

Minimally Invasive Endodontics- A Nostalgic Turn-Back

According to Constantine Sedikides, Professor of Social and Personality Psychology at the University of Southampton, nostalgia does not seem to be a disease but a powerful stimulant to feel optimistic about the future. In a similar manner, minimally invasive endodontics (MIE) is one of the main paradigm shifts of modern endodontics which is not only becoming nostalgic about conservation but also turning back to the older concepts of minimal instrumentation.

In 1940s "focal infection theory" was discredited and less invasive endodontic treatment was preferred to wholesale extraction of teeth. But modernization in instrumentation and pressure on elimination of infection from the root canal has led to aggressive cleaning and shaping. But if various generations of endodontic files are reviewed from then and now, we can envisage the paradigm shift towards lesser number of instruments, less taper and less removal of dentine which ultimately leads to less procedural errors and conservation of tooth structure.

The nostalgic turn-back is seen not only in minimal instrumentation but also in preservation of pulp and dentine. The legends in endodontics have realized how dentine is sacrificed during overzealous preparation of root canals and hence they are advocating initially to try non-invasive pulp capping, apexogenesis, apexification and pulp regeneration procedures.

MIE is a concept of maximum preservation of the healthy coronal, cervical and radicular tooth structure during the endodontic treatment.¹

There is a difference opinion amongst authors whether to consider MIE as a standard procedure or is it just a fad? Clifford J Ruddle in 2004 stated that it is not logical to repair car engine through a "tail pipe" when you can look under the hood;² while, Clark and Khademi in 2010 promoted MIE by urging the profession to "bless the tooth" as you create endodontic access, rather than "cursing" the tooth with traditional burs and techniques.³ In 2014 Gluskin stated that MIE challenges the prevailing paradigms and it has been used to describe smaller-than-usual apical sizes and an understanding that the long-term success of root canal-treated teeth will improve by retaining as much dentin structure as feasible.⁴

As early as in 1992 James Gutmann had said that the amount of remaining dentin and root morphology are the ultimate factors in resistance to fracture.⁵ Thus, today the biggest concern is the effect of endodontic treatment on dentine. It has been assumed that endodontically treated teeth become brittle after losing moisture and become vulnerable to fracture. Although dentine loses moisture



up to 9%, it was found that the fractures occur mainly due to physical loss of dentine.⁶

Endodontic treatment affects three most important properties of dentine-fracture resistance, micro-hardness and tensile strength. Fracture resistance can be enhanced by minimally invasive access opening, less tapered instrumentation of root canal and apical preparation not more than #50 file.⁷ Micro-hardness can be preserved by use of less harsh irrigants⁸ or intra-canal medicaments⁹ and tensile strength can be improved by creating a monoblock obturation.¹⁰

Traditional endodontic access has been endodontic centric. It is primarily focused on operator needs & has been decoupled from restorative needs and tooth needs. A balance needs to be restored to these THREE needs, which are almost always in conflict when performing complete cusp tip to root tip treatment.³

No man-made material or technique can compensate for tooth structure lost in key areas such as three-dimensional cervical ferrule, soffit and peri-cervical dentine (PCD).³

We should look for new concepts & develop new protocols for minimal removal of tooth structure, effectively clean and fill root canal in its smallest shape. Or look for pulp therapy which could altogether avoid root canal treatment.

William Faulkner said, "You cannot swim for new horizon until you have courage to lose sight of the shore"; therefore, a new modus operandi of MIE needs to be established using the triad of CBCT, DOM and LASERS and eventually robotics and micro-guided endodontics should be introduced to improve precision and rule out human error.^{11,12,13}

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