I don’t like the term “microendodontics.” I like the term “minimally invasive endodontics” better, but they both imply an objective that is not the reality of the changing concepts of what access and shaping results should ideally look like. It’s not about how small you can make an access but about designing treatment protocols that maximize dentin conservation while balancing the need for meeting treatment objectives. It’s about dentin conservation and root form appropriate shaping, not the smallest possible accesses.

There is a growing awareness that the legacy access concepts and principles have resulted in unnecessary removal of critical dentin that is structurally compromising teeth. Dr. David Clark and Dr. John Khademi deserve the credit for identifying and defining the critical importance of pericervical dentin. Pericervical dentin is the dentin from the top of the pulp chamber to the upper canal area (Fig 2). This is considered to be the dentin critical for tooth strength and should be conserved as much as possible. Strength equates to longer lasting restorations — our ultimate goal. Two features of the legacy designs are a problem for dentin conservation. The first is the recommendation to completely de-roof the pulp chamber. The second is developing “convince form” in the coronal part of the canal by removing the internal triangle of dentin. Both are unnecessary and remove dentin that should be retained for strength.

Defenders of these legacy concepts point to the five mechanical objectives for shaping presented in 1974 by Dr. Herbert Schilder. Even though he was a giant in endodontics who dramatically influenced the specialty, the almost religious defense of his ideas gets in the way of conceptual progress. His objectives need a fresh look in the light of our better understanding of dental anatomy and newer file designs and materials.

Dental anatomy

Work with high-resolution micro-CT scanners starting in the 1990s provides us a much more profound understanding of tooth anatomy. In addition to the obvious canal complexity shown by these scans, the presences of concavities were shown to

---

**Fig. 1** This case by Dr. Jeff Pafford has all the features of a well-designed conservation approach, including respect for the natural dimensions of the pulp chamber, an orifice-directed occlusal outline and root-form-appropriate canal shaping with adequate deep shape and conservative upper shape. It shows the typical hourglass profile of this style prep. (Images/Provided by Dr. Eric Herbranson)
Technique_instrumentation

be ubiquitous, and they reduce the amount of dentin we have to work with. An example is the lower molar mesial root. Virtually all of them have significant concavities in the furcation side of the root that starts at the furcation (Fig 3).

There is simply much less dentin than most clinicians realize at this point, and over-enlargement of the canal must be guarded against to maintain strength and prevent strip perforations.

_Pulp chamber outline_

The legacy recommendation for pulp chamber outline is to un-roof the pulp chamber and, once identified, flare the opening from the canal orifice to the occlusal. This excessively large access is justified by the need for irrigation, visualization and canal access. All can be accomplished through a smaller, more conservative access design that does not destroy tooth strength.

_Convenience form — triangle removal_

The recommendation to remove the dentin triangle from the upper canal is based on the need for straight-line access to the coronal part of the canal system. This feature was dictated by the historical use of stiff stainless-steel instruments and later by the excess stiffness of overly large NiTi instruments.

Today’s newest generation heat-treated NiTi instruments are much more flexible, have a smaller upper flute diameter and do not require this feature.

_Instrument design_

Multitaper instruments were introduced to solve some inherent problems of straight taper instruments. They automatically created more deep shape for better irrigation and steeper apical tapers for better obturation control. Good ideas — however, the first-generation multitaper instruments and their newer derivative all have a design defect, in my estimation.

_The greater the amount of dentin conserved, the greater the increase in strength._
Simply Better Endodontics™

The V-Taper™2H NITI rotary endodontic file system utilizes only 3 files to allow you to complete most root canal cases. The V-Taper™2H performance enhanced system is the only system that offers you these industry leading advantages, all in one file: Conservation • Efficiency • Flexibility • Strength

The V-Taper™2H System is the most efficient and effective endodontic file system in the world.

- **Conservative**
  V-Taper™2H files with their patented taper, are the most minimally invasive file on the market today.

- **Efficient**
  Complete most root canals using only 2-3 V-Taper™2H files, fewer files means lower cost per root canal treatment

- **Flexible**
  V-Taper™2H files are heat treated to increase flexibility to insure navigation of even the most curved canals without lodging, transportation or zipping.

- **Strong**
  V-Taper™2H files are designed with a Parabolic Core, which was the strongest core design in a recent test conducted at the University of Michigan. The V-Taper™2H Rotary System advances the science of file design, manufacturing, and materials.

Call for an in-office demo today.
800-535-2877
The mean flute diameter (MFD) at the upper end of these instruments is too large for most teeth. It is certainly too large for most molar canal systems and results in unnecessary removal of critical dentin, especially in teeth with longer roots. The newest instrument designs have profiles that better match the actual root anatomy and thus conserve valuable pericervical dentin — all while creating shapes that allow us to meet quality treatment objectives.

They have significantly smaller MFD at D16 than the older designs while creating similar deep shape for irrigation and obturation (Fig 4). This smaller MFD combined with newer heat-treating protocols has created a much more flexible instrument that eliminates the need for the "convenience form" design.

The new paradigm

Dentin conservation needs to be designed into our access and shaping. It involves reducing the excessive widening of the pulp chamber, eliminating the convenience form and using instruments with a smaller MFD at the upper end. The occlusal opening is outlined by projecting the canal center line to the occlusal surface to avoid impinging the file into an "S" bend (Fig 5). The result is, each tooth has a different geometry, depending on its specific needs (Fig 1).

Does it matter?

Yes, it does. A recent project conducted at the University of Toronto and published by Dr. Rajesh Krishan, et al, specifically set out to answer this question. It showed that the greater the amount of dentin conserved, the greater the increase in strength.

The more-conservative access prepped molars had strengths that approached the un-accessed control group and were 2.5 times stronger than the traditional access design. Coronal fracture is responsible for a significant percentage of endodontic failures and a more conservative approach to access and shaping has the potential to lower that percentage. It is time we integrate these concepts and instruments into our clinical practice.

Let’s just not call it “microendodontics.” Let’s call it “conservative endodontics,” with respect for the anatomy. “Root form appropriate shaping,” if you will!

A complete list of references is available on request.