar study, Miyashita et al.[13] observed that 12.4% of mandibular incisors contained two canals; however, only 3% had two foramina. Mauger et al.[11] evaluated the canal morphology at different root levels in 100 mandibular incisors and reported that 98-100% of the teeth had one canal in the area 1-3 mm from the apex. Sert et al.[12] noted that two canals were present in 68% of mandibular central incisors.

In the present case, two roots and two canals with separate foramina were distinctly observed in the mandibular lateral incisor. Assessing the bifurcation in the middle third of the root was very important for successful root canal treatment. Thus, this case demonstrates that conventional root canal therapy can be an acceptable treatment modality for teeth with anatomical irregularities provided all canals are located, cleaned, disinfected, and filled adequately.

CONCLUSION

This case report highlights the importance of having a thorough knowledge of all possible root canal irregularities. The significance of preoperative assessment cannot be overstressed. Thus, it is imperative to treat any mandibular anterior tooth with thorough attentiveness.

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Conflicts of interest
There are no conflicts of interest.

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Abstract

A middle-aged female patient from West Bengal presented with complaints of redness, foreign body sensation, and watering for 2 days in the left eye. Slit lamp examination of the left eye revealed several minute white foreign bodies moving over the bulbar conjunctiva. Removal of the foreign bodies under local anesthesia, followed by microscopic examination, suggested the presence of first instar larvae of *Oestrus ovis*; the sheep nasal bot fly. Diagnosis of unilateral external ophthalmomyiasis was made. Such cases though very infrequently have been reported in the past from Southern and Central Part of India. To the best of our knowledge, this is the second report from Eastern India. A high index of suspicion is necessary both on the part of the clinician and the microbiologist for correct diagnosis.

Key words: *Oestrus ovis*, ophthalmomyiasis externa, sheep nasal bot fly, unilateral conjunctivitis

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**INTRODUCTION**

Conjunctivitis is a very common cause of bilateral as well as the unilateral red eye. Most of the infections are of viral and bacterial etiologies. However, parasitic infestations may also manifest as unilateral red eye. Although rare, the occurrence of exoparasitic maggot infestations of nose and eye in human being have been found in Africa, Central America, and Mediterranean countries and is termed as myiasis.\[1\] It is caused by the larvae of numerous dipteran fly species, including the sheep bot fly *Oestrus ovis*. This species is an obligate parasite in the nasal cavities and frontal sinuses of sheep but may also cause accidental infestation in human.\[2\] Involvement of the eye is termed ophthalmomyiasis and may be classified according to its location as external, internal, or orbital.\[3\] Symptoms of external ophthalmomyiasis are nonspecific. So it may be misdiagnosed as any other conjunctivitis if physicians do not take myiasis into consideration.

**CASE REPORT**

A 36-year-old lady presented with complaints of redness, foreign body sensation, and watering for 2 days in the left eye.

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