

MB2 and Magnification

J Endod. 2002 Apr;28(4):324-7.

Effect of magnification on locating the MB2 canal in maxillary molars.

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The purpose of this study was to determine if the surgical operating microscope and/or dental loupes could enhance the practitioner's ability to locate the second mesiobuccal canal (MB2) canal of maxillary molars in an in vivo, clinical setting. The participating endodontists documented 312 cases of root canal therapy on maxillary first and second molars. Participants that used the microscope or dental loupes located the MB2 canal with a frequency of 57.4% and 55.3%, respectively. Those using no magnification located the MB2 canal with a frequency of 18.2%. When no magnification was used, significantly fewer MB2 canals were located based by Chi-square analysis at $p < 0.01$. There was no significant difference between the use of the microscope and dental loupes in the frequency of locating the MB2 canal. When the maxillary first molars were considered separately, the frequency of MB2 canal detection for the microscope, dental loupes, and no magnification groups was 71.1%, 62.5%, and 17.2%, respectively. The results of this study show that the use of magnification in combined groups leads to a MB2 detection rate approximately three times that of the nonmagnification group and that the use of no magnification results in the location of significantly fewer MB2 canals. Based on these results, more emphasis should be placed on the importance of using magnification for locating the MB2 canal.

J Endod. 1999 Jun;25(6):446-50.

Canal morphology of maxillary molars: clinical observations of canal configurations.

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An examination of 1732 conventionally treated maxillary molars was made in an attempt to determine the percentage of MB2 canals that could be located routinely. The teeth examined were 1096 first molars, 611 second molars, and 25 third molars. The results were recorded on a modified computer program over an 8-yr period of time. An interesting trend was noted. The MB2 canal was found in 802 (73.2%) first molars, 310 (50.7%) second molars, and 5 (20.0%) third molars. It occurred as a separate canal in 54.9% of first molars, 45.6% of second molars, and joined in all third molars. However, as the operator became more experienced, scheduled sufficient clinical time, routinely employed the dental operating microscope, and used specific instruments adapted for microendodontics, MB2 canals were located in 93.0% of first molars and 60.4% in second molars.

J Endod. 1997 Apr;23(4):236-8.

Factors affecting the negotiability of second mesiobuccal canals in maxillary molars.

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Factors affecting the negotiability of MB2 canals were evaluated by studying 87 extracted maxillary molars that had undergone previous endodontic treatment in the endodontic technique laboratory. The mesiobuccal roots were resected and radiographed, after which a #08 file was used in an attempt to negotiate those roots with the potential for a second mesiobuccal canal. The file was then intentionally separated in the MB2 canals that could be negotiated. The roots were decalcified, cleared, and observed under a stereomicroscope. Several factors that could interfere with the total or partial negotiation of MB2 canals were identified and included accumulation of debris and sealer that blocked access to these canals, dentinal debris produced with the pathfinding instrument, the presence of anatomical variations, diffuse calcifications, and pulp stones.

J Endod. 2002 Jun;28(6):477-9.

Clinical investigation of second mesiobuccal canals in endodontically treated and retreated maxillary molars.

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An examination of 1873 conventionally treated and retreated maxillary first and second molars was made in an attempt to determine the percentage of second mesiobuccal (MB2) canals that could be located routinely and evaluate if there were any significant differences between initial treatments and retreatments. The teeth examined were 1193 first molars and 680 second molars treated consecutively over a 2-yr period by five endodontists. Overall the MB2 canal was found in 724 (61%) first molars and 245 (36%) second molars. The incidence of a MB2 canal in first molar retreatments was 67% compared to a 59% incidence in initial treatments. Whereas in second molars, the retreatment incidence was 44% compared with 35% in initial treatments. The significant difference in the incidence of a MB2 canal between initial treatments and retreatments suggests that failure to find and treat existing MB2 canals will decrease the long-term prognosis.

J Endod. 2000 Nov;26(11):673-4.

Frequency of second mesiobuccal canals in maxillary molars as determined by use of an operating microscope: a clinical study.

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Operating microscopes have recently been introduced to facilitate treatment of surgical and nonsurgical endodontic cases. The aim of this study was to determine in an in vivo clinical study if the use of an operating microscope would increase the number of second mesiobuccal canals located and obturated in maxillary first and second molars. Two hundred maxillary first and second molars treated with the aid of a microscope were evaluated. The number of second mesiobuccal canals that could be negotiated and obturated within 4 mm of the apex was recorded. Thirty percent of all maxillary molars had a negotiable second mesiobuccal canal. Evaluated separately, 33.1% of the maxillary first molars and 24.3% of the second molars had a negotiable second mesiobuccal canal. Results indicated that use of a surgical microscope did not increase the number of second mesiobuccal canals located, compared with those reports where access preparations were modified and the microscope was not used.

Aust Endod J. 2002 Aug;28(2):57-60.

Identification of second canals in the mesiobuccal root of maxillary first and second molars using magnifying loupes or an operating microscope.

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Various authors have investigated the frequency of second canals (MB2) in the mesiobuccal roots of maxillary molars, predominantly first molars. Further, it has been reported that the percentage of MB2 canals that are treated during routine endodontic therapy is much lower than the number of second canals identified in vitro. It was the purpose of this study to investigate whether the use of an operating microscope may improve the diagnosis of MB2 canals in mesiobuccal roots of maxillary molars. The canal orifices of 100 maxillary first and second molars (50 of each) were initially inspected by Examiner 1 using individually-adapted x2 magnifying loupes. Subsequently, all teeth were examined by a second investigator using an operating microscope (OPM) with x8 magnification. Finally, the mesiobuccal roots of all teeth were separated. Then, the sections were analysed histologically and by SEM. The histological investigation revealed a total number of 63 MB2 canals, 39 in first, and 24 in second molars. Only 26 (41.3%) of those canals were identified using magnifying loupes, whereas 59 (93.7%) were found by means of an operating microscope.

J Endod. 2000 Sep;26(9):532-4.

Orifice locating with a microscope.

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The purpose of this study was to determine whether the use of the dental operating microscope (DOM) could increase the number of root canal orifices located in mandibular molars. Ninety-three first and 111 second extracted mandibular molars were used. With the naked eye, all access cavities were prepared and the number of canals in each root was recorded. Using a DOM with x8-x13 magnification, all teeth had the access cavity preparations again examined. With the naked eye, a total of 641 canals were seen in all teeth. After the DOM examination, 50 more canals could be visualized, representing a 7.8% increase in the total number of located canals. From these canals, 35 were located in the first molars and 15 in the second molars. The use of the DOM increases the number of root canal orifices located.