RUDDLE ON
The Radar

When does endodontic treatment truly begin?

All clinicans who perform endodontic treatment need to urgently turn their attention to methods that can improve disinfection

On a cold winter's night this past January, I had dinner at the Hotel Royal with a group of endodontists in Amman, Jordan. Sitting to my left was Dr. Edmond Koyess, my longtime friend who is the Department Chairman of Endodontics at the Lebanese University in Beirut, Lebanon. During this memorable evening, Edmond turned to me and asked, "When does endodontic treatment truly begin?" This insightful question acknowledges the endodontic treatment challenge.

Predictably successful endodontics is predicated on the recognition that pulpal degeneration often occurs in a complex anatomic space. Diagnostic radiographic images frequently reveal a lesion of endodontic origin (LEO) at a location other than at the terminus of a canal. It must be understood that a LEO arises in the bone secondary to pulpal breakdown and forms adjacent to a portal of exit (POE). In most instances, a LEO will heal following the extraction because the extraction serves to eliminate all the contents of the root canal system 100% of the time. *Like the extraction, the biological goals of clinical endodontic treatment are to remove all the pulp, bacteria when present, and their related irritants.*

Treatment is directed toward performing a series of procedural steps that comprise start-to-finish endodontics. Following diagnosis, the mechanical steps include access preparation, glide path management, shaping canals, 3D disinfection, and filling root canal systems. Each clinical treatment step directly influences each subsequent step, yet the question remains, "When does endodontic treatment truly begin?" Only when a canal exhibits existing shape or has been mechanically shaped can the actual *endodontic treatment goals* be potentially fulfilled.

Well-shaped canals promote the exchange of a strategic volume of full-strength NaOCl. *Active* irrigation encourages NaOCl to penetrate, circulate, and digest organic substrates from the uninstrumentable portions of the root canal system. Regrettably, during instrumentation, canals often become blocked. Our profession must make the critical distinction between vertically versus laterally blocked canals. Most dentists equate a blocked canal as the inability to slide a small-sized hand file to the terminus of a canal.

Most blocked canals result from debris that is compacted vertically or laterally into the anatomy during instrumentation. This debris could be all dentin, but is frequently a cocktail of dentinal mud containing pulpal remnants, microorganisms when present, and their related breakdown products. More insidious than apically blocked canals are laterally blocked canals. Laterally blocked canals prevent the exchange of NaOCl into the dentinal tubules and deep lateral anatomy.

Recently, considerable attention has focused on technologies that enable dentists to more predictably clean root canal systems. Complete disinfection is fundamental for predictably successful endodontics. All clinicians who perform endodontic treatment need to urgently turn their attention to methods that can improve disinfection. Dentists can immediately improve disinfection protocols by recalling a fundamental property of matter, which is that no two objects can occupy the same space at the same time. Logically, if we desire to heat-soften and three-dimensionally adapt filling materials into root canal systems, then the assignment is to first eliminate the pulp and related breakdown products. The breakthrough is to understand that active irrigation can start as soon as sufficient space has been created with shaping files.

Dentists should investigate three criteria before selecting any given disinfection method.

1. Is the disinfection method supported by scientific evidence?
2. Is the disinfection method easy to use?
3. Is the disinfection method readily affordable?

The EndoActivator® System (Dentsply Tulsa Dental Specialties) is a disinfection technology and method that readily fulfills the above criteria. More than eight international scientific papers have been published in peer-review journals reporting that the EndoActivator is safe, efficient, and produces effective fluid activation in well-shaped canals. Of clinical significance, the EndoActivator has been shown to statistically improve debridement, the disruption of biofilms, and the elimination of debris, while leading to more filled auxiliary canals (references available at www.endoruddle.com).

The EndoActivator system is comprised of a cordless, sonic handpiece that drives highly *flexible* and *noncutting* polymer tips. Strategically, sonic technology allows an EndoActivator tip to move freely and agitate any given solution, even upon wall contact, in curved canals. On the other hand, piezoelectric ultrasonic energy drives relatively expensive metal insert tips that cut dentin, create their own smear layer, and increase the risks of ledges, transportations, perforations, and broken instruments. Most limiting, when any part of an ultrasonically driven metal tip contacts an internal dentinal wall, the resultant tip movement is undesirably reduced or dampened.

All the steps in endodontic treatment are important and build upon each other. Once a smooth, reproducible glide path has been confirmed, canals are optimally shaped utilizing state-of-the-art shaping files. At this point, endodontic disinfection, the *essence* of predictably successful endodontics, can truly begin. Excluding coronal leakage, virtually all endodontic failures result from inadvertently leaving residual necrotic or potentially necrotic tissue in avascular root canal systems. When performing endodontic treatment, keep on your radar the important role disinfection plays in successful endodontic outcomes. EP

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