

Case Report

A Rare Case of Mandibular Second Molar with 3 Independent Mesial Canals: A Case Report

Neelam Mittal, Vijay Parashar, Prasad Patel

Department of Conservative Dentistry and Endodontics, Faculty of Dental Science, IMS, BHU, Varanasi, Uttar Pradesh, India

ABSTRACT:

Aim: The aim of the paper was to report an unusual case of mandibular second molar with three independent mesial canals. **Background:** Successful endodontic therapy depends on three dimensional obturation of root canals after proper biomechanical preparation of all the canals and thorough irrigation. Presence of aberrant canal has been commonly encountered in endodontic practice and needs to be managed carefully by clinicians. Missed canals are often, the most common reason of endodontic failure. Use of operating microscope and magnifying loupes aids in locating and efficiently preparing these canals. **Case description:** This case report describes a case of mandibular left second molar with three independent mesial canals. A female patient reported to the department of conservative dentistry and endodontics with complain of carious left lower back tooth. After careful clinical and radiological examination root canal treatment of the tooth was planned. Access opening of tooth revealed extra canal in the mesial side. The tooth was managed using operative microscope and all canals were prepared and subsequently obturated. **Conclusion:** Proper detection of these extra canals and there efficient cleaning and shaping will improve the prognosis of endodontic treatment. Operating microscope, magnifying loupes, CBCT are all important aids in locating these supplemental root canals.

Key words: extra canal, radix, dental anomaly, advanced diagnostic method, microscope.

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Corresponding author: Dr. Prasad Patel, Department of Conservative Dentistry and Endodontics, Faculty of Dental Science, IMS, BHU, Uttar Pradesh, India

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BACKGROUND:

Successful endodontic treatment depend on many independent factors such as thorough knowledge of internal anatomy of root, variations in the root canal anatomy, proper instrumentation techniques, thorough irrigation of the canals and three dimensional filling of root canals with inert material. Molars do not follow one root one canal formula and instead have multiple canals and may have supplemental canals in the same root. There are several studies reporting failure of endodontic treatment due to missed canals. In a prospective study carried out by Hoen and Pink[1], the incidence of missed canals were reported to be 42% of all the 1100 endodontically failed teeth.

The usual formation of root canal anatomy in mandibular molars is mentioned in literature being two roots and three canals. However, variations in root canal anatomy is

reported in various studies [2,3]. Variations such as c-shaped canals, middle distal canal, extra roots etc have been reported [4,5].

Occurrence of middle mesial canal has been mainly reported in mandibular first molar and rarely in mandibular second molar [6]. Its prevalence in different studies is shown in the range of 10–37.5% in the first molars and 18–60% in the second molars[7-8].

Pomeranz *et al.* classified the MM canal into three types: Fin, confluent, and independent.[6] Fin type does not have a separate orifice and it is usually small linear extension of MB or ML canal of very small length allowing free movement of the file between the main canal and fin. The confluent type has separate orifice but it merges either with the MB or the ML canal. Independent type has a separate orifice and separate exit at the foramen. Occurrence of three independent mesial

canals in mandibular second molar has been rarely reported.

This report present a rare case of mandibular second molar having three independent mesial canals and its management.

CASE DESCRIPTION:

A 26 year old patient reported to the department of endodontics with chief complaint of carious left lower back tooth. She gave history of pain 8-9 months back. Intra-oral examination revealed a deep carious lesion in left lower second molar. Tooth was non-responsive to vitality tests. IOPA examination revealed caries involving enamel, dentin and overlapping pulp chamber of tooth 37. Initial diagnosis of irreversible pulpitis with necrotic pulp was made and root canal treatment was scheduled.

Administration of LA (2% lignocaine with 1:80,000 adrenaline) and isolation of tooth 37 was done and endodontic treatment was started. Access cavity preparation revealed three independent canal orifices in the mesial side and one distal canal. Middle mesial canal was thus located and subsequently negotiated with no 10 k file.

The working length was determined with electronic apex locator (coltene, whaledent, switzerland) and no 10 k-file (dentsply) with IOPA confirmation. Biomechanical preparation was done with k files upto size 20 no followed by hyflex cm files size 15, 20 and 25 4% progresively (coltene, whaledent, switzerland).

Irrigation with copious amount of 3% sodium hypochloride (septodont), 17% EDTA (Amdent) and sterile saline was done. Calcium hydroxide dressing was given and patient was recalled after one week.

On 2nd visit patient was asymptomatic thus obturation with 4% gutta percha cones (coltene, whaledent, switzerland) was done.

Post obturation restoration of tooth 37 was done after one week to ensure proper coronal seal.



Figure 1: Microscopic image, three independent mesial canals can be viewed



Figure 2: post obturation of all four canals

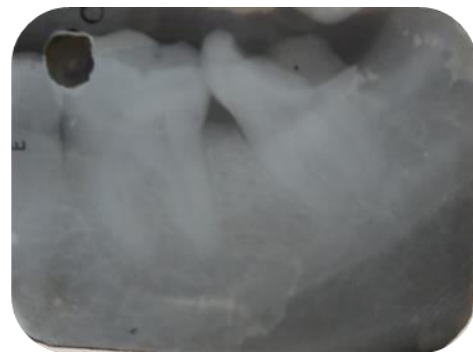


Figure 3: Pre-operative IOPA



Figure 4: Post obturation IOPA

DISCUSSION:

Several studies have been reported showing the frequency of anatomical variations found in mandibular molars. Fabra studied 760 mandibular molars and reported that 2.6% cases have three canals in mesial root. Among the cases studied, 65% of middle mesial canals joined the mesio buccal canal in the apical third, 30% joined the mesio lingual canal also in the apical third whereas independent third canal in the mesial root were found only in one case. [9] the prevalence of independent third canals is reported in literature from 0-15% [9,10,11].

Occurrence of middle mesial canals is reported as more frequent in mandibular first molar (17.2%) compared to mandibular second molar (4.5%) [12], however recent study by azim et al reported the prevalence of middle mesial canal in mandibular second molar to be 60% and in mandibular first molar to be 37.5%. [13].

To detect an additional canal one must follow careful clinical and radiographical examination. Proper access opening, careful visualization of pulpal floor and dentinal maps, use of magnifying loupes or microscope are important aid in locating the extra root canals. Failure to locate an extra canal may lead to future failure of endodontic treatment due to persistent bacteria in the canal.

CBCT has been successfully used in endodontics for better understanding of the root canal anatomy [14], evaluation of root canal preparation/obturation, detection of bony lesions[15], and vertical root fractures . Recently, CT imaging is used for the confirmatory diagnosis of morphological aberrations in the field of endodontic.

CONCLUSION:

Proper detection of these extra canals and there efficient cleaning and shaping will improve the prognosis of endodontic treatment. Operating microscope, magnifying loupes, CBCT are all important aids in locating these supplemental root canals.

CLINICAL SIGNIFICANCE:

Encounter of such cases are infrequent, although dentists should be aware of such anatomic variation for successful endodontic treatment.

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