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Endodontics in the 21st century: A personal mission statement

Endodontics is ready for another paradigm shift. The time has come to go back to the scientific roots of endodontic therapy and reassess our technologies, techniques, and instrumentation.

In an ideal world, root canal treatment would never fail. It would never cause postoperative pain. The roots would never crack and the coronal restoration would never leak. If we only could, our coronal access would be smaller, and our removal of canal dentin would be minimalized. Our treatments would be reliable, repeatable and less expensive. And we, the dentists, would feel less stress during the treatment.

We have a problem of vocabulary. We file with "files" that are actually drills. We clean canals, but only the round parts. We irrigate canals, but mostly only the easy coronal part. We base our filling protocols on an arbitrary ISO sizing system, on the assumption that GP master points correlate to said sizing. In fact, the GP points' variability [hand rolled!] makes a mockery of the whole enterprise.

Today we have excellent digital radiography systems. We *(should)* have surgical operating microscopes to enhance diagnosis and treatment. We know how to listen to the patient, how to test for hot and cold and to probe the periodontal sulcus. We should be able to make better diagnoses than the previous generations. To make the patient safer and more comfortable we have excellent anesthesia solutions, rubber dams, and bite blocks. Now is the time to update and upgrade our armamentarium for root canal treatment.

The Gentlefile was developed over the last seven years to address many of these issues. It is a rotary file made of three layers of fine stainless steel wire wrapped around itself and made very abrasive with Nano-grit blasting. The Gentlefile is friction-fit to a light, cordless, torque-controlled motor operated at 6500 rpm. This combination gives us an efficient filing motion to penetrate and clean root canals. The extreme flexibility of the file and its slight centrifugal asymmetry causes it to clean the entire canal wall, not just the round parts. It also causes significant fluid movement of the canal irrigants, activating them as well as encouraging fluid movement throughout the canal system.

The Gentlefile is quite consciously a narrower set of files with a taper of between 0.3 and 0.4 . This helps preserve coronal dentin. The extreme flexibility of the Gentlefile also means that direct-line access, a mandatory feature of NiTi file systems, is not necessary, further preserving tooth structure.

Unlike NiTi rotary "files", **the Gentlefile actually files, and does not cut into the dentin**, so micro-cracks are not generated. The Gentlefiles are designed to be disposable and are inexpensive enough to actually be single-use in practice, thereby promoting infection control and efficient work-flow.

Most importantly the Gentlefile is virtually unbreakable, a significant stress reducer compared to NiTi rotary files. Additionally, the friction chuck of the Gentlefile releases if the file jams in the canal, further protecting against potential "procedural failures". The only "demand" that the Gentlefile makes of its user is to keep the canal wet. In return we receive debris-free canals, even in irregular canal systems.

Supplementing the Gentlefiles are the GF-NiTi hand files. The files are specially treated to **reduce** cutting efficiency, create roughness, and increase flexibility. These are used as patency files and to ease the transition between Gentlefile sizes. Also available are Gentlefile wire brushes to further clean and smooth the canals when desired. The world-renowned Medic NRG apex locator comes from the same factory and perfectly complements the system.

I am often asked how to fill canals that have been prepared with the Gentlefile system. The easy answer is "any method that you're comfortable with." The canal will be clean, smooth and well-shaped, if perhaps slightly narrower than you are accustomed to.

The scientific literature does not seem to show a preference for any specific method of filling. I think that we will see new methods developed over the next few years that will address this lacuna in our knowledge and technique. Currently I have been experimenting with a cold, flowable material which shows much promise.

We need to avoid the kind of thinking that modifies tooth preparation protocol in order to accommodate a specific filling methodology. Similarly, we need to avoid the kind of thinking that generated a protocol of gross over-preparation of roots canals in order to overcome the limitations of a specific file system.

We should keep in mind the goals that are keys to our success. They are: preservation of tooth structure, apical seal, coronal seal, and avoidance of iatrogenic damage. If so, we will be well on the way to providing for our patients the quality of treatment that they deserve.

Nachum J Stone is a 1986 graduate of BCDS University of Maryland Dental School. He has practiced general dentistry in Jerusalem and Maale Adumim for 30 years. In addition he currently serves as clinical consultant for MedicNRG.