

A Case of Unusual Anatomy of Mandibular First Molar With Three Independent Mesial Canals – A Case Report

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ABSTRACT

The importance of knowledge of morphology of root canal system is very important in diagnosis and successful treatment. Variations in canal morphology have been described in dental literature. This case report presents the treatment of a mandibular first molar with five root canals, three mesial roots and two distal canals.

Key words: mandibular first molar, root canal morphology, multiple canal systems.

INTRODUCTION

Successful root canal therapy requires a thorough knowledge and root canal morphology of all teeth. There have been numerous studies that describe the variations in external and internal morphology of all teeth among them variations including mandibular first molars is also described. Skidmore and Bjorndal, Pineda and Kuttler, and Vertucci¹⁻³ have reported about the morphology and variations of the mandibular first molar. Their reports have shown that mandibular first molar have three or four canals. Vertucci and William (1974) and Barker et al.^{4,5} have described the presence of an independent middle mesial canal. There have been multiple case reports of aberrant canal morphology of the mandibular first molar⁶⁻¹². These reports have described aberrant canals in the mesial root of the mandibular first molar. Stroner et al, Beatty and Iterian^{13,14} have reported one more case in which a third canal was located in the distal root. Martinez-

Berna and Bandanelli¹⁵ showed two cases with six canals. Reeh¹⁶ has reported a case with seven canals, consisting of four canals in the mesial and three in the distal root. With increasing reports of aberrant canal morphology, the clinician needs to be aware of this varied anatomy in mandibular molars. There are also a wide variety of methods used for studying canal morphology. These methods include various types of clearing studies using decalcification with injection with India ink, Chinese ink, hematoxylin dye, radiography with instruments, in vitro radio opaque gel infusion and radiography, scanning electron microscope studies, grinding or sectioning. Recently clinical evaluation using magnification or use of surgical operating microscope has made identification of extra canals and orifices easier¹⁷. The main purpose of this article was to report the successful treatment of a case of a mandibular molar with three mesial canals and two distal canals.

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Case Report

CASE REPORT

A 40 yr old male patient reported to Department of Conservative dentistry and Endodontics with chief complaint of pain and food lodgement since one week. History of pain revealed a dull pain of continuous nature and pain on chewing food. Thermal test showed delayed response to cold and electric pulp test showed a delayed response. The clinical examination revealed deep proximal caries on tooth #46 with peri apical changes and loss of continuity of lamina dura. Radiograph examination showed a deep, proximal carious lesion approximating the pulp (fig-1). A diagnosis of necrotic pulp with acute apical periodontitis was made. The patient was advised root canal treatment followed by full coverage crowns. After obtaining informed consent of patient access opening was done, caries completely excavated and patency of

all 5 canals was established with #8, #10 and #15 K files. After estimation of working length (fig-2) of each canal with digital radiograph conformation was done with Root ZX Apex locator(J.Morita,Tokyo,Japan). All 5 canals were enlarged with hand Protaper files up to size F2 (Dentsply/Maillefer) .(fig-3) shows microscopic view of all enlarged five canals. Master cones were selected (fig-4) obturation was done with Protaper gutta percha points (Dentsply/Maillefer) using AH PLUS as sealer (Dentsply/Maillefer) (fig-5). Access cavity was restored with composite resin and patient recalled after 1 week. After clinical and radiographic evaluation crown preparation was done and full ceramic crowns were cemented (fig-6). The patient was periodically evaluated for successful root canal therapy.



Fig-1 Pre-operative radiograph



Fig-2 Working length radiograph



Fig-3 Microscopic view of access cavity



Fig-4 Master cone radiograph



Fig-5 Post obturation radiograph



Fig-6 Post endodontic restoration with ceramic crown

DISCUSSION

Several authors have described multiple canal system of mandibular first molars. Successful root canal therapy can be achieved by proper biomechanical preparation, good obturation and post endodontic restoration. Through knowledge of root canal system and internal anatomy identification is essential for good clinical performance and results. Aberrant anatomy should be identified prior to and during root canal treatment. Mandibular molars show variations both in mesial and distal canals. Skidmore and Bjorndal 1971¹, have described multiple canals and transverse anastomoses. The present case report described treatment of mandibular first molar with three canals in mesial roots. Vertucci (1974)³ described different canal configurations, in the present study distal canals had separate roots and apical exit, there were two mesial roots with middle extra canal, all canals had separate apical exits. Radiographic interpretation is very important and is great help to clinician to identify possible anatomical variations. Operating microscopes help in location of extra orifices and canals. The present case indicates that each case presented for root canal treatment should be carefully evaluated radiographically and clinically. Adequate time should be spent on exploring the floor of pulp chamber which will help to locate canal orifices. Knowledge of root canal anatomy and good clinical experiences provide good treatment and good prognosis.

CONCLUSION

Successful root canal therapy depends on adequate knowledge, good diagnosis, case selection and good clinical skills. With newer methods available for diagnosis, digital radiographs, apex locators and microscopes, detecting variations in tooth anatomy has identify possible variations in root canal anatomy and enable us to perform better treatment and achieve good prognosis.

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