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An *In-Vitro* Study to Find the of Frequency of MB2 Canal in Permanent Maxillary Molars

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Abstract

Present in-vitro research conducted to find out the frequency of second mesiobuccal canals in permanent maxillary molars. Eighty extracted, intact maxillary permanent molars were selected for the present study. Following that, a slow-speed diamond disc was used to divide the occlusal sections of the crowns at the cement-enamel junction. Using a safe-end diamond bur, overhanging dentin that covered the canal orifices was removed to allow straight line visibility. Under an x8 magnification, the teeth were photographed from their occlusal side. Result showed that the first and second maxillary molars, MB2 canals were found in 70% and 55%, respectively. In conclusion it is crucial during endodontic procedures on maxillary molars to cautiously check pulpal floor to detect any "extra" canals, notably the second mesiobuccal canal, by scraping away the constrictive dentin above the orifices.

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1. INTRODUCTION

To achieve successful long-term endodontic therapy, each stage of the procedure - from the proper access opening to the proper shaping and cleaning to preserve the original anatomical shape while eliminating the greatest quantity of organic tissues - must be completed without error. Finally, the right restoration must be used to close the root canal three-dimensionally and avoid microleakage. Understanding the root canal system, particularly the complexity and design of multi-rooted teeth, is the foundation for endodontic treatment..¹

Presence of second mesiobuccal root canal is considerable contributor to the failure of endodontic therapy in maxillary molars due to their complicated root canal architecture. In order to successfully treat the maxillary molars with endodontics, it is essential to recognize the MB2 canal and its position.² Thus objective of present study was to assess prevalence of second mesiobuccal canals in permanent maxillary molars.

2. MATERIALS AND METHODS

80 extracted, intact permanent maxillary molars were gathered from private dental offices. The instructions and procedures of the Centre for Disease Control and Prevention and the Occupational Safety and Health Administration were followed for collecting, storing, sterilizing, and handling the extracted teeth. The teeth were cleared of severe debris and visibly bloody matter. For one week, teeth were reserved in a 1% thymol solution. The teeth were transported in a sturdy container with a tight-fitting top to avoid leakage. The biohazard emblem was written on the container's label. Using a stereomicroscope at standard (×8) magnification, the teeth were digitally captured from the occlusal side. Then, by means of a water-cooled, slow-speed diamond disc, occlusal sections of crowns were divided at the cement-enamel junction (CEJ). With a safe-tip diamond bur, the overhanging dentin over the canal orifices was removed to see the root canals opening clearly. For greater canal orifice visibility, the teeth were submerged in 3% sodium hypochlorite solution for 24

hours. The pulpal floor was explored by a DG-16 endodontic explorer (Dentsply, Switzerland). With a 10K file, the canal orifices were navigated. Under identical magnification and exposure circumstances, teeth were once again photographed from their occlusal aspect.

3. RESULT

Frequency of the MB2 canal was 70% in the first molar and 57% in the second molar as shows in Table 1 and 2.

Number of Orifice	Number of Teeth	MB1	MB2	DB	Palatal
3	24 (30%)	24	-	24	24
4	56 (70%)	56	56	56	56

Number of Orifice	Number of Teeth	MB1	MB2	DB	Palatal
3	36 (45%)	36	-	36	36
4	44 (55%)	44	44	44	44

4. DISCUSSION

According to the historical triangle, "debridement, disinfection, and obturation" are crucial for the effectiveness of root canal therapy³, and for each, a clinician needs to have a thorough understanding of root canal morphology. Main reason of root canal therapy failure to identify root canals, which may diminish likelihood of treatment success.⁴

Inability to correctly identify and treat each canal in the root canal system is generally acknowledged as significant barrier in accomplishment of root canal therapy. Onerous root anatomy is directly linked with the increased incidence and risk of missed canal. This is specifically associated while treating molars.⁵⁻⁷

The MB2 canal's opening in the pulpal floor is small and harder to see them compared to orifices of the other canals. When mesially placed, it is frequently concealed in a tiny groove or behind the shelf of the dentine wall. It frequently needs to be exposed by carefully removing dentine.⁸

There is documented evidence of an intricate root canal anatomy with isthmuses, fins, anastomoses in mesiobuccal root of maxillary molars. Mesiobuccal root of permanent maxillary molars typically has a second canal, which is one of the

common alterations. More than 93% of maxillary first permanent molars and 60% of second molars have MB2 canals, according to in vitro research conducted by Stropko JJ et al. in 1999.⁹

Dental loupes offer a magnification for greater visualization, allowing the practitioner to treat conditions that would otherwise thought to have a poor prognosis or be untreatable. With Dental Operating Microscope (DOM), Kulild JC (1990) discovered two mesiobuccal root canals in maxillary molars of 95.2% subjects.¹⁰

According to Baratto Filho and co-researchers (2009), the frequency of supplementary canals being found in MB root of maxillary first molars was 95.45% (CBCT results), 95.63% (clinical data), and 92.85% (ex vivo).¹¹ Histological sections and CBCT reconstructions of root canal networks were compared by Michetti et al (2010).The CBCT data and histological sections showed a significant association, according to the authors.¹²

The method utilized, different sectioning procedures, various social groupings, various age groups, with or without magnification, etc., all have a significant impact on the frequency. The reduced incidence of MB2 canals in clinical settings as opposed to in vitro research may be explained by limited accessibility and vision in a clinical context along with chances of perforation.

5. CONCLUSION

According to the current study, 70% and 55%, respectively, of the first and second molars had MB2 canals. So its necessitate thorough examined of pulpal floor of maxillary molars during endodontic therapy to identify any "extra" canal orifices, particularly the second mesiobuccal canal, by scraping away the constrictive dentin above the orifices.

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