

**CASE REPORT**

**ENDODONTIC MANAGEMENT OF PERMANENT FIRST MANDIBULAR MOLAR WITH SIX CANALS: A CASE REPORT**

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**INTRODUCTION**

The main objective of root canal treatment is the thorough mechanical and chemical cleansing of the entire pulp space followed by complete obturation with inert filling material.<sup>1</sup> Therefore, it is imperative that aberrant anatomy is identified before and during root canal treatment of such teeth.<sup>2</sup>

Many dental clinicians tend to perceive a given tooth will contain a predetermined number of roots and/or canals. However, a careful evaluation of the literature shows deviations from the normal tooth morphology is not uncommon.

Complex anatomy is often seen in the mesial root of mandibular molars. Few clinical studies have investigated the incidence of middle mesial canals in mandibular molars.<sup>3</sup> Despite reports of a high prevalence of intercanal communications in mandibular molars, reaching 83%,<sup>4,5</sup> success in locating and accessing a middle mesial canal has been very low, ranging between 1% and 25%.<sup>6,7</sup> Failure to locate, cleanse, and shape these root canal system may result in persistent apical periodontitis.<sup>3</sup>

Although, the occurrence of three root canals in the mesial root is frequently reported in the literature but with three independent canals in distal root is a rare anatomic configuration with incidence of 1.3%.<sup>8,9</sup> The present article reports successful management of mandibular first molars with six canals. The incidence of such anatomy is exceptionally rare and is reported to be 0.2–3% .

**CASE REPORT**

A 49 year old patient reported to Clove Dental (Rohini Sector-15) with chief complaint of severe pain in respect to lower right back tooth region. The patient’s medical history was non-contributory. Extraoral examination did

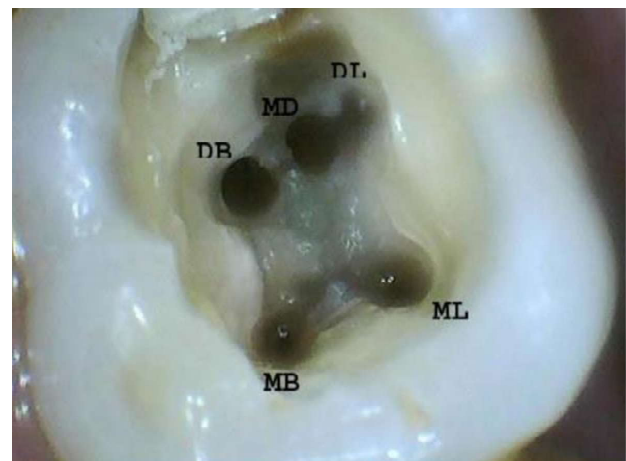
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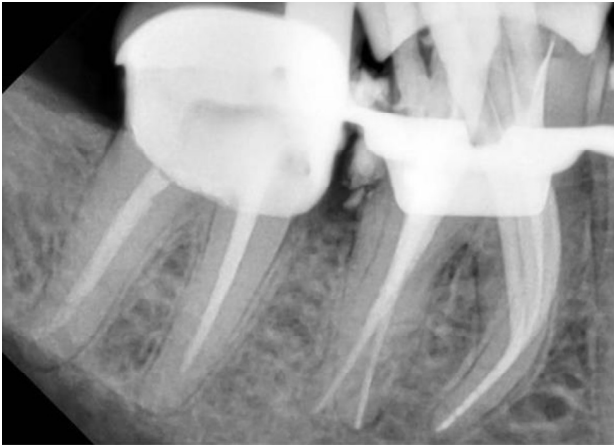
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not reveal any significant changes. Clinical examination revealed the class II deep carier i.r.t 46. Thermal and electric pulp testing elicited a delayed and prolonged response in tooth #46 which was lingering in nature. Radiographic examination showed no signs of apical periodontitis. The clinical diagnosis of symptomatic irreversible pulpitis was made, and root canal treatment was initiated.

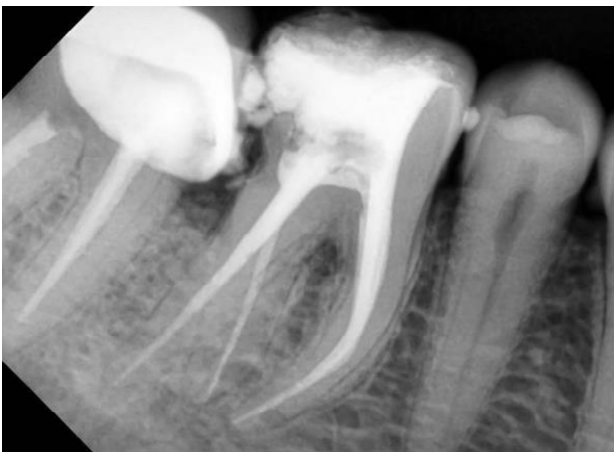
Tooth #46 was anesthetized. A rubber dam isolation was done and endodontic access opening was established in tooth #46. (Figure 1). After troughening of chamber, canal orifices were located connected by the developmental root fusion line (DRFL). The orifices located were mesio- buccal (MB), mesio lingual (ML), mid- mesial (MM), disto-lingual(DL), disto- buccal (DB) and mid distal (MD) (Figure 2&3). The canals were successfully negotiated to full length with #8 and #10 K hand files. Coronal enlargement was done with a nickel–titanium (NiTi) ProTaper S1 followed by SX rotary file to improve the straight- line access. Working length was determined with the help of an apex locator and later confirmed by using a radiograph. The canal system was classified as confluent-type. The working lengths of MB, MM, ML, DB and MD was 25mm. The working length for distolingual (radix root) was 20mm. Cleaning and shaping was performed under rubber dam isolation by using ProTaper NiTi rotary instruments (Dentsply Maillefer). Irrigation was performed using normal saline



**Fig. 1: Initial access opening with four canal orifices**



**Fig. 2: Obturation with gutta percha and AH plus sealer**



**Fig. 3: Obturation with temporary coronal seal**

and 2.5% sodium hypochlorite solution. After completion of cleaning and shaping, the root canals were dried with absorbent points. Calcium hydroxide was placed as an intracanal medicament with a lentulo spiral for 2 weeks and the access cavity was sealed with Cavit. The patient was asymptomatic on the next visit; therefore, tooth #46 was obturated using protaper gutta percha and AH Plus root canal sealer. The patient was clinically asymptomatic on follow-up visits.

## DISCUSSION

The clinical approach for endodontic management is discussed below:

1. A thorough inspection of the preoperative radiograph is key for detection of additional canals. Diagnostic tools such as multiple radiographs and careful examination of the pulpal floor with a sharp explorer are important aids in detection of extra root or canals.<sup>10</sup>
2. Better visualization can be obtained by using magnification tools such as loupes or dental

operating microscope. A study on mandibular molars revealed that dental operating microscope (DOM) enhances the probability of locating and negotiating middle mesial canals.<sup>7</sup> Gorduysus et al. stated that additional accessory canals were not found with dental operating microscope, but their ability to explore and negotiate the canals improved by over 10% when compared with no magnification.<sup>11</sup>

3. Advanced diagnostic aids such as cone beam computed tomography can play significant role in diagnosing morphological variations.
4. Law of concentricity and “law of Symmetry” are important to keep in mind during access cavity achievement to identify all root canals and prevent the endodontic treatment failure.<sup>12</sup>
5. The classic white line between buccal and lingual orifice should invite further exploration. The area can be explored for catch with the help of small files.
6. A dark line on the pulp chamber floor can indicate the precise location of the extra canal orifice. Pulp chamber floor can be explored with angled probe, DG-16 or micro-openers to remove dentin overlying orifices.<sup>13</sup>
7. The use of ultrasonic tips help to remove dentin conservatively. Any instrumentation of pulpal floor should be carried out under direct vision with adequate illumination because of risk of perforation.<sup>14</sup>
8. Glide path should be established with small file such as 10 K. The use of flexible nickel-titanium rotary files allows a more centred preparation shape of the canal.<sup>15</sup>
9. Copious irrigation and use of passive ultrasonic irrigation may be useful in these cases to overcome the isthmus and depressions, many times present, in the roots.<sup>16</sup>
10. Regarding the techniques used to approach these cases some points are important to remember. The over-instrumentation should be avoided at all cost in cases with multiple canal configurations to minimize the chance of root weakness in cases where three, and sometimes more, canals have to be prepared in a single root.<sup>17</sup>

## CONCLUSION

Managing the teeth with extraordinary root canal anatomy may not be the only challenge; also, the inadequacy to explore extra canals and improper treatment of the root canals may lead to a

failure. Although the incidence of such root canal variations is rare, every effort should be made to find and treat all the root canals for successful clinical results.

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