



# THRILL OF THE FILL

## AVOIDING APICAL AND LATERAL BLOCKS

Great endodontics is not only possible, but attainable. This statement does not mean endodontic treatment is routinely easy or always successful. Fortunately, with effective training, utilization of the most proven technologies, and sufficient desire, predictably successful endodontics is a cornerstone of interdisciplinary treatment.

By far, the number one reason dentists give for taking endodontic training courses with me is they want to experience the so-called "thrill of the fill." General dentists and endodontists, alike, express enthusiasm and the desire to radiographically visualize filled root canal systems. Clinical confidence soars when post-treatment radiographs reveal, for example, filled furcal canals, anastomoses, loops, deltas, or multiple apical portals of exit. More and more, dentists understand that any communication from a root canal system to the attachment apparatus is potentially significant and strongly influences predictably successful outcomes.

Why is the extraction oftentimes contemplated when there is clinical and/or radiographic evidence of a lesion of endodontic origin, especially in the instance of post-treatment disease? Obviously, the extraction serves to eliminate 100% of the contents within any given root canal system. Yet, like the extraction, modern meticulous endodontic treatment also has the capacity to eliminate 100% of the pulpal tissue, and when present, bacteria and their related breakdown products. Certainly, blocked canals, apically or laterally, seriously compromise success and represent a major cause of endodontic failure. Blocked canals prevent the exchange of irrigant and clinically limit 3D disinfection and filling root canal systems.

The reason for the high clinical incidence of blocked canals can be dominantly attributable to how dentists have been trained. Virtually all dentists were

taught to work short of the actual terminus of any given canal. In fact, many practice with the erroneous assumption that ideal working length is the distance measured from the selected coronal reference point, extending apically to the cementodentinal junction (CDJ). To clarify, the CDJ has also been referred to as the minor foramen, the constriction, or the preferred most apical extent of treatment.

The problem with this philosophy of treatment is that the CDJ is a histological versus a clinical anatomical landmark. Numerous international published articles have clearly demonstrated that cementum on the external root surface, invaginates through the greater foramen, and extends unevenly in a coronal direction, anywhere from a few microns to several millimeters. As such, the CDJ varies from wall to wall within the same canal. Regrettably, there continues to be relentless advocacy for extending endodontic treatment to a clinically nonattainable landmark.

From a practical standpoint, conscientiously working 0.5-1.0 mm short means dentists frequently end up even shorter than their intention. The desired working length is oftentimes lost because dentinal mud accumulates when grinding increasingly larger sized files apically. Compounding the problem of working short is the ill-fated philosophy that the terminal extent of virtually all canals should be enlarged to at least 0.40 mm. Needless large apical sizes are advocated to ensure a round foramen is prepared and, additionally, to encourage the exchange of irrigant. The clinical requirement to make a round or needlessly large foramen is simply outdated, outmoded, and irrelevant to histological facts and longstanding documented clinical outcomes. Working short and over-preparing the apical extent of a canal frequently results in an apical preparation that is both blocked and ledged. Canals are commonly blocked apically because of dentinal mud and ledged because of the over-enlarged box-shaped preparation.

Most dentists equate a blocked canal to the inability to slide a small-sized hand file to the terminus. Far more insidious than apically blocked canals are laterally

blocked canals. Laterally blocked canals result when debris is compacted into the lateral anatomy when shaping canals using manual or mechanically driven instruments. It should be appreciated that canals frequently exhibit cross-sections that are not round. Debris is commonly compacted into the eccentricities off the rounder portions of canals. Equally concerning is when debris is compacted into the uninstrumentable lateral anatomy, including dentinal tubules. Once the lateral anatomy is blocked, it becomes improbable, if not impossible, to exchange irrigant laterally, compromising 3D disinfection and filling root canal systems.

The prescription to avoid apical blocks is apical patency. Apical patency is encouraged by gently and deliberately sliding the apical 1 mm of a small-sized and flexible file *to* and minutely *through* the foramen. Most important, a patency file discourages the accumulation of dentinal mud. Apically unobstructed and patent canals allow the clinician to maintain the desired working length and more effectively exchange irrigants into all aspects of the root canal system.

The prescription to avoid lateral blocks is to irrigate, recapitulate with a size #10 hand file, and reirrigate after using every single shaping file. Strategically, an active irrigation method can be used as soon as sufficient space is available. Active irrigation has been shown to enhance the exchange of irrigant into the uninstrumentable portions of a root canal system. I prefer the EndoActivator® (Dentsply Tulsa Dental Specialties), which has been repeatedly shown in multiple peer-reviewed articles to improve deep lateral cleaning.

Much attention has been focused on avoiding or managing apically blocked canals. However, virtually no attention has been placed on the potential consequences of laterally blocked canals. Both vertically and laterally blocked canals can and do serve to sabotage predictably successful results. Keep active irrigation on your radar, and experience the thrill of the fill. **EP**



Clifford J. Ruddle, DDS, FACD, FICD, is founder and director of Advanced Endodontics ([www.endoruddle.com](http://www.endoruddle.com)), an international educational source, in Santa Barbara, California. Additionally, he maintains teaching positions at various dental schools. Dr. Ruddle can be reached at [info@endoruddle.com](mailto:info@endoruddle.com).