

Confluent Type Middle Mesial Canal In Mandibular First Molar - A Case Report

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Introduction

Thorough mechanical and chemical cleaning of the pulp space followed by obturation with a suitable material is considered as the main objective of the root canal therapy. ¹This is to eliminate all the irritants (necrotic pulp, microorganisms and their by-products) from the root canal system. ² Thus it is very important to identify the aberrant anatomy of the tooth before initiating the treatment and during the root canal procedure.

Case Report

A 43 years of male patient reported to the out-patient department of Dept. Of Conservative Dentistry and Endodontics with a chief complaint of pain in lower left back teeth region. The patient reported the pain was since 3 weeks, dull aching and continuous in nature. The pain aggravated to sharp shooting on subjecting to cold and hot beverages. The tooth had class II onlay given 8 to 10 months back.(Figure 1)

The tooth responded to thermal vitality test confirming the vitality of the tooth. On radiographic examination the involvement of the pulp horn was recorded. The patient was advised for removal of the onlay.(Figure 2)

The tooth was diagnosed with symptomatic pulpitis with normal periapical tissue. Root canal therapy was planned for the tooth followed by post operative restoration.

The patient was anesthetized by administering Lignocain with adrenaline (1:1,00,000).The tooth was isolated with the use of a rubber dam.Root canal opening was done using endo access bur (Dentsply).Troughing in the floor of the pulp chamber, with visualization via dental loupes, was used to locate canals.Three canals were located in mesial root i.e. Mesio-Buccal, Mesio-Lingual and Middle mesial. And one canal was located in the distal root.(Figure 3)

A number 10 K file was introduced in each canal to see the course of the canals. The middle mesial can was seen to merge

with the mesio-lingual canal in the apical third. Thus the middle mesial canal could be classified as the confluent type where the canal originates with a separate orifice but fuses to the mesio-buccal or the mesio-lingual canal. (Figure 4)

Working length was calculated using apex locator and was then confirmed on radiograph. The canals were cleaned and shaped using ProTaper Universal system. The mesio-buccal, mesio-lingual and distal canals were prepared till 30/0.6 and middle mesial canal till 20/0.6. 5% NaOCl was used for irrigation throughout the instrumentation along with RC Help (EDTA). The canal was then irrigated by 17% EDTA for removing the smear layer. The final irrigant used was CHX 2%. Paper points were used to dry the canals.

The 6% protaper gutta-percha points were used for obturation of the canals. AH Plus sealer was used along with the gutta-percha to seal the canals. (Figure 5 and Figure 6) The tooth was then restored with Dual Cure Composite (Hardcore). (Figure 7)

Discussion

Mandibular molars are said to be the most frequent tooth type to require root canal treatment.³ Mandibular molars are generally considered to have two roots with two canals in the mesial root and one or two canals in the distal root.⁴ However, there are a number of studies that contradict this by showing variations in the anatomy of the mandibular molars. Pomeranz et al studies 100 mandibular molars and found that 12 of these molars had middle mesial canals in their mesial roots.⁵ Other researchers to report on the morphology of the mandibular first molars were Skidmore and Bjorndal, Pineda and Kettles, and Vertucci.^{6,7,11}

Classification of Middle Mesial canals given by Pomeranz et al 1981		
1.	Fin	The file can be passed freely between the main mesial canal (ML /MB) and the middle mesial canal.
2.	Confluent	The middle mesial canal originates as a separate canal but merges with main mesial canals apically.
3.	Independent	The middle mesial canal has a separate origin and exit separately at the apical foramen.

Table :- Classification of middle mesial canal in mandibular first molar given by Pomeranz et al 1981⁵

The incidence of negotiable MM canals was found to be 0% to 36% in various studies done using various detection methods.^{6,8} Failure to locate, cleanse, and shape these RCSs may result in persistent apical periodontitis.⁹

In the present case reported the tooth had three mesial canals i.e. mesio-buccal, mesio-lingual and a middle mesial canal and one distal canal. The orifices of the three mesial canals were along the line if drawn in the buccal-lingual direction. The middle mesial canal was seen to be closer to the mesio-lingual canal. According to Karapinar-Kazandag M, Basrani BR and Friedman S the hidden middle mesial canal should be searched starting from mesio-lingual canal along the subpulpal groove to mesio-buccal canal.¹⁰ Radiographs of the tooth taken with No.10K files placed in the canals showed the middle mesial canal merging with the mesio-lingual canal, putting the case in the confluent type of canals as classified by Pomeranz et al.⁵

The incomplete cleaning of a root canal caused due to missed canals can lead to persistent presence of bacterial biofilm. This could cause persistent endodontic infection leading to treatment failure.¹¹ Therefore every attempt must be made to identify, shape and clean all the canals. There are numerous techniques that enable the clinician to identify the middle mesial canals. These techniques include adequate flaring of the access cavity, radiographs taken in multiple angulations, CBCT, using a sharp explorer to examine the pulpal, ultrasonic tips for troughing grooves and removing secondary dentine, 1% methylene blue dye for staining the chamber floor and "champagne bubble" test.¹² There are various magnification and illumination devices also available for better visualization that aids in identification of these extra canals. Magnifications reduces the challenges faced by the clinicians in locating the canals with naked eyes.¹⁰ In the present case we used a dental loupes of the magnification power 2.5X.

Conclusion

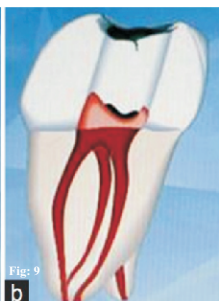
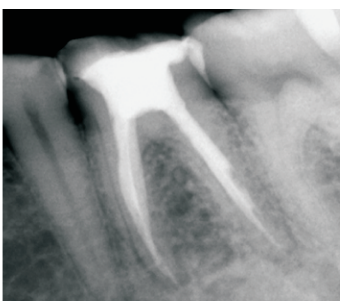
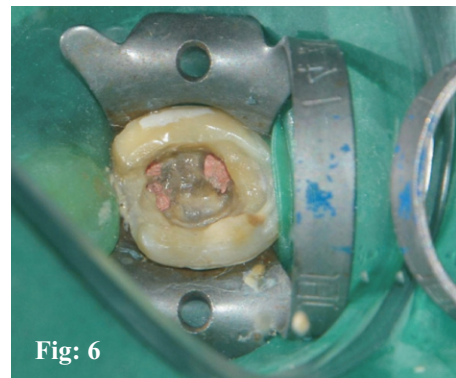
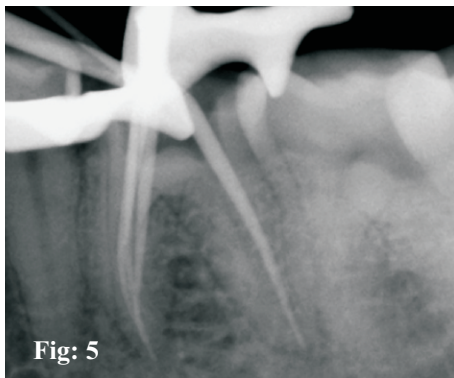
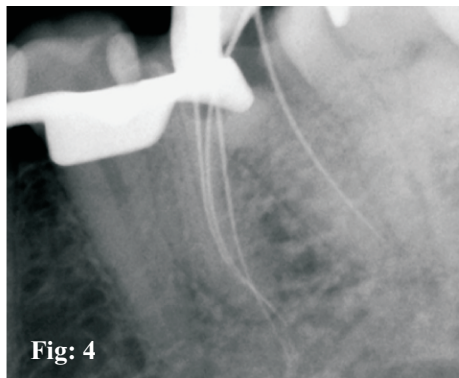
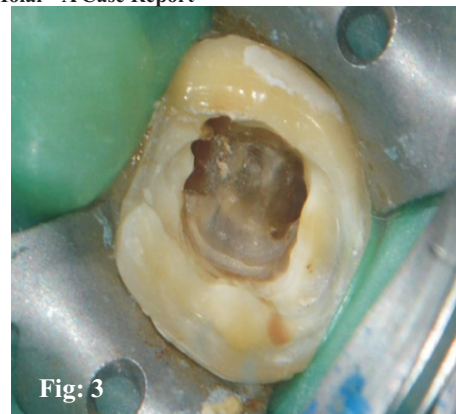
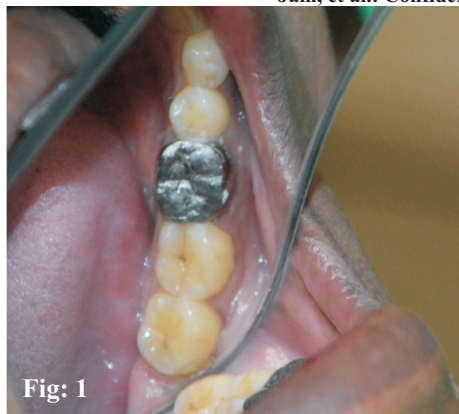
Having knowledge of the aberrant morphology of the teeth is a must for carrying out successful endodontic therapy. The clinician must be aware of and trained well to use the aids available for detection of the extra canals. The use of magnification and careful tactile search techniques can be of great value in adding success to endodontic treatments.

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Legends

- Figure 1:- Pre-Operative Image.
 Figure 2:- Pre-operative image post onlay removal.
 Figure 3:- Root canal opening showing three canal orifices in the mesial root
 Figure 4:- The middle mesial canal traced with a K file.
 Figure 5:- Master-cone radiograph.
 Figure 6:- Post obturation image.
 Figure 7:- Post endodontic restoration.
 Figure 8:- Post operative radiograph.
 Figure 9:- Pomeranz et al classified the middle mesial canal into 3 possible canal configurations: (a) fin, (b) confluent, or (c) independent (5)



FORM-IV

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