

The MB2 Canal:

Following the Map of the Pulpal Floor

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A recent epidemiological study noted that 97% of 1,462,936 endodontically treated teeth were retained in symptom-free function over an 8-year follow-up period.¹ This outstanding accomplishment can be attributed to coordinated advances in research and technology that have enabled practitioners to raise the standards of clinical endodontic care. For instance, anatomical complexities of root canal systems have been

appreciated since 1925.² We are now able to identify and treat many more of these complexities than in the past, leading to greater opportunities for successful endodontic outcomes.

A prime example of this elevated standard may be found in the mesiobuccal (MB) root of maxillary molars. Clinicians should consider treating these roots as if they always have two canals until proven otherwise. Untreated

mesiobuccal 2 (MB2) canals have been implicated in therapy-resistant endodontic infections (Figure 1).³ Magnification has been found to increase the detection rate of MB2 canals from 17.2% with the naked eye, to 62.5% with loupes and 71.1% using the surgical operating microscope.⁴ Utilizing microsurgical instruments and a surgical operating microscope, Stropko was able to

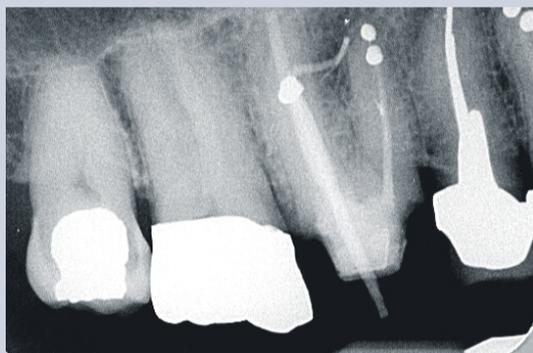
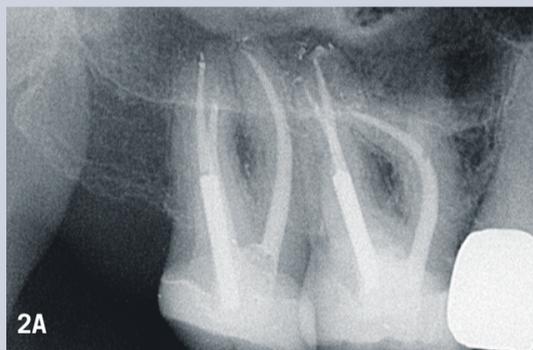


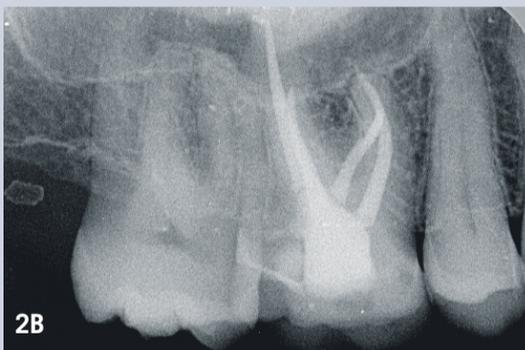
Figure 1A. Sinus tract tracing of an unsuccessful surgical attempt to resolve endodontic failure using retrograde amalgam.



Figure 1B. Additional MB canal located when MB root was reentered. Isthmus and lateral canal present in apical region.



2A



2B



2C

Figures 2A-2C. Variations in MB root configurations: Weine Types I, II, and III.



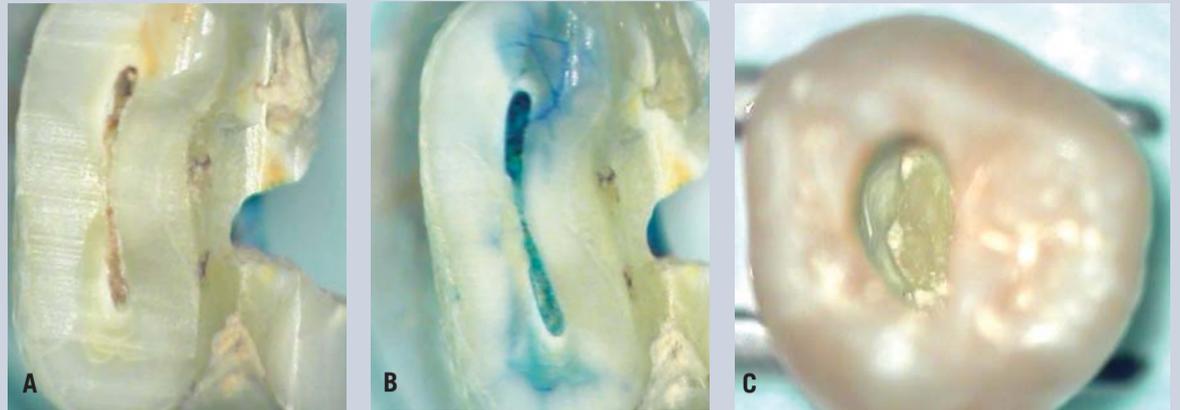
Figure 3. Weine's classification of MB root canal configurations. Type I – single canal from pulp chamber to apex; Type II – two canals leaving the chamber and merging to form a single canal short of the apex; Type III – two separate and distinct canals from chamber to apex; Type IV – one canal leaving the chamber and dividing into two separate and distinct canals.



Figure 4. Road map of pulp chamber floor depicting developmental grooves between root canals.

Table. Protocol for Locating MB2 Canals

- **Road Map.** Using a rhomboid access, follow the road map that the developmental grooves form on the pulpal floor. The MB2 canal is palatal and often mesial (under the marginal ridge) to a line drawn between the MB1 and palatal canal (Figure 4).
- **Remove Mesial Shelf.** After locating the MB1 canal, remove the mesial dentin shelf which represents the roof of the pulp chamber overlying the MB2 orifice. Enter the MB2 canal from a flat pulpal floor angling a precurved file from the distal toward the mesial.
- **Highlight.** Use stains (eg, 1% methylene blue or dentin powder created by drilling) to highlight the pulp chamber anatomy (Figure 5).
- **Trough.** Trough and search with low-speed burs or ultrasonic tips (Figure 6), beginning from the MB1 orifice. Also try not to exceed a depth of 2 mm to 3 mm as this could weaken the mesial furcation.
- **Bubble Test.** A bubble test with sodium hypochlorite in the pulp chamber may be helpful in detecting organic tissue within the MB2 canal.
- **Chelate.** Chelating agents (ie, EDTA) can assist in removing the smear layer and softening calcifications inside the pulp chamber, allowing for easier access to canal openings.
- **Remember the Isthmus.** Maxillary MB roots are not perfectly round in cross-section (Figure 5). Different anatomic configurations are present at different levels of the same root, especially in the apical 4 mm.⁹



Figures 5A-5C. Cross-section of maxillary MB root shows two canals connected by isthmus. **5A.** Unstained. **5B.** Methylene blue stain highlights isthmus and network of accessory canals. **5C.** Dentin dust created by drilling highlights MB1 and MB2 canals connected by isthmus.



Figures 6A-6E. Troughing and searching aids. **6A.** LN bur (Dentsply, Milford, DE). **6B, 6C.** Moller burs (Brasseler, Savannah, GA). **6D.** Munce #1 bur (CJM Engineering, Santa Barbara, CA). **6E.** KIS 2 ultrasonic tip (Dentsply Tulsa, Tulsa, OK).

identify and treat MB2 canals in 93% of maxillary first molars and 60.4% of maxillary second molars.⁵

Weine's classification⁶ has been used to describe four common configurations of the maxillary MB root. Type I is a single canal from orifice to apex, Type II has two orifices that converge to one, Type III has separate and distinct canals from orifice to apex, and Type IV begins as one canal and diverges into two separate canals (Figures 2 and 3). Type II and III canals comprised almost 95% of all teeth in Kulild's study.⁷ Gilles et al noted two orifices in the MB root in 81% of maxillary first molars and 59% of second molars.⁸ This data reminds clinicians to search for two canal openings

the majority of the time. The table provided describes a protocol that may aid in locating MB roots of maxillary molars.

Endodontic research and technology are continually evolving to enable practitioners to identify, disinfect, and obturate root canal systems predictably and efficiently. Since the ultimate goal for patients and practitioners alike is the retention of natural teeth for a lifetime, endodontic therapy remains, and will continue to be, the primary treatment choice for teeth with pulpal and/or periradicular pathology. ■

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