



## ENDODONTIC MANAGEMENT OF MANDIBULAR FIRST MOLAR WITH A MID-DISTAL CANAL - A CASE REPORT

### Dental Science

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### ABSTRACT

#### Aim:

To describe an atypical rare occurrence of three distal canals in a Mandibular First Molar.

#### Summary:

According to literature, root canal anatomy of mandibular molars is found to be very complex<sup>7</sup>. The clinical challenges faced because of these complexities often places the main goal of root canal therapy in a gamble<sup>1,2</sup>. Thorough knowledge of pulp chamber and root canal anatomy will affect the success of treatment<sup>3,4</sup>. The following case is a report of a right mandibular first molar with five root canals located two mesially and three distally; treated endodontically.

### KEYWORDS

Mandibular first molar, five canals, mid-distal canal, spiral computerized tomography

#### INTRODUCTION:

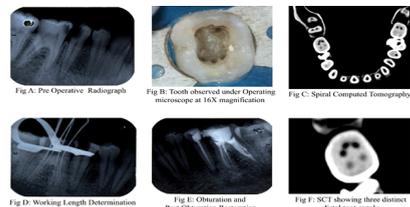
According to literature, root canal anatomy of mandibular molars is found to be very complex<sup>7</sup>. The clinical challenges faced because of these complexities often places the main goal of root canal therapy in a gamble<sup>1,2</sup>. Thorough knowledge of normal anatomy and the associated aberrations of the pulp chamber and root canal will affect the eradication of microbial contamination and consequent successful endodontic treatment<sup>3,4,5</sup>. Usually a mandibular first molar has two well-defined roots, a mesial root characterized by a flat mesiodistal and wide buccolingual surfaces, and a straight distal root with a wide oval canal or two round canals<sup>6</sup>. Various authors have described the incidences of a mid-distal canal in the mandibular molars differently which varies from 0.2 to 3%<sup>9</sup>. Although Stroner et al.<sup>8</sup> have investigated and described the presence of a mid-distal canal in the mandibular first molar, very few cases with this peculiarity have been reported. Therefore, the aim of this case report is to describe an atypical rare occurrence of three distal canals in Mandibular First Molar.

#### CASE REPORT:

A 28-year-old female patient reported to the Department of Conservative Dentistry and Endodontics, PMNM Dental College and Hospital, with a chief complaint of pain in the posterior right mandibular region since one month. She also presented history of intermittent pain since three months. Past medical history was noncontributory. After proper clinical examination it was revealed that the right mandibular second premolar (45) was carious on distally and the first molar (46) was also carious but on mesially. Both teeth were tender on vertical percussion, and gave a negative response to thermal and electric pulp testing. Preoperative radiograph of 45 and 46 unveiled radiolucency approaching the pulp and widening of periodontal ligament (figA). Based on aforementioned findings the diagnosis derived was irreversible pulpitis with apical periodontitis. Hence endodontic therapy was planned and provided.

three distally (distobuccal, mid-distal and distolingual). Patency of canal was checked with No.10 K-file (Mani). Working length was measured using an apex locator (Root ZX J Morita) and confirmed with intraoral periapical radiograph (figD). The radiograph Local

anesthesia was achieved using 2% lignocaine (Lignox-Adr 2% Injection) and isolation was achieved using a rubber dam. Endodontic access cavity was prepared. The right mandibular first molar (46) revealed five root canals i.e. two mesially (mesiobuccal and mesiolingual) and



confirmed working length as measured using the apex locator and it was also noticed in the radiograph that the three distal canals were merging into one apex. ProTaper NEXT NiTi rotary instrument files (Dentsply, Maillefer) were used in crown down technique for cleaning and shaping of the root canals. All the canals were instrumented till size X2. Between the instrumentations, canals were irrigated with Saline, 3% Sodium Hypochlorite using a side vented needle and 17% Ethylenediaminetetraacetic acid (EDTA) (Prime Dental Product Pvt Ltd, Mumbai, India) following which the tooth was temporized with cotton pellet and Cavit (3M ESPE AG, Seefeld, Germany). To certify the presence of a mid-distal canal, a multisliced spiral computerized tomography (SCT) (SIEMENS-syngo fastView software) of the area of interest was performed. This was carried out after the patient provided her consent. This validated the presence of queried mid-distal canal. Root canal treatment of 45 was carried out before the SCT (fig B and fig F). Patient was then recalled after one week. The root canals were re-irrigated with Sodium Hypochlorite, Saline and final irrigation were performed with 2% Chlorhexidine. Then all the canals were dried with absorbent paper points (Dentsply Tulsa) and obturated with corresponding gutta-percha and AH Plus epoxy resin-based root canal sealer (Dentsply Tulsa). Post endodontic restoration was carried out with composite resin (fig E) (Filtek Z350 XT 3M ESPE) and also the tooth was asymptomatic during the 3 month's follow-up period.

**DISCUSSION:**

Very often we see complex root canal anatomy which is vitally important that the dentist recognizes and carefully handles these aberrations. Usually the mandibular first molar has two roots, one mesially with two canals and one distally with one or two canals<sup>8,9</sup>. The presence of a third canal in the mesial root of mandibular molars is called the mid-mesial canal and on the distal side it is called mid-distal canal. According to Baugh & Wallace the prevalence of mid-mesial canal in mandibular first molar is 1–15%<sup>12</sup>, according to Stroner et al. presence of three distal canals in the mandibular first molar is uncommon<sup>8</sup>. According to Parul et al. incidences of a mid-distal canal in the mandibular molars varies from 0.2 to 3%<sup>9</sup>. Several case reports have also described the presence of mid-distal canal in mandibular first molars. A detailed review of case reports with mid-distal canal has been summarized in the table below.

Investigator	Year	Tooth #	Root configuration	Distal root canals
Berthiaume et al. <sup>13</sup>	1983	46	2 roots (1D,1M)	DB, MD, DL
Martinez and Badanelli <sup>14</sup>	1985	46	2 roots (1D,1M)	DB, MD, DL
Quackenbush <sup>15</sup>	1986	46	2 roots (1D,1M)	DB, MD, DL
Reeh et al. <sup>16</sup>	1998	36	2 roots (1D,1M)	DB, MD, DL
Kimura and Matsumoto <sup>17</sup>	2000	36	2 roots (1D,1M)	DB, MD, DL
Ghodussi et al. <sup>18</sup>	2007	36	3 roots (2D,1M)	DB,DB2,MD,DL
Barletta et al. <sup>19</sup>	2008	36	4 roots (2D,2M)	Db1, Db2, MD, DL
Chandra et al. <sup>20</sup>	2009	46	3 roots (2D,1M)	DB,MD,DL
Kottor et al. <sup>21</sup>	2010	46	2 roots (1D,1M)	DB, MD, DL
Mushtaq et al. <sup>22</sup>	2011	46	2 roots (1D,1M)	DB, MD, DL
Garg et al. <sup>23</sup>	2011	36	2 roots (1D,1M)	DB, MD, DL
Kakar and Gupta <sup>25</sup>	2011	46	3 roots (2D,1M)	DB, MD, DL
Shweta Jain <sup>24</sup>	2011	46	2 roots (1D,1M)	DB, MD, DL
Bhardwaj and Garg <sup>26</sup>	2011	46	2 roots (1D,1M)	DB, MD, DL
Vijay Reddy et al. <sup>7</sup>	2012	46	2 roots (1D,2M)	DB, MD, DL
Parul Bansal <sup>9</sup>	2015	36	2 roots (1D,2M)	DB, MD, DL
Present study	2018	46	2 roots (1D,2M)	DB, MD, DL

The canal configuration in this study is type XVIII according to Sert and Bayirli supplemental canal configurations of root canal morphology<sup>27</sup> and also reported by Kottoor et al.<sup>21</sup>, Kakar and Gupta<sup>25</sup>, Shweta Jain<sup>24</sup>, Parul Bansal<sup>9</sup>.

One of the recent advances in diagnostics is the Spiral Computed Tomography (SCT). When an area of interest of a body undergoes SCT, a three dimensional data is developed from which thin transverse sections are reconstructed. These sections can be visualized as individual images at any required level.

Here in this case report, the noninvasive high end diagnostic aide: SCT has been employed to visualize the third canal in the distal root of right mandibular first molar<sup>28</sup>.

**CONCLUSION:**

Alert examination assists the clinician to explore additional canals. This study also advises the use of newer imaging technologies like Spiral Computerized Tomography. These technologies help to gain more information and educate about the unknown variations in the root canal anatomy

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