Hi folks, I often read about not finding MB2s in upper molars, not knowing where to look or how to uncover them. I had a light day yesterday, so I had a chance to fully document this case for you. Hopefully, it helps to not only show where the MB2 is located and the angle it initially takes, but also what the microscope can show for endo at high mag.

This was a 45-year-old lady who has had intermittent lingering pain to cold and spontaneous pain on her upper left 2nd molar with large resin in place.

I opened the tooth and found DB and Pal canals to be vital and easy to find because of bleeding. MB1 and MB2 were non-vital and not easy to see at all. I used an ultrasonic tip to uncover the MB1 canal, which was not on the same plane as the DB canal (not a straight triangle), and so I assumed there would be an MB2. The tip used is called the Carr Killer Ultrasonic tip (www.eie2.com) and it was in the EMS mini endo unit.

Now to look for the MB2 canal, I placed water on the floor of the pulp chamber. Quite often you get a chance to read the dentin map, which is subtle shades of the pulpal floor that allow you to see where the canal may be. Typically it involves shades of gray that lead to the canals. In this case something was visible, but not clear. The next thing to do is to trough 2-3 mm down following the dentin map and have another look. There was the tell-tale white line (tissue) between the uncovered MB1 and the position where the MB2 would be, which is mesial to a line drawn between the MB and Palatal so almost always you have to remove some of the mesial wall of your access. It’s interesting to note how I had to trough 3 mm down to get a good view, and also note the angle that the MB2 initially is entered at, USUALLY MESIAL AND LINGUAL to that of the MB1.

The MB1 and MB2 were completely separate even though the post-op film was straight on and didn’t separate them. I can usually tell by irrigation. If you place bleach down the MB1 canal and the MB2 fills up as well, then suck back and see if the MB2 dries up. This means there is a connection. Of course you can also tell by putting two files into both canals at the same time. These two were separate portals of exit, so it was good I found both.

My file system, which really is unimportant, is the K3 VTVD (variable tip and variable taper: For example, alternating between 06 and 04 tapers and changing the tip size of each file as well). This has been shown by John McSpadden to reduce file breakage. Typical sequence is:

• Hand file 06- 20 to apex with Glyde
• .12 , .10, .08 tapered coronal shapers (17 mm length) to open coronal half
• .04 #40
• .06 #55
• .04 #30
• .06 #25
• .04 #20
• .06 #15 (if needed)
• Then taper back from there to gauge the apex with a file. (In this case MB1, MB2, and DB canals filled with 04 #35-#40 tips cut specifically with a gauge.) In the palatal canal I used a 06 #35 tip.
• EWT sealer, System B downpack and Obtura backfill to obturate.

Note the nice accessory canals in the apical third on the DB and Palatal canals. Time to complete case...90 mins.

I hope you find this interesting. It is pretty standard for me to find a 4th canal in a molar both maxillary and mandibular first and second molars.
Glenn, you stated that MB1 and DB were not in the same plane. Is this the main clue in suspecting a MB2?

Hi there Bogdan, here is a drawing I attempted on my Wacom Tablet, a little crude but the idea is there to explain what I was looking for.

I noticed, in your photos, an almost perfect illustration of why you sometimes can’t “get into” or negotiate MB2. If you look at your first view with a file in the MB2 canal, notice the direction the file takes as it enters the canal. In this view, you can clearly see you don’t have straight-line access, and I am not criticizing you, but this illustrates a very important factor in fully negotiating the MB2 canal, as you well know.

Very often, the MB2 is initially difficult to fully negotiate because you have to enter the canal from the disto-palatal, at a more extreme distal angle than the MB1 canal. Quite often I cannot negotiate the canal until after I have opened up the coronal one-third of the canal, i.e., started crown-down. Some use orifice openers, others use Gates Glidden burs, while still others use a Pesso. (Right Barry?) You clearly show straight-line access to the MB2 in your instrumented photos.

Again, an EXCELLENT post illustrating the location and negotiation of the elusive MB2.
Which ultrasonic system do y'all recommend? I don't currently have one, and it really seems everyone here finds them to be best for searching for canals (especially those hard-to-find MB2s), agitating the NaOCl, opening the orifices, etc.

What kind of cost am I looking at if I wanted to invest, and which companies should I check out?

Glenn, the diagram you drew above: Is that really the typical location of MB2s? There have been several times I've been sure found it, but could not get even a 6 file into it, so I've been hesitant to trough.

Since I don't currently have an ultrasonic, will a small slow-speed round bur work as well until I can afford/get one?

I don't have an ultrasonic either Chip. Call up Brasseler and order some of their Mueller burs, smallest size they make. It's a tiny round bur on a thin shank like a Gates Glidden. Easy to visualize where you're troughing.

Satelec P5 is a good ultrasonic, Chip, with lots of tips for endo and hygiene. If you go to www.eie2.com you can find some tips that fit different units.

You can use Mueller burs, but not for agitating the solutions in the canals, not for rotating out posts and pins, not for loosening up separated instruments, etc.

I have the EMS mini endo, but most people suggest either the Satelec P5 or you can check out the Obtura Spartan unit as well.

Chip, yes, that diagram is right in that many, many times the MB2 is located mesial to a line drawn from the MB1 to the Pal especially when the MB1 is as far buccal in the MB cusp as this one was.

Another couple of hints, if the MB root is wide, then there usually is a 2nd canal (when you look on the radiograph if the root is wide). If the MB1 is not centered in the root, then it is usual to find a 2nd canal.

If the MB 1 is not so far to the buccal there can be a 2nd canal (MB2), but many times if they are quite close, then you will find that they join.

In theory, if the two canals join and you get all the way down the MB1 to the apex, then you will have a better chance of success, but as you see from the studies I posted, in many studies more than 50% DON'T join.

Yes, Glenn, very helpful info. and I'll start using it this week! So does this mean you're using the same kind of ultrasonics you use for perio?

Hi Chip, I don't use the same unit. My mini EMS is actually installed into my delivery system (like a handpiece), so I can just attach tips as needed. I have hygiene tips from Spartan Obutra and also a variety of ultrasonic tips from www.eie2.com. (The hygienists are using the Cavitron units.)

The ultrasonics, though, can be used for more than just troughing for canals. You know, what I do is listen to and watch very closely the great endodontists.

Almost all ultrasonics are for straightening out access preps to have straight-line access, and to trough like I showed is actually much quicker than a Mueller bur, when you use these Carr tips. They are awesome and in a period of 5-10 secs you can get a trough 3-4 mm deep following the white line and presto the MB2 is there.
Ultrasonics do require good mag, though, to see what you are doing, especially the long thin ones for removing separated files.

I know I harp about magnification all the time, but in all honesty, troughing around posts or separated files isn’t for the faint of heart. Troughing on the floor of an access prep is not as worrisome.

Since I started spending so much time on this site, I find MB2s most of the time, although, I find the instrumenting of them difficult. I have had 3 recent cases where I was sure there was a 4th canal, but couldn’t get into it. Multiple .06s trashed. Then the pièce de résistance on Friday troughing for MB2 and perfed—man that just ruins your day/weekend/all the time, until you see the patient again to obturate it, place MTA and explain yourself—can’t wait! Luckily he’s a 70-year-old man—the only positive I can find in this situation. The scary thing for me is: I’m not sure how it happened. It was all going so well, and then it went pear shaped. How deep is too deep? Obviously not so deep that you perf, but is 2 mm deep too close for comfort? I know I won’t be troughing as aggressively as I have from now on. More annoying for me was that I think it would have been less likely with my scope, which was delivered a few days earlier and was sitting out front in boxes.

Glenn, love the radiographic results you are getting, and for molars I am going to change out from the SafeSiders—scared of strip perfs in curved MB canal, palatal canals are usually too big for the medium point, etc. Love to know what system you are using.

My Friday finished in fantastic fashion with an upper 5 I had prepped a week earlier and the patient had some ongoing symptoms. I had searched for 2 canals initially ribbon in shape. Went back in, found BU canal and couldn’t get beyond 3 mm from working length due to pain that couldn’t be stopped with 4 cartridges of articaine—off to endodontist! Still don’t know why that happens sometimes, but it has happened to me previously. These are the days when you hate endo and dentistry. Sorry just venting. I see work like Senor, Mark Dreyer and Glenn van As’ and get excited again.


Hi Cam, I feel your pain. I too got very frustrated when I couldn’t get the results the endodontists were getting. I went and saw my buddy Cliff Ruddle with Steve Buchanan in Oct. of 1997 and saw what they were doing with a scope and thought, “Oh my God. It’s either stop doing endo, or do it to the best of my ability.” I got my first scope early in 1998 and endo became significantly more predictable.

As for SafeSiders, I have no experience with them at all. Barry Musikant has a lot of supporters and it seems as if it is a system designed for GPs who want to reduce the risk of fracturing NiTi. I don’t know how many endodontists use them at all, but I am sure Barry can tell us.

One thing I do know is if you go to a #20 handfile to the apex, then you can easily get NiTi files to go crown down to the apex with much less fear of fracture.

I often will extend the smaller files down through the apex to get the wider files to go. So a #6 goes through the apex a mm or so and the #8 goes to length, it goes a mm through the apex (I have the apex locator on it) and the #10 goes to length, etc., until I get a #20 through to the end of the root.

Then coronal shapers with the K3 - 12, 10 and 08 tapers to shape the coronal half.

Then K3 VTVT (varying taper and tip) consecutively between the two, as I mentioned in the opening post.

Then gauge the apex and use warm vertical—System B, Obtura with Dovgan pluggers for the downpack.

I haven’t used Resilon yet at all, but may start in the near future. I am using the Er:YAG laser to help reduce bacterial count and in addition to remove the smear layer before I obturate.

Thanks for the kind remarks and remember if you have never perfed you aren’t doing much endo in my opinion!!

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