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roots

the international C.E. magazine of endodontics

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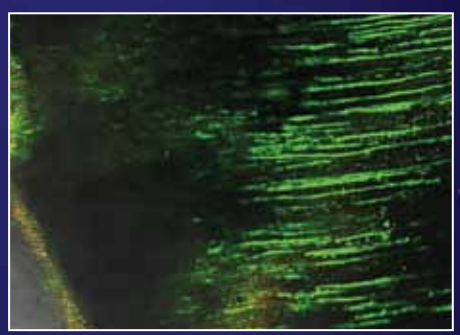

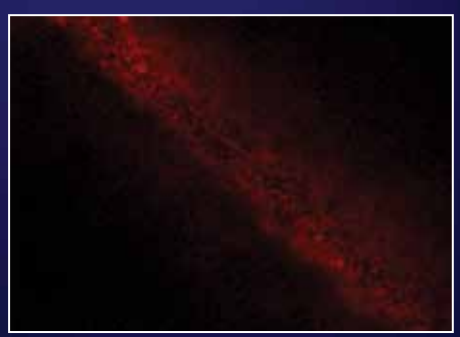

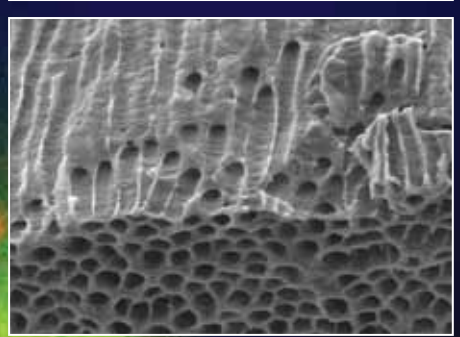

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_trends
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Valuable summer reading

Fred Weinstein, DMD, MRCD(C), FICD, FACD

It was a pleasure to see so many of you at the recent American Association of Endodontists Annual Session in Boston. Each year, the meeting is a wonderful opportunity to connect with one another, to learn about new products and to discover new techniques and innovations.

Now that summer is upon us, it's also a good opportunity to catch up on some reading, and I hope that you will find this issue of *roots* to be beneficial.

Presented within the pages of this publication, among many other articles, you will find an interesting case report and an article about endodontic technology. You will also find our meeting coverage from AAE, plus articles on some of the latest product offerings.

What makes roots even more beneficial is its C.E. component.

By reading the article on apical microsurgery by Dr. John Stropko, then taking a short online quiz about this article at *www.DTStudyClub.com*, you will gain one ADA CERP-certified C.E. credit. Remember that since *roots* is a quarterly magazine, you can actually chisel four C.E. credits per year out of your already busy life without the lost revenue and time away from your practice.

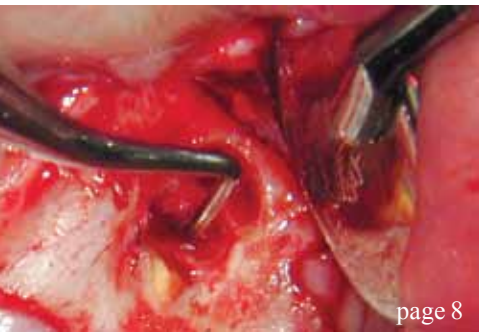
To learn more about how you can take advantage of this C.E. opportunity, visit *www.DTStudyClub.com*. Annual subscribers to the magazine ($50) need only register at the Dental Tribune Study Club website to access these C.E. materials free of charge. Non-subscribers may take the C.E. quiz after registering on the DT Study Club website and paying a nominal fee.

I hope that you will take the time to read all of the articles presented here in *roots*, and please send me your feedback and ideas. I can be contacted at *f.weinstein@dental-tribune.com*.

Until we meet again at the fall meetings, I wish you the very best.

Sincerely,

Fred Weinstein, DMD, MRCD(C), FICD, FACD
Editor in Chief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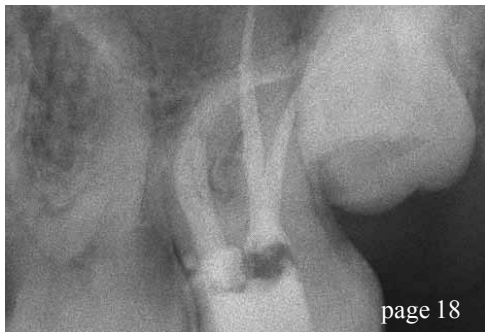
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on the cover

Confocal imaging showing live E. faecalis in green (main image), infiltration of the bacteria into the dentin tubules (upper right), post treatment 30 seconds with Photon Induced Photoacoustic Streaming (PIPS) showing no live bacteria (middle right) only dentin auto fluorescence in red. The samples were then imaged via SEM, confirming the effectiveness of PIPS application (lower right). Images courtesy of Enrico DiVito, DDS, and Technology4Medicine.

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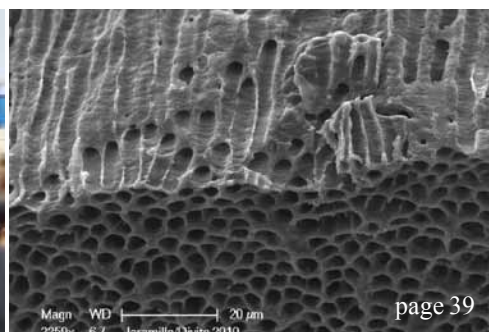
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Endodontist, Sarasota, FL

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2012

Predictable apical microsurgery (Part II)

Author_John Stropko, DDS

_c.e. credit

This article qualifies for C.E. credit. To take the C.E. quiz, log on to *www.dtstudyclub.com*. The quiz will be available on June 15, 2012.

_The REB and REP

_The amount, or degree, of the root-end bevel (REB) is of utmost importance and should be precisely planned in advance after considering the overall crown/root ratio, presence of posts or other obstacles, the root anatomy and the periodontal status of the tooth. According to previous research, 98 percent of canal system ramifications occur in the apical 3 mm.[1]

If the bevel is long (traditionally 25 degrees to 45 degrees) an excessive amount of root structure would have to be removed to include the apical 3 mm on the palatal, or lingual, part of the root's apical canal system (especially in roots with multi canals). If the bevel is closer to 0 degrees, the lingual 3 mm is easier to remove; more root structure can be conserved, improving the crown/root ratio. With a long bevel, there is also an increased risk of completely missing some important palatal, or lingual, anatomy, especially if the operator is in any measure trying to be conservative in order to preserve as much crown/root ratio as possible (Fig. 1).

The long bevel creates a spatial problem that is generally impossible for the operator to overcome while trying to visualize the true long axis of the canal system (Fig. 2). The longer the bevel, the greater the tendency is for the operator to leave more of the palatal, or lingual, aspect of the root intact. Because it is difficult to visualize the long axis of the tooth, the resultant retroprep is not as likely to be within the long axis of the canal.

This concept is of utmost importance and is the primary reason that, on occasion, the retroprep unintentionally perforates to the lingual or palatal (Figs. 3a, 3b).

Another important consideration is, with a bevel as close to 0 degrees as possible, the cavo-surface marginal dimensions (bet you haven't heard that term in a while!) of the root end preparation will be considerably decreased. Therefore, the restoration will be easier to place and have less chance of leakage.

The root anatomy is especially important when there are more than two canals in one root. This occurs most commonly in maxillary bicuspids and in the mesial roots of nearly all molars. It has been shown that as many as 93 percent of the MB roots of the maxillary first molars have a second (MB2) canal.[2] However, the operator has to be constantly aware that multiple canals can occur in any root, no matter what tooth is being operated on. If there is an isthmus present, it can usually be seen with the OM if the root has been adequately beveled and stained with methylene blue.

The refinement of the bevel is best accomplished with a surgical length 1171 carbide-tapered fissure

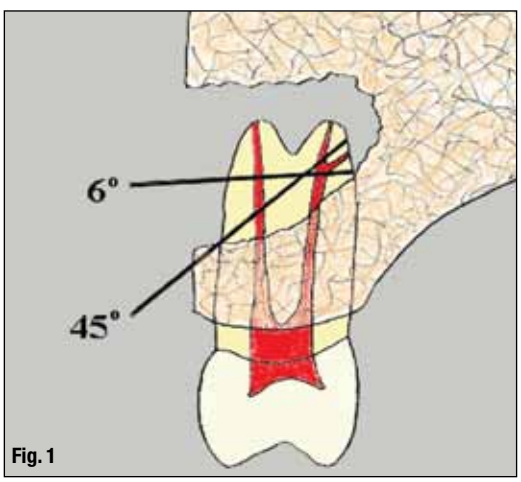

Fig. 1

Fig. 1_Illustration of the effect that different bevel angles have on root length, including the missing of potential lingual anatomy. (Photos/ Provided by Dr. John Stropko, unless otherwise noted.)

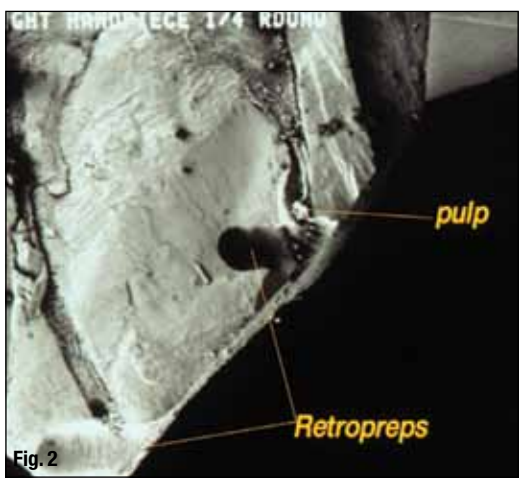

Fig. 2

Fig. 2_Long bevel with round bur preps, demonstrating angulation and orientation problems, courtesy of Dr. Gary Carr.

Fig. 3a

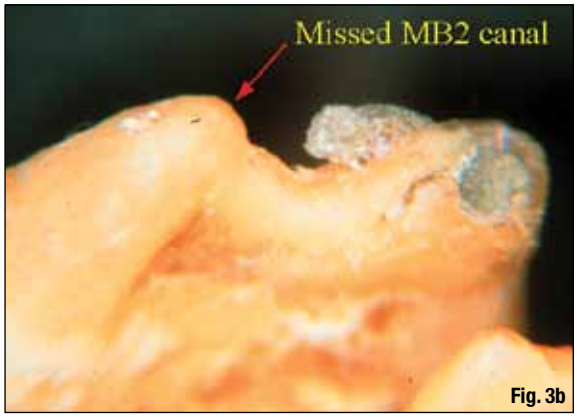

Fig. 3b

Figs. 3a, 3b_Inadequate and acute 45-degree bevel clearly shows how perforations can occur and canals can be missed. Fig. 3a is the surgeon's view from the buccal. Fig. 3b is what actually occurred but was completely missed by the operator.

bur (Brasseler) in a 45-degree handpiece (Sybron-Dental). These handpieces have no air exiting from the working end, which nearly eliminates the possibility of an air emphysema, or air embolism, beneath the flap.

A standard high-speed handpiece should never be used for the above reason. On occasion, the refinement of the bevel can cause additional bleeding due to some enlargement of the crypt. The operator should address any newly created crypt management problem before proceeding any further. Remember that it is of utmost importance to fully complete one step before proceeding to another!

After the REB is refined and crypt management is completely under control, the apical surface is rinsed and dried with a Stropko Irrigator (*www.stropko.com*). The clean and dried surface is then stained with methylene blue. It is important to allow the methylene blue to remain on the tooth for just a short period of time before gently rinsing and drying again to enable inspection of the stained surface.

Normally, a fresh, white piece of Telfa is reinserted for better lighting. If there are any fractures, presence of isthmus tissue or accessories present, the staining will greatly enhance the operator's ability to visualize them. Also, the methylene blue will stain the periodontal ligament and enable the operator to be sure the apex has been completely resected (Fig. 4). If there is an accessory canal present, the easiest answer is usually to bevel past it and restain. Or, on occasion, the accessory can be "troughed out," leaving the bevel as is.

When two canals are present in the same root, it is necessary to prepare for an isthmus between the two canals even if the staining didn't reveal one. It has been shown that in the mesiobuccal roots of the maxillary first molars with two canals, the 4 mm section displayed a partial or complete isthmus 100 percent of the time.[3] This combined with the finding in the same root in maxillary molars, that two canals present clinically at least 93 percent of the time in the mesiobuccal root of the maxillary first molar, lends importance to always preparing isthmus area of the REB.[2]

Although staining doesn't always reveal the presence of an isthmus, it may lie just below the surface, only to be exposed during the remodeling process of the surface of the beveled root that normally takes place during the healing process (Fig. 5). The rule is to always prepare an isthmus when there are two canals in one root.

The preparation of the root-end preparation (REP) is best accomplished using ultrasonics. There are many different ultrasonic units available. For the most part, they are all dependable and have a good service record. There are multitudes of ultrasonic tips to choose from. The newer diamond coated and vented tips (ProUltra Tips from DENTSPLY Tulsa Dental or KIS Tips from Obtura/Spartan) are much more efficient and especially good at removing gutta-percha.

The most important consideration is not the brand of the ultrasonic unit or type of tip but how the instrument is used. The tendency for the new operator is to use the ultrasonic in the same manner (pressure-wise) as the handpiece. The secret is to start at a low power setting and use an extremely light touch! The lighter the touch, the more efficient the action of the tip will be.

The correct amount of coolant is also important. If too much spray is used, visibility and cutting efficiency are both decreased. If too little spray is used, the necessary amount of cooling will not be available and overheating and/or micro cracks can be the result.

The occasional left and right, variously angled tips are necessary on occasion, but in most cases, the anterior type tips will suffice. If the canal is large and/or filled with gutta-percha, a larger, coated tip can be used most efficiently. The key is to: 1) slow down; 2) be gentle; 3) use a light, brushing movement; and 4) carefully regulate the power setting of the ultrasonic unit. The power setting will vary greatly depending on the tip being used and nature of the preparation task at hand.