I’ve noticed quite a few people here use the single-cone obturation technique for obturation and I have a few questions about it. How do you obturate a ribbon-shaped canal or one with an oval appearance with a single-cone technique? Is it possible? Do you do the same thing and just use accessory cones (like cold lateral) or is there another way? Also, for those of you who perform the single-cone technique, what is your procedure/materials used? I’m interested because I was taught warm vertical in dental school, learned lateral in my residency and now the senior doc I’m going to be working for uses the single-cone technique. Thanks.

Josh, here is the rationale and mechanics behind the single-point fill. First of all, to do it properly, it requires a preparation that has enough taper (at least .06 mm) to allow the canals to be efficiently irrigated with NaOCl and 17% EDTA. I also prepare the canal apically to a minimum of 35. This allows the placement of a medium point from Dentsply Maillefer or a 30/06 from Lexicon to be placed with significant tug-back with little or no apical length adjustment. This alone will not allow a three-dimensional fill. To accomplish the three-dimensional fill, the canal must be flooded with epoxy-resin, the bidirectional spiral. In the words of Rich Fossum, it will have the look of a corn dog when the cement is properly applied to the bidirectional spiral. This applicator has the ability to thoroughly flood the canal without driving cement over the apex. The pre-fitted gutta percha point, in most cases the medium or the 30/06, is then liberally coated with cement, so it too has the look of a corn dog. You now have a situation where the canal is almost completely coated with cement. This cement will be driven laterally with significant force by the tapered, well-coated gutta percha point. The hydraulics forced upon a cement that has better flow than thermoplasticized gutta percha by the well-coated gutta percha point drives the cement into all the lateral invaginations that exist. Epoxy-resin has the properties of bonding to both dentin and gutta percha. It does not shrink upon polymerization and, in fact, expands along with the gutta percha as it warms to body temperature from room temperature. It is hydrophobic and, thus, highly resistant to hydrolytic degradation. If the smear layer is first removed with 17% EDTA, it has been shown that the epoxy-resin will penetrate to a minimum of 30 microns into the dentinal tubules. The end result is a far simpler way of attaining a three-dimensional fill without adding the complexity of warming the gutta percha, which must shrink upon cooling to body temperature. In this case, the relative simplicity of the procedure enhances the predictability of the obturation procedure. I have been doing it this way for about 11 years with what appear to be excellent clinical results. I might add that given a very oval canal, there is nothing that precludes me from placing one or more accessory points. However, I will never apply more than the weight of my hand to a spreader to create the lateral space for the subsequent points, which also are liberally coated with cement. Far more times than not, however, I use a single point for complete obturation. We can continue this discussion if you wish and I will be happy to present the studies for all the statements that I made above.

Barry Musikant

continued on page 30
Barry, thanks for the great response. Just one question, do you rinse with the 17% EDTA before rinsing with NaOCl, and for how long with each? Up until now I have been using just NaOCl for irrigation and lubrication of the canal, while C&S [cleaning and shaping] and before obturating with lateral condensation. Sometimes I feel I may not be enlarging the canals enough do to my concern over possible root fracture with lateral condensation. Do you take your molar canals to 35/.06 as well? What about central incisors? Thanks again. ■ Josh

Based on my past observations, here are some conditions that give sealer puffs.
1. Mismatched master cone size and final instrumentation apical size.
2. Pumping the master cone with sealer.
3. Overloading the canal with sealer, then adding a master cone.
4. Necrotic tooth with lesion. This is quite interesting. A tooth with lesion will generally have a portal of exit (POE) in the center of lucency. Usually, these cases harbor relatively empty canal systems with some remaining necrotic debris. Hydraulics will naturally force sealer into these empty areas. Does this mean that you actually cleaned the lateral canal? We don't know. What I do know is that we don't see many lateral canal puffs on teeth that were one-stepped with a vital pulpal diagnosis.
5. Adequate hydraulics with a heated plugger or System B on the downpack.

I used the word “master cone” because IMO [in my opinion], single cone fills do not accomplish the biologic objectives of a root filling.

Silver points are single cones. Roots are not shaped like .06 gutta percha points. They are ovoid, ribbon-shaped, C-shaped, figure eight-shaped, etc. Sealer, no matter what kind you are using should not be relied on a crutch for a 3-D seal, no matter how you deliver it into the canal system.

Single-cone fills? Isn't this like lateral condensation without adding accessory points? Come on now. I can’t believe this keeps popping up. ■

So is it better to use an obturation technique that applies condensation forces on the root and results in root fractures? From what I’ve read, the literature shows that there is no statistical difference between the seal created by lateral cold vs. warm vertical vs. single-cone obturation. Please correct me if I’m wrong here. I am a new dentist and obviously do not have near the experience of most of you guys on this board. I’d like all your input. I probably need to figure out what technique works best in my hands. I just don’t want to start with a technique and then find out five years later all my endos are failing. Not a good way to start off private practice. Since I’ve recently graduated and done a one-year residency, I have not done nearly as much endo as you guys and also have not been able to monitor the long-term success of any of the treatment I have done. All I know is that I was taught warm vertical in dental school and it was a pain in the @$$. I used lateral in my residence program and was satisfied with the short-term results, but I didn’t like the forces I had to apply to the teeth. Thanks again. ■ Josh

If anybody taught you to put force on the tooth laterally condensing, I don’t think I’m very far out on a limb saying that is absolutely wrong. This is a powerful wedge, to be used carefully. You watch carefully where you are inserting the spreader, sliding the spreader in and at an angle that is logical, and vision what you know from what your shap-
ing tells you is likely to work, and slide it apically with hardly any more force than the weight of your hand. If it doesn’t go, consider reorienting and/or switching to a skinnier spreader. Leave it as long as you conveniently can, rotate left and right first and withdraw, while continuing to rotate. Always polish the spreader before starting. If the access point does not go to the same depth, pull it out and try again. I do not know if there are any endodontists who still do this.

There is no question that warm vertical is harder to learn, but with a little practice it is much quicker on most teeth. And it helps if you have a really good prep, while you get more slack on this with lateral, especially in terms of radiographic appearance. Backfilling with the Obtura gun can be a pain, but you don’t have to use it. You can just fit a chunk of a medium or coarse cone, trimmed to approximately fit and heat and condense that. Some guys coat it with sealer and do things like add powder and that seems to work for them. And there are other ways. Back in my day, we picked up little balls of GP [gutta percha] with a condenser tip and inserted them. Of course in those days we used porcupine quills for condensers. We used trilobites that had been out sunning themselves to heat the GP. The invention of fire was a huge improvement.

Barry’s technique has to be the quickest and easiest of all. And as you mentioned, we are absent results based scientific evidence of the superiority of any technique. I still see lots of Dr. Siskin’s silver point endos, mostly 20-to 30-plus years old, and almost never see a failure. I do not suggest imitating that though, Dr. Siskin was a wizard.

Note, no matter how well it is done, conventional lateral condensation almost never pops a lateral canal. I believe Barry’s technique is better in this regard.

I am not an endodontist or any kind of expert, and all the above is JMHO [just my honest/humble opinion].

My belief is this – in order to place a white line in a canal, the space has to be empty. A master cone goes to length because you instrumented the canal. With regards to a sealer puff in a lateral canal, the same condition applies. If you have a vital case where there is tissue in the lateral canal, hydraulics are unlikely able to push sealer into an already occupied space. Of course, if you find and instrument this lateral canal with a small curved handfile, filling the lateral canal may be possible. Or, if you take your NaOCl irrigating needle to the depth of the lateral canal, you may be able to clean this area. Unfortunately, I think the majority of clinicians do not place an irrigating syringe deep into the canal. In a side venting irrigating syringe, the solution will barely push 1-2mm beyond the tip. I’ve been able to see this with dye in a plastic block. In regards to your comment about a two-step vital case: Ca(OH)2, as an intracanal dressing, if delivered correctly, can have a necrotizing effect on remaining tissue. So, on a second visit, you may be able to push sealer into the lateral canal. In a necrotic tooth with a lesion, there is usually a portal of exit in the middle of a lesion. And example would be a lateral lucency. There is necrotic debris and/or minimum remaining tissue in these areas. With good hydraulics, these areas can be filled with sealer.

Josh, just some thoughts on your questions. Most canals are ovoid or ribbon-shaped and have fins, lateral canals, anastomoses, etc. or do not have a consistent taper (i.e. open or resorbed apex). This is where the hydraulics come into play and are the reason why I prefer warm vertical condensation to lateral or single cone techniques. Gnome posted a great
case a few weeks ago of a lower molar anastomoses making this point.

Here’s a retreatment from today:

Previous endo three years ago – failing. Granted, this system was not initially cleaned and shaped properly in the apical third to begin with, however, once cleaned, this apical shape (distal canal) would be difficult to fill three-dimensionally with a single cone or lateral condensation. With either technique, hydraulics would be difficult or impossible to generate in this broad, ovoid, single distal canal, and it would rely entirely on the sealer to fill the blunderbuss apical space which (if ZOE [zinc oxide-eugenol]-based) would be later resorbed away or (if epoxy) not set adequately in the moist apical environment ultimately leaving only the single cone apically. Also, with warm vertical and the use of minimal sealer, as opposed to large quantities in the single cone technique, very little sealer is extruded into the periapical tissues as would almost certainly happen if spiraling sealer in a case like this.

This is my latest protocol for irrigation. I use 6% NaOCl with RC-Prep, which has 15% EDTA in it. After com-

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Completing the shaping procedure, I then rinse the entire canal with 17% aqueous EDTA, and give a final rinse with 2% CHX [chlorhexidine] irrigating with this blue fluid until the milky precipitate that forms is all washed out. I keep the 17% EDTA in the canal for about a minute and the CHX is in the canal for at least five minutes simply because I leave it in the canal while I am fitting points.

I prepare the canals to the apex to a minimum of 35/02 using the stainless-steel SafeSiders and then step back 1mm to a 40/02. My last instrument is a 25/08, which obviously is not cutting in the most apical few mm, but does impart some deep shaping in the apical third. One thing I think I don’t clarify enough is the number of times that I will open the apex to a much greater diameter than a 35. Often I’ll open canals apically to a 50 or 60, and then continue to flare back using larger sizes in a stepback fashion often giving a taper of .10 mm. I tend to fill these canals with 30/06 that are cut back appropriately to give predictable tug back. ■ Barry Musikant

You’re absolutely right that we depend on our sealers for success in obturation. Studies show that gutta percha, without the use of a sealer interface, will leak terribly. We also know that epoxy resin won’t set in moisture, it needs a dry environment. That’s probably a good thing and may be the reason that overfills are able to be resorbed by the body. I’ve used AH26 for a number of years, and I’ve also used Kerr (ZOE-based). Many cases that I’ve recalled after one or two years using either sealer, particularly large apex cases, show significant sealer resorption in the apical 1-2 mm, revealing over time the true extent of the gutta percha fill. Perhaps, any apical percolation or seepage during the setting of the sealer may have an effect on its ability to set. Interestingly, even in routine cases I’ve seen canals that appear 2mm short after a few years, which had perfect fills with small puffs on the final film. This is my concern with a single-point technique that relies primarily on the sealer for the bulk of obturation, particularly in a non-standard shape like the open apex case I posted. ■