E=mc$^3$: **Endodontics** is equal to the third power of many changes

Revolutionary protocols and materials science demonstrate the evolving sophistication of modern era root canal therapy. The technological advances of the past three decades have enabled greater debridement and disinfection of the labyrinthine root canal space. Iterations of apex locators, enhanced magnification and illumination, new file designs and metallurgy provide for bio-minimalism and diminished fracture potential. The development of bio-active adherent sealers has enhanced the biologic potential of root filling. However, the sum of these innovations has not as yet produced a substantive increase in treatment outcome percentages. For years, clinicians have accepted on faith the purported marketing claims of company-supported in vitro testing. Fortunately, scientific determination of the metrics of success of product-neutral studies has replaced the possibility of experimental bias.

The most profound change in endodontics is the recognition that root canal therapy is a restoratively driven discipline. Bio-smart materials used in the root and crown do not require egregious removal of tooth structure as dictated by classical protocols. Clinicians blinded by the optics of the “artistry” of radiographic results are recognizing that this does not represent the totality of the biologic requirements of success.

The “look” academically disenfranchised the clinician from the understanding of the biomechanical dynamics of dentine and its impact on the potential for fracture. The excessive removal of tooth structure to enable treatment needs was counterintuitive to long term success and is fortunately a protocol of the past. As well, the overlooked impact of both light and heavy parafunctional loading on endodontically treated teeth is now recognized as the most important tipping point in the configuration of the restoration required.

The rigid restorative mandate of posts and cores had the propensity to cause catastrophic failure. Fortunately, reduced taper, new irrigation products have reduced the retention of greater volumes of tooth structure and the costs of new equipment. Overprepared tooth structure is not necessary in the adhesion era.

The dogma of the protocol of cleaning shaping, irrigation and “monobloc obturation” is axiomatic folly. The pendulum swings of new equipment and treatments are not necessarily best practices. The primary disease vector of pulpal and peri-radicular is biofilms and to date, the mechanism for their removal remains elusive. The work of Kishen and Shrestha on biofilm disruption by nanoparticles shows the greatest hope for elimination of recrudescent disease as a consequence of biofilm resistance intractability.

The ebbs and flows of endodontic growth, even if measured in dollops, has always have been part of the tenets of interdisciplinary dental therapeutics. The recognition that endodontics is an equal member at the table of disciplines is now assured as it has chosen to extend its involvement beyond the orifice. Endodontics is a foundational component of the state of oral health. Its outreach is now extended to a point commensurate with its potential.

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