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

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- **INTRODUCTION**

Accurate diagnosis and successful endodontic therapy is always a challenge due to the complexity of the root canal morphology, especially in multi rooted teeth. Literature shows numerous case reports on the anatomic variations and the abnormalities that are seen with the mandibular first molars.[1-7] As usual root canal morphology, mandibular first molars have two roots (mesial and distal) with two canals in the mesial root and one or two canals in the distal root. An additional third root may be present in permanent mandibular first or second molar, in a distolingual (Radix Entomolaris) and rarely in a mesiobuccal location (Radix Paramolaris). Knowledge of such anatomic variation of root and root canals is essential during the treatment of the patients presenting with morphological diversities in their root canal anatomy.

- **CASE REPORT**

A 37-year-old male patient with a non-contributory medical history was referred to the Department of Conservative Dentistry and Endodontics for endodontic management of the left mandibular first molar (tooth no 36).

He complained of a localized, sharp shooting and momentary pain in his left lower jaw region since last 2 weeks, which is aggravated on taking hot & cold foods.

The clinical examination of the tooth revealed no swelling or associated sinus tract. The tooth was slightly tender on percussion but there was no tenderness on palpation or associated mobility. The vitality tests (thermal and electric pulp test) showed exagerrated responses indicating irreversibly inflamed pulp.

The routine intra-oral periapical radiograph revealed radiolucent lesion on disto-proximal side of the tooth, approximating the pulp, with presence of a fractured restorative material on the occlusal aspect.

Any morphological variation in the roots or the root canals was not revealed. Clinical and radiographic findings lead to a diagnosis of symptomatic irreversible pulpitis, indicating the need for endodontic therapy.

Figure 1 – Pre operative radiograph

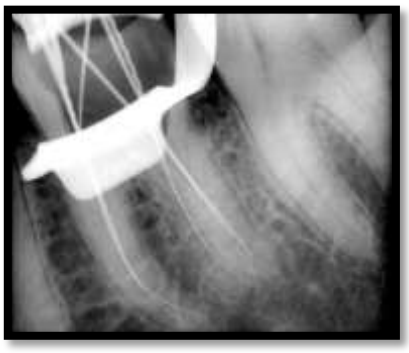

Figure 2 – Working Length Estimation Radiograph

The tooth was anesthetized using two percent lignocaine with 1:80,000 adrenaline and isolated under rubber dam.

After removal of all carious tissue, access cavity with a straight line access was prepared using endodontic access bur (Dentsply Maillefer). The pulp chamber was flushed with 2.5% sodium hypochlorite to remove the debris.

Careful exploration of the pulp chamber floor with endodontic explorer (DG 16 probe, Dentsply) revealed six canal orifices, three mesially (mesiobuccal, middle mesial and mesiolingual) and three distally (distobuccal, middle distal and distolingual).

The patency of the canals was checked with number 10 K-file (Mani, Inc.Japan).

The intraoral periapical radiograph for the determination of working length further divulged the presence of three independent roots, two on mesial side and one on distal and six canals.

Cleaning and shaping of the canals was completed using rotary Protaper files till F2 (Maillefer, Dentsply) under copious irrigation with 2.5% sodium hypochlorite solution and 17% EDTA solution to remove the smear layer.

Figure 3&4 – Clinical photograph depicting the six canal orifices (MB,MM,ML, DB, DM,DL)

The canals were then dried with paper points and filled with calcium hydroxide paste using a lentulo spiral. The tooth was then temporized with temporary filling material. Patient was recalled after 10 days and temporary restoration was removed under rubber dam isolation. The root canals were irrigated with normal saline and stirred with number 25 K file (Maillefer Dentsply) to remove the intracanal medicament. Final irrigation of the canals was done with 2.5% sodium hypochlorite and then 17% EDTA solution. Gutta-percha cones were inserted in dried root canals to reconfirm the working lengths. The angled radiograph was taken which revealed the presence three roots and six canals.

Figure 5 – Mastercone radiograph

Figure 6 – Post obturation radiograph

Obturation was then performed with Protaper guttapercha cones (Dentsply) and calcium-hydroxide- based sealer (SealApex, Kerr Dental). Postoperative radiograph was then taken to assess the quality of obturation. Permanent glass ionomer cement restoration was then placed as access restoration.

- **DISCUSSION**

There are number of literatures available to prove that deviations in tooth morphology are not uncommon. Missed canals could be a clinical outcome of anatomic variations resulting in a treatment failure in considerable number of cases.

Occasionally mandibular molars present with Radix Entomolaris (RE) and rarely with Radix Paramolaris (RP). Theses extra roots are usually small and more curved.[8]

Although there is a paucity of literature reporting the occurrence of middle distal canal in mandibular molars, few articles are available with the anatomic variation of the distal root with three separate canals.

The presence of three distal canals in mandibular first molar have been reported to be 1.7% in Indian population,1.7% in Turkish population, 0.7% in Burmese population, 1.6% in Thai population, 0.2% in Senegalese population, and 3% in Sudanese population[9]

Radiograph and/or other diagnostic images help clinicians in detecting the variations present in both root and root canal anatomy, which could have been missed clinically.

Tagger et al suggests that clinicians should always suspect and strive to search for presence of extra canals whenever the instrument demonstrates an eccentric direction on deeper penetration.[10]

This case is a rare morphological variant of Mandibular first molar with 3 distinct mesial & distal canals. Angled radiograph that was taken in order to locate and confirm the extra roots and canals along with their paths revealed the presence of 3 roots and 6 canals.

However in cases where radiographs are not clear or direct visualization of the internal anatomy is not possible or impaired, the use of magnification devices or/ and enhancement of colour contrast by means of dye is recommended.

- **CONCLUSION**

Patients having teeth with morphological or anatomic variations might not be usual but it is imperative for a clinician to having an understanding about it to manage such cases successfully.

Along with the identification of the number of roots present and the correct location and the number of canals present, thorough debridement, cleaning, shaping and three dimensional hermetic sealing of the entire root canal system are indispensable procedures for the long term success of the root canal treatment.

Clinicians should use increased magnification and advanced diagnostic aids, to ensure identification and management of additional canals.

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