

Rappin with Dr. B.

A ROOTS Guest Day featuring Dr. Steve Buchanan

A transcription of highlights from Feb. 16, 2005

By Dr. Robert Kaufmann

I am a subscriber to the excellent online Endodontic resource www.rxroots.com. One of the advantages of belonging to this group is the RxROOTS "Guest Day". Guest Days offer us the unusual opportunity to interact with world class clinicians and researchers who have committed to being online for a few hours to interact with forum members. Over the internet, in real time we can ask questions and share answers with the hundreds of dentists monitoring the conversation. Here is a partial transcription of some of the conversation that was featured on Feb. 16, 2005.

Questions: (Dr. Robert Kaufmann)

- 1. How does one answer the "single vs. multi-appointment success rate" argument?**
- 2. How does Dr. Buchanan react when he is criticized for mostly publishing his material in non-peer reviewed journals that most serious researchers consider "bathroom reading"?**
- 3. Is there any way for us to bridge the gap between the "Scandinavian Research Oriented – Show me the Studies – Your clinical impressions are meaningless" gang and "wet fingered – I do it everyday so I know it works" clinicians such as himself?**

Dr. Buchanan's Answer:

"I think all three of these questions can be answered with the same statement of my belief in evidence-based clinical knowledge.

First off, I studied under Sam Seltzer and learned to have a healthy skepticism regarding baseless claims and opinions and to value peer-reviewed research published in scientifically respected journals. But I was also taught by Sam the limitations of published literature. Anyone who has gone to a decent post-grad program in Endo has spent hundreds of hours critiquing the literature, certainly not worshiping it. At the end of their training grad students should be able to read published articles, pick them apart and decide for themselves whether the author contributed to their understanding of what works and doesn't work in our procedures."

At this point Dr. Buchanan critiqued a paper that had recently published in the Journal of Endodontics. The researchers had used the files he designed but – according to Dr. Buchanan - in an unorthodox and improper manner. He felt this not only invalidated the paper but caused it to be misleading.

"My point here is, what's so great about peer-reviewed literature when it is a poor model of clinical reality? The list of peer-reviewed research conclusions that later turned out to be either erroneous or seriously misguided is quite a long one, so I have a hard time praying at that alter. With that said, I am totally respectful of great research done by intellectually curious scientists who are looking for answers instead of those who "know all the answers" and are just trying to win a debate."

"I'll give you an example of a research study that I love, Sjogren, et al, 1997. These researchers were very smart, very careful, and very honest. They did a study, came up with surprising results, and while they seemed to be a bit non-plussed to see 100% success in overfilled canals, regardless of whether they had positive or negative culture results, they accurately deconstructed the etiology for the results. In their discussion, they attributed that success to technically excellent shaping and filling, as well as the probability that any remaining bacteria had been entombed within the canal by the fill, as opposed to the poor results achieved when infected canals were underfilled—allowing

the bacteria a path of egress into the periradicular tissues. This paper accurately described clinical endodontic reality thereby furthering our specialty and I *will* worship at that altar.”

Now, back to the claims of some that good articles published in *Dentistry Today* and sage conclusions drawn from clinical experience have no validity. What I most love about the philosophy of evidence-based clinical knowledge is it states that well observed clinical experience is more valid than in vitro research when no well-designed clinical studies are available. I think I would say the same about *Dentistry Today*. In the absence of a peer review article that accurately reflects what happens in a root canal during cone fitting and obturation (i.e., the example from the last JOE where the authors understood so little about the simple concept of preparation shape and cone fit), I would prefer to read an article in *Dentistry Today* by Richard Mounce with a common sense technique description that works.

What about the fact that I've published very little in peer review journals? Jeez, I'm sorry! Can we move on? In no way does my publishing history reflect (sic) disrespect for those who do the harder thing—quite the contrary. I think there are three significant reasons that I've published in *Dentistry Today*:

1. Articles are published within two or three months of submission—when JOE wait time was 18 months (no longer thanks to Ken Hargreaves), the rate of technologic advance in instruments and techniques by far outstripped the time lines of more prestigious journals,
2. The JOE is read by less than 10K dentists and DT is read by 100-140K dentists,
3. I have ADD and it is really hard for me to hang in there for the extended time necessary to get through more respected publications, *mea culpa*.

With that said, it is my greatest professional ambition to submit myself and the research I am doing at the USC grad endo program to the peer review process. We are doing anatomic studies of root end anatomy and instrumentation studies comparing file function, both using m(micro)CT scanning as I've done since 1987. I would like to do a 20 year retrospective study of my cases as well, but don't hold your breath.

In terms of the seemingly huge distance between the “researchers” and the “clinicians”, I would quote Rodney King and say, “can't we all just get along?” As most of us well-versed clinicians read and give respect to researchers for the knowledge they can share, I would only ask the same of them—could they look at what we do that works and explain it instead of saying that it can't work if it hasn't been published? The sun comes up every day whether or not somebody writes about it.

Single visit RCT literally wouldn't be done if it didn't work so predictably. It is really competitive out there in practice—if I had even a ten percent failure rate in Santa Barbara, I wouldn't have a practice in two years. I think the smartest researchers are curious, not opinionated; they are looking at procedural trends in the specialty and for ways to explain what works and doesn't work. It's the Craig Baumgartners, the Jim Simons, the Marcus Haapasalos, and the Mahmoud Torabinejad that I read with anticipation when my JOE gets delivered each month.

Rather than disrespect any of my peers that fear sealer puffs, I would rather seek an understanding of why that is—and I'd probably find out that they use Grossman's Sealer or AH+, two sealers that are quite toxic for three days before setting. They are accurately describing their patient's post-op experiences. I'd be afraid of puffs too if all my patients wanked after I saw one on the post-op radiograph.

When they see the calm demeanor that we “apical barbarians” exhibit when there is surplus filling material at the end of a case, I'd like them to ask themselves the question, do they use different sealer and do the tapered shapes they create have a more predictable potential to be sealed than the apical stop prep?

When they are afraid to do single visit endodontics because (as we have all known) it is difficult to sterilize a complex root canal system still in a patient's head, I'd like them to read Sjogren's study again and think “Oh, those guys pull it off because they do their best to fill to the full apical and lateral extents of these root canal systems.

Q: Which cases would you complete in 1 visit? Dr. Simon Lidster

A: Any case I have time to finish and can dry the canals, however, teeth that are significantly sensitive to percussion I prefer to leave open for at least 24 hours and then finish. This allows the periapical tissue time to decompress and become less inflamed.

Questions about shaping canals:

Confluent Canals – Questions by Dr. Carmen Cohn

Q: What is your approach to avoid file separation in canals which seem to be confluent early, but in fact have separate portals of exit? There is an increasing tendency for rotaries to separate when these canals are really confluent.

A: Not all confluent canals are a set-up for file breakage, only those where the apical third contains a severe buccal or lingual curvature. My approach in these cases is to determine which canal has the smooth continuous curve and cut my primary shape in it, and typically use a GT Hand File to cut a smaller shape in the canal with an apical hook.

Q: What is your protocol to instrument oval or ribbon shaped canals (in cross-section); what is your method for gauging their apex?

A: Fortunately most canals that are ovoid coronally become round or rounder as they terminate. An indication of canals that are ovoid at their terminal points is a tenuous sensation of binding during gauging procedures. If I suspect this I simply go up to the next larger file tip size. Regarding shaping the coronal aspects of ovoid canals, I simply allow the rotary file taken to length to cut on the buccal as well as the lingual aspect of that canal at the orifice level.

Re: Complicated file schemes:

Q: What are your views in terms of varying file size as opposed to varying taper size, or a combination of both?

A: Regarding file or taper sizes: Rotary shaping instruments, such as GT Files, are varied in both tip and taper sizes so you can pick the final canal shape that is ideal for a specific root form and cut it with a single instrument.

My technique is cut a GT File to length, gauge the terminal diameter of the canal, choose an appropriate final shape, and finish the preparation. In most roots classified as medium or large, a single 20-.10 GT File cuts to length. If that canal gauges at .20 mm's the shape is done. Does anybody have a simpler technique? In those canals with a larger than .20 terminal diameter, one more .30 or .40 GT File finishes the shape - that's two files total.

Lack of Patency in Necrotic or Retreatment Cases

Q: What is your approach in treating canals when you can't get apical patency especially in necrotic cases or retreatments? Dr. Carmen Cohn

A: Apical surgery, but keep in mind that the harder you work the more often you get to length. It is imperative that you use a lubricant during all negotiating procedures and NEVER do crown-down negotiation.

Q: Dr. Buchanan could you define what you mean by "Crown Down Negotiation" in the last answer? Does that mean that you should never start crown down until you have negotiated the canal to length?

A: No, I'm happy to do initial enlargement with rotary files to any length that has already had a #15 hand k-file to that depth, but I would never finish my crown-down shape to the terminus until the whole canal has been negotiated to at least a # 15 (in the presence of a lubricant - I hope this continued mention of lubricant is sticking with all of you)

Q: In what % of VITAL canals can achieve patency?

A: 99.9% patency in vital cases. Dr. JL Marcos Arenal

Q: Which is the most difficult vital root to get patent in your experience?

A: Long canals with severe multi-planar curvatures in posterior teeth with little inter-occlusal distance.

Q: You say you "leave open for 24 hours cases with percussion sensitivity". Open is open? No coronal temporary restoration?

A: Does a sponge count as a temporary restoration? I imagine the very thought of leaving a tooth open is heresy at UNC as it was at Temple U when I was there. There is only one reason I leave teeth open when they are symptomatic - it virtually always works. I wish it wasn't so, because I have taken a lot of flak for my observations and emergency treatment planning, but why it works shouldn't be a surprise since none of us have ever had an infection that didn't feel better when the pressure around it was relieved.

Finally, leaving a tooth open robs the bacteria in the root canal system of one of their primary means of pathogenesis-- gas formation, movement into new tissue spaces, and carrying the battle further into our patient's bodies.

Q: Why is it almost always much easier to achieve patency in necrotic cases than in vital ones?

A: The absence of tough collagenous pulp tissue and the typically larger apical diameters seen in necrotic cases after internal apical resorption occurs in the presence of apical inflammation. I consider vital cases to be far more difficult to negotiate and to clean.

Q: How do you recommend we address large diameter apical foramens greater than size 40?

A: .12 GT Accessory Files have tip diameters of .50, .70 and .90 mm's to address this anatomy. I consider canals with apical diameters greater than 1mm to be open apex cases and I fill them with ProRoot MTA.

FILE BREAKAGE

Q: Could you please comment on this study? Dr. L. Steier

The Influence of a Manual Glide Path on the Separation Rate of NiTi Rotary Instruments. Journal of Endodontics. 31(2):114-116, February 2005.

A: Just read the article and their results jive with my clinical and teaching experiences. I don't think the reduction in breakage they showed had much to do with any coronal flaring as those small instruments are ineffective in that regard. I do strongly believe in the advantage of cutting a glide path that relieves pressure on the most fragile part of the instrument. I personally would not ever place a shaping file into a canal region that wasn't explored up to a #15 k-file size in the presence of a lubricant.

Q: The manufacturers claim a revolutionary electrochemical polishing treatment done to their files to reduce cyclical fatigue and raise the breaking limit. Is this exclusive to this file series?

A: Electro-polishing creates a very shiny/pleasing surface, however it takes the edge off cutting blades in a relatively uncontrolled manner. I've seen no research that proves a reduction in cyclic fatigue or a decrease in breaking limit. ProTaper files were actually first introduced with this finish but it was eliminated when cutting ability was seen to be compromised with no reduction in breakage. In fact the reports I hear from clinician's who have tried Sequence files reflect the fact that these instruments break just like all the other instruments on the market when used incorrectly.

Torque Control Motors - Dr. Liviu Steier

Q: Different claims are being made regarding torque control and settings of different files used with different motors. These are mostly the result of studies in straight canals, aren't they? What are your suggestions to the use of the electromotor?

A: Most of the torque settings are empirically based and err on the side of caution. What is greatly needed is very accurate mapping of failure curves for each file size in each file set for all the different canal morphologies they may be asked to shape. Not a small problem, huh? In the meantime the current settings are better than nothing.

Q: One problem I find with the GT rotary files is the feeling they are either not progressing or "suckdown". I feel I use a very gentle pressure with my TCM motor on AP 15 torque. I do not feel I get a gentle progression with each file, as a result I feel very uncomfortable with the feeling they give.....on removing I feel I never see the flutes loaded with dentin. Dr. Gareth Jones

A: My guess is that you tried GT Files with Tulsa's or Maillefer's technique, not mine (see NEW GT taper protocol document). Finally Tulsa is going to teach my more effective technique). With the manufacturer's technique roots "classified" as medium or large size are initially shaped with 30 or 40 Series GT Files, respectively. When these roots contain narrow curving canals (and they often do) apical progress can be difficult with these larger stiffer

instruments. When these roots contain large canals a sensation of threading or being sucked into the canal may be experienced. This is actually new information to me gained by multiple debriefing of multiple clinician's expressing your complaint. My experience has been totally different as I always do my initial crown-down shaping with the 20 Series GT Files first (again, see attachment). I never experience threading, and in most medium and large roots, my first file (20-.10 GT) cuts to length by itself.

As an aside, the useless GT technique taught by Tulsa and Maillefer (until now) was designed by Ken Koch and Dennis Brave when they were consultants for Tulsa (at least that is what they claim).

This is a good time to bring up a case when GT Files will thread. Sales people often demonstrate files in clear plastic blocks with simulated canals. Files with landed blades (Profiles, GT Files) bind up in plastic canals in a way that does not happen in dentin. So the next time a salesperson tries to show the superiority of his/her file line to you in plastic blocks throw them out by their ear! (Unless you have patients with plastic teeth).

CANAL OBTURATION

Q: What are your thoughts on "overfilling of canals" and "excess material in the periapex"? Dr. Jeff Rodgers

(Editors note: Jeff refers to his excess as "big boogers". Although I love it when Jeff talks so technically on Roots (©), I have taken editorial license to rephrase the question in a more – ahem- scientific manner.)

A: I agree with you but strive to control apical extents of filling, primarily by accurate apical gauging with NiTi k-files and completion of the shape in a manner that insures apical continuity of taper.

Q: Is Dr. Buchanan considering the "System S" (Obtura only –Squirt technique) as an obturation method? (Dr. Ken Serota – See Ken – you CAN ask it in just one sentence! :-))

A: Was your question, "Do I have any intention of being a squirter?" The answer is no although I wouldn't say that would make anyone a bad person. I feel the hydraulic forces generated with centered condensation are going to push filling material farther laterally than the extruding forces exiting the tip of the needle. I guess I'm thinking about that MB-2 that branches off the MB-1 at right angles, goes 7-8 mm's up the root and bifurcates before terminating.

(Editor's Note: I guess Dr. Buchanan is not entirely familiar with the System S technique. Correct squirt technique (as shown to us by John Stropko) relies HEAVILY on hydraulic forces generated by deliberate use of a Dovgan plugger in a "centered condensation" manner. Looks like Joey D and John S. need to have Steve over to their office in Az. to show him! - Right Joey?)

Resilon: Questions by Dr. Liviu Steier

Q: Squirting using Elements Obturation is a new dimension of obturation procedure. I very much like it by the way. Have you altered the manufacturer's instructions according your experience? Which is your preferred speed (sorry need to mention I am a Resilon user)? What are the temperature settings you use? Do you use Resilon? If so do you use System B with Resilon? What are your settings here? Dr. Liviu Steier

A: Currently I use the Extruder for backfilling only, I am interested in learning more about your (the Squirt) technique.

I have used Resilon on 15 cases and loved the results and its exceptional handling properties. I hope the research proves Resilon to be the long-term obturation solution that it appears to be. When that research is available I will no longer use gutta percha and sealer. The challenge of proving an obturating material is different than the challenges of proving a shaping device. If I use a new file, it doesn't break, and the shape turns out okay we know at that point that it worked. With obturating materials the question is: Did it work during the filling procedure--do I like the outcome--but also, what is it going to be like in 10-20 years. I'm not saying we need to wait to see 20 years of research results, but I do need more information than is currently available on leakage and long-term degradation of this material. Frankly, I'm rooting (no pun intended) for Martin's material.

Q: I Performed endo therapy on #20 today using Resilon (real seal). I expected to see apical deltas based on radiograph on down pack with elements heat tip. I believe I did not get sealer flow because I

may NOT have "wicked" all of primer out. Can primer "thicken" or set in apical deltas or simply be too thick to allow sealer / Resilon flow if not "wicked" out with paper points? Dr. Randy Miller

A: Primer will not get in the way of lateral canal obturation. It's more likely your disappointment is related to not enough irrigation time.

Q: I do not find the 150 setting on the elements unit enough to cleanly separate the Resilon (Real Seal) points or 100 degrees enough to perform down pack. The points seem to get real sticky. Is there harm to the material using a higher setting i.e.; 200 degrees? Dr. Randy Miller

A: In my experience it is critical that the Resilon cartridges for the Extruder not be over-heated as it will lose all of its viscosity, however I don't see the same problems in raising the temperature above Pentron's recommendation in downpacking and I noticed a better separation at 170 degrees.

Q: Will you continue to use Gutta Percha for the foreseeable future and what would push you towards the use of Resilon? I have switched to Resilon perhaps based on hype and the early studies of better sealing with the primer bond. Dr. Randy Miller

A: I will use Resilon instead of gutta percha when I am convinced of its long-term sealing capabilities. Hopefully that research will be available soon. Remember, Endodontists do a lot of cases everyday they are in practice. For an Endodontists to do 1,500 cases in a year and find out after two years that the longevity of the material is suspect is to invite great anxiety over reputation and practice health.

Other File Designs

Liberator Files: Questions by Dr. Liviu Steier

Q: I am very interested in hearing your comments regarding the special design of the Liberator files!

A: I'm so glad you asked about the Liberator files. First I will refer you to my earlier comment on "new generations" of file designs which are really just instruments designed around existing patent claims (posted earlier). The Liberator is another example. This flexible NiTi instrument has no flute twists which even on first view would be incapable of pulling cut dentin debris out of the canal. On a second look at the design in function, the first thing that happens when the blades contact dentin is that they twist in a counter-clockwise direction, becoming essentially a very efficient way to throw debris apically off the end of the file. Does that sound like a good idea to you?

Q: What is your take on the LightSpeed files and the fact that most canals diameters are bigger than a size 35 or 40? Would a size 20 or even 40 file touch all the walls for proper debridement of tissue remnants from the canals? Dr. Ahmad Tehrani

A: I think LightSpeed files are very good instruments for making a stop-preparation after cutting an initial crown-down shape with GT Files. Regarding canal diameters, where are we measuring that diameter? If I'm making a stop-prep I measure that 1mm back from the terminus. With my tapered shapes I'm measuring the very end of the canal before it exits onto the root surface. An anterior tooth in which I finish the shape with a 30-.10 or a 40-.10 GT File has been cut open to a #40 or #50 1mm back. I don't see the problem with this shaping outcome. There is no molar case treated with any file system in which all the canal walls are touched. Considering isthmus spaces, lateral and accessory canals that's a pipe-dream. This is why I so depend on my irrigating solutions to clean root canal systems after I cut a shape in the primary canal that provides access the whole canal length for those irrigants to work.

Q: What is your opinion on the Race files by FKG. Sequence in the U.S? Dr. Samir Shah

A: Neither RaCe nor Sequence files have much research proving their claims. My own mCT research done at USC shows Sequence files to significantly transport canals mid-root and apical (see attachments showing instrumentation to a size 30-.06 with GT vs. Sequence Files). One more note on Sequence files. They claim to be 4th generation designs. What does that mean? They are really first iterations of a design that hasn't been proven to be effective. Furthermore, at least in their 30-.06 size their instruments do not have one low flute, they have one high flute as revealed by our mCT reconstructions of their instrument.

Q: These files exhibit a distinct clacking, chattering sound when taken around curvatures. This however does not result in breakage. What does this sound indicate?

A: The clicking sound is caused by the one high flute snapping past isthmus spaces in curved canals.

Safesiders:

Q: You say your Safesider idea is from back in 1987; you say that now is passé. But what about then? Did you market them back then? JL Marcos Arenal

A: Kerr Company licensed and manufactured the Safety Hedstroms to be used in the M4 oscillating handpiece -- sound familiar? They took so long to prototype them that by the time they got to market they were obsoleted by NiTi. In regards to the design of the Safesider files, I invented safe-sided files in 1987 and have the patent to prove it. The only reason I have never brought the issue up with Barry (Musikant) is because the design is obsolete compared to current rotary concepts. Why would I be concerned about a file line that requires too many instruments, too many steps, and has such an unpredictable shaping result?

I this era of the "designer file" many files introduced as the latest generation of NiTi instruments are in fact re-hashes of old geometry, i.e. - Sequence (k-file geometry) and Safesiders (Safety Hedstrom); or, they are just designs to get around existing intellectual property claims, not new and improved. rotary (fortunately by my GT's).

IRRIGATION

Q How much time and volume of irrigation should we normally use for each case?

A: Ironically rotary instrumentation has indirectly caused an increase in irrigation failures. When it took 45 minutes to shape a root canal perfectly the irrigants had time to do their job. Today when many shapes take less than 3 minutes, if the clinician stuffs the canals shortly after the shape is done most canals have not been effectively cleaned. We need more research on the times necessary to achieve the irrigating results that we want but my empirical rule is a minimum of 30 minutes in necrotic cases and 45-60 minutes in vital cases with NaOCl at full strength. If I don't have the time I place CaOH in the root canal system for 2 weeks thereby shortening the irrigation time needed on the second appointment.

Q: How about the new irrigating solutions like MTAD or Smear clear?

A: I'm not sure yet what I think about MTAD. I know that I'm not concerned about over-etching dentin. The SEM photos of that outcome (in the ads) would look perfect with a short rinse of NaOCl following EDTA to remove the smear layer. Tetracycline is a bacteriostatic not a bacteriocidal agent, however, its effect does persist for some time. I guess I'm looking forward to more research, not from Loma Linda, to get a more balanced view of the benefits or limitations of the solution. Regarding Smear Clear: I use it because of its improved wetting ability over generic EDTA solutions.

Q: What inter-appointment agents do you dress canals with?

A: CaOH

Q: Regarding Chlorhexidine.. is one final wash post EDTA adequate to provide the antimicrobial activity that we desire?

A: I have no informed opinions about Chlorhexidine. I guess if I filled root canals short apically and laterally I would be able to have a greater interest in this topic.

ENDO FEES

Q: I heard sometime ago "Dr Buchanan charges his cases according to the number of canals of the case". May I ask if this is true? If it is, could you please elaborate on the rationale? I kind of like it. Dr. JL Marcos-Arenal

A: I charge for the amount of work each case will require with a range quoted at the consult visit. Not only do I charge more for teeth with more canals, and more for retreatments, but I even charge patient's more if they are high maintenance during the consult. That way, as they ride me hard during the procedure I feel less bitter because I'm being paid more to deal with it - we call it the AGG Fee. At the same time, I charge less for simple cases because I am in competition with generalists' for those and they are such a pleasure to treat. Charge as much as you want on the real difficult cases because nobody wants these. Of course we do a fair amount of charity cases also.

ROOTERS Suggested Product Improvements

Paper Points:

Q: I find the Greater Taper paper points very useful but after debriding and importantly, disinfecting the canals I find it disconcerting to use paper points that do not come out of a sterilized blister pack.

Say 5 in a pack like the Diadent ones. Can you not use your influence with the suppliers to provide a sterilized option? I am sure there would be a market for them. - Stephen Day. UK.

A: Dr. Buchanan agreed with this statement.

Sybron Elements Unit – Extrusion Volume:

Q: Are you aware of any plans for making the extruder a little more economical to run? When one extruder cartridge doesn't quite do a 3-4 canal tooth on occasion, and with them being single use.....it gets rather expensive. Elements Obturation is wonderful. But would it be very hard to put a little more filling material (gutta-percha / Resilon) into the cartridges? Dr. Gareth Jones and Dr. Carmen Cohn

A: I agree a little more material in the Elements Extruder cartridges would be helpful. It irritates me in the occasional backfill needing a second cartridge. I don't know of anything in the pipeline with the Extruder except Resilon cartridges.

Q: What are the data ports behind the Elements unit used for?

A: The extra ports in the back are for future networking capabilities with other Elements devices (i.e.- apex locator) for power supply.

In closing please remember there are a 100 ways to do it right and a 1,000 ways to do it wrong. If people say they have the only way to do it they are most often wrong. Keep your minds open, have fun in practice, be curious, and I'll see you at the apex!

Steve

If I have missed any of the posts to Dr. Buchanan or if you simply wish to add a comment to the piece, please feel free to E mail me and let me know.

Rob
rmk@endoexperience.com