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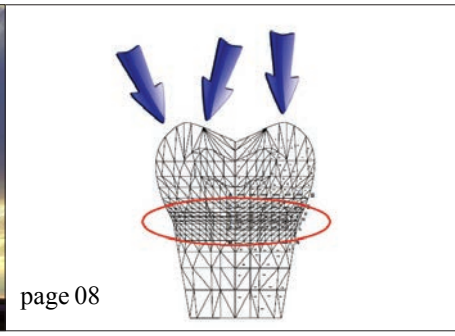
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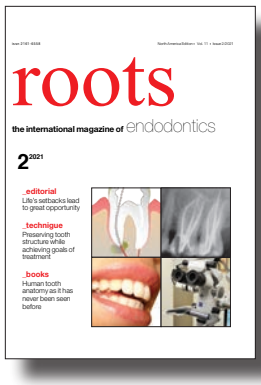
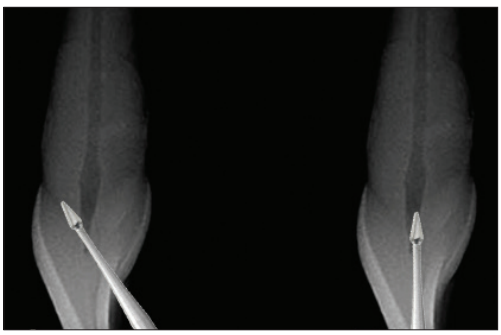


on the cover

Clockwise from top left: Root canal illustration based on information at www.animated-teeth.com*, originally created by Jeremy Kemp (Photo/Provided by Wikimedia Commons); completed root canal treatment (Photo/Provided by Dr. Gregori M. Kurtzman); Surgical operating microscope, Endodontist NYC (Photo/Provided by Wikimedia Commons); smile (Photo/Provided by gökçe özaslan,* www.freeimages.com*)*

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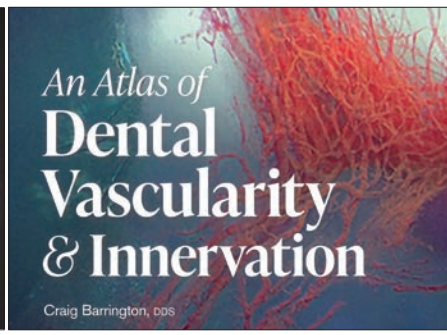


John J. Stropko, DDS
Editor in Chief

How life's setbacks can open the door to great opportunity

Not everyone remembers when they decided to become a dentist, but I sure do. The dentist's office was just half a block down the busy street we lived on in Cleveland, Ohio. I remember my mother standing on the front porch as I was on my way to a dental appointment, yelling to me, "Johnny, don't let him numb your tooth, it costs an extra dollar!" No doubt about it, I wanted to be on his side of the chair, not mine.

Our family was not wealthy, so I learned to get any kind of job to make spending money. By the beginning of the seventh grade, my time after school and during summer vacations was spent mowing yards, washing cars, cleaning garages, pulling weeds, shoveling snow. You name it, I did it. Any free time was spent playing baseball and touch football with my friends.

When it came time for high school, there was no doubt it would be an all-boys Catholic school. At that time, the school I wanted to attend, Cathedral Latin, was on the other side of town. The only transportation was by city bus, and the only bus route from our west side location to the east side was to change buses in downtown Cleveland. Fortunately, I got a job as stock boy at the huge Higbee Company Department Store, located in the Terminal Tower on the public square located close to my downtown bus connection. It paid well, about $1.15 an hour, and fit right into a decent schedule between bus changes. Summers were spent working for building contractors, doing many different tasks. I learned a lot about landscaping, woodwork, painting and plumbing. The pay was $1.50 an hour, a particularly good wage at the time. In 1958 I graduated from high school, and it came time for me to get more serious about my future life.

Now it was time for pursuing my career as a dentist. I applied to St. Joseph's College in Rensselaer, Ind., a small, all-boys Catholic college. My grades the first year were about average. In the spring of 1959 I went for an interview at the Indiana University School of Dentistry (IUSD) and was given direction for a formal application to make later in year.

During my summer vacation in 1959 I worked at a trailer factory, screwing very thick wooden decks onto heavy construction trailers. The next summer I worked for the Chicago Bears football team that did their pre-season workouts at the St. Joseph College facilities. My job was to make beds and shine shoes for the players at Halas Hall. At the end of that summer, George Halas (aka "Papa Bear") gave me a $25 bonus check, a small fortune at the time. How often I wished I did not cash that check and still had it.

At this time a few dental applications to Indiana University School of Dentistry (IUSD) were accepted after only two years of pre-dental work. Making the dean's list after my second year at St. Joe's must have helped, and my application was accepted to begin dental school in September 1960. My journey to become a dentist had begun. After receiving my DDS in 1964 I spent two years as a captain in the Dental Corp at Lincoln AFB, Lincoln, Neb.

(Photo/Provided by Dr. John J. Stropko)

In 1966 I started a general dental practice in a small town of 4,500 in northern Indiana. My practice grew by leaps and bounds, but by the early 1970s I was getting very tired of the climate and decided to take the boards for the Arizona State Dental License.

After getting my Arizona license I decided to relocate to Tucson and start another practice. But this time, it would be a practice limited to adults. I love children, but not in the dental chair. Again, the practice did very well over the years. Then one day in 1985 a very close contractor friend came to me and proposed a large real estate investment that was a "sure thing" that we could both get in on. He was an extraordinarily successful and highly respected person in the community, and I could not see anything wrong with the opportunity. So, we co-signed a note for almost $900,000 to purchase an entire 40-acre subdivision that was in the process of being developed.

But over the next year several things happened. The contractor putting in the roads and underground utilities went bankrupt. The prime rate had risen to almost 10 percent (our bank note was prime +2). And finally a hundred-year flood wiped out my partner's huge business complex. As a result, his corporation had to file for Chapter 7 bankruptcy protection. It was not long after that I was made aware that he had signed our bank note with his corporate signature, and I had signed it with my personal signature. Of course, the banks came after me for the monthly interest payments. In the early months of 1987, my wife and I worked more than 90 hours a week trying to make the payments, but it was a losing cause. Soon my accountants, my lawyer and even my banker (he was also a close friend) advised me that I also had to file Chapter 7. I remembered my father often commenting, "The worst man in the world is one that files for bankruptcy." And now I was one. There was no other option other than to close the doors to my practice. All my patients were sent a letter of explanation, along with a referral to an excellent dentist, to make sure they were well taken care of. My wife and I were just going to "hit the road" for a while.

A few weeks later I got a phone call from an endodontist I knew. He asked me if I ever considered going back to school to specialize. That was absolutely the very last thing on my mind. I knew little or nothing about endodontics and hardly did any endodontic treatment since I graduated from dental school. But I thought maybe God was talking to me and I should listen. Arrangements were quickly made, and the next

‘Endodontics was my life’s calling, but it would not have happened if a terrible event had not disrupted my life’s path.’

day I was on my way for an interview with Dr. Schilder and was accepted into the postgraduate endodontic program at Boston University. So, in 1987, after 24 years of practice, I was once again a student. We had no money and no credit, but thanks to several friends who came to my salvation I received my Certificate of Endodontics in 1989.

As was mentioned previously, almost everything other than prosthetics was referred to a specialist. So as a new specialist just out of training I knew there was so much more to learn. One of my biggest concerns about my specialty training was that I did not learn anything different about apical surgery than before I started. Fortunately, there were some good C.E. courses in our profession to learn from, and I decided to start my journey.

One of my first endodontic C.E. courses was “Apical MicroSurgery,” presented by Dr. Clifford Ruddle in Santa Barbara, Calif. During the two-day seminar, Dr. Gary Carr presented his work with the surgical operating microscope (SOM). The “hands-on” session using the SOM for the first time just blew me away. Within a week I had an SOM delivered to my Prescott, Ariz., office and used it for every procedure. I wished I could redo all the dentistry I had done since I started practice back in 1966.

Changes became the norm: MTA and bioceramics produced more predictable results; computers replaced paper charts; digital radiographs were more efficient; 3-D radiographs (CBCT) allowed more precise diagnostics; 3-D printing of stents; robotic endodontic procedures; conservative canal preparations; new instruments were developed; just to name a few. It was an exciting time to be in practice.

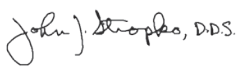
Over all these years I’ve had incredible opportunities to present lectures, visit hundreds of dental offices and make lasting friendships, both nationally and internationally. It was interesting to talk with different doctors and enjoy occasional “after-hours” casual conversations. When we were together, no matter the subject, it always ended up in dentistry. We are a curious group for sure. After watching some of the finest operators, I soon observed that the common ingredient for excellence was passion for the work.

I will have to admit that I was somewhat of a perfectionist. Everything had to be “just right,” or I was not pleased with the result. I remember so many times that when I tried to do that “one more step” to make it perfect, it turned out not as good as it was to begin with. Then one day I read an article that basically said, “There is nothing wrong with the pursuit of perfection as long as you will accept excellence during the process.”

On a few occasions I left an office I just visited and had the feeling that he, or she, should have retired some time ago. My prayer became that I would know when to quit. It happened about 11 years ago. It was a routine endodontic case. To finish the case to the level I always tried to achieve would have normally taken two hours. But instead, I had to spend more than four hours to get it done. I suddenly realized that my hand-eye coordination was not what it used to be, and I knew it was time to put the handpiece down.

But after 50 years of practice, listening to the masters speak and trying to live up to what I had learned was an incredible experience. I felt I still had much to share. I decided to spend more time on the road trying to spread the word to anyone who wanted to listen.

I learned an important lesson during the whole 60-year process. During the low points of your life, it’s not important what got you there but what you do about it. Endodontics was my life’s calling, but it would not have happened if a terrible event had not disrupted my life’s path and I had not listened to “that someone” talking to me. I would have missed the most exciting and rewarding part of my career without those traumatic experiences. Perhaps you may look back on your own low times and realize if they had not happened to you, you would not be where you are today!_



John J. Stropko, DDS
Editor in Chief

Conservative restorative-driven endodontics, preserving tooth structure while achieving the goals of treatment

Author_Gregori M. Kurtzman, DDS, MAGD, FPFA, FACD, FADI, DICOI, DAIDA, DIDIA

_Introduction

Endodontic treatment has trended to more conservative access as well as canal instrumentation. This has been geared to preserve as much tooth structure within the root and specifically the cervical region of the tooth, taking on a restorative-driven approach. Long-term treatment outcome is not just dependent on identifying the canals, instrumenting them and obturating those canals to the apex, but on restoration of that tooth to allow functional loading over time without structural failure. Those goals, the endodontic and restorative aspects, are not mutually exclusive, and with proper planning and treatment they together complement each other in achieving long-term clinical success.

Teeth when loaded either by loads along the tooth's long axis (longitudinal) or off-axis lead to concentration of those loads in the cervical region of the tooth[1] (Fig. 1). This occurs in teeth with no structural deficiencies (absent of restorative material or caries) or those that have cervical compromised tooth structure. Stress distributions in the cervical region have reported that tensile stress is mainly concentrated on the mesio-buccal aspects of the root, and in multirooted teeth in the root furcation.[2] Thus, preserving coronal dentin especially in the cervical region utilizing a conservative endodontic approach significantly reduces tensile stress concentration and the potential for structural failure at the cervical aspect of the tooth. Yet, endodontic goals (instrumentation and obturation of the canal system) still require adherence to achieve clinical success with that portion of treatment on the affected tooth. Included in those goals is removal of any remnants of pulpal tissue within the canal system, as well as bacteria that may be present in the pulp or dentinal tubules and creating a shape that can then be obturated to seal the canal system from the apex coronally.

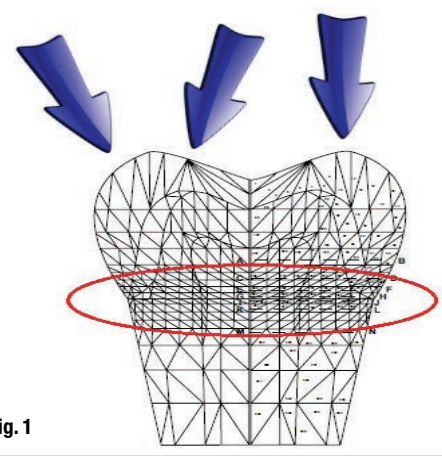


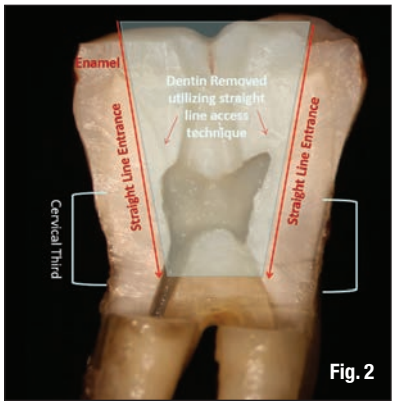
Fig. 1

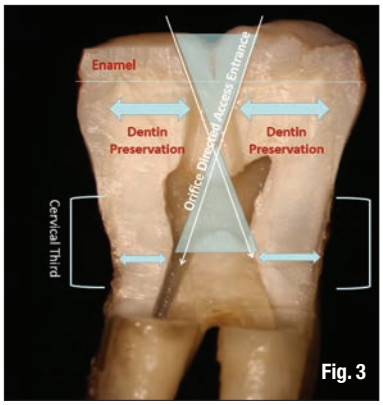
Fig. 1_Finite element analysis when the tooth is loaded under function by either longitudinal or off-axis forces leads to concentration of those forces in the cervical region of the tooth. Courtesy of Dr. Gene McCoy. (Photos/ Provided by Dr. Gregori M. Kurtzman)

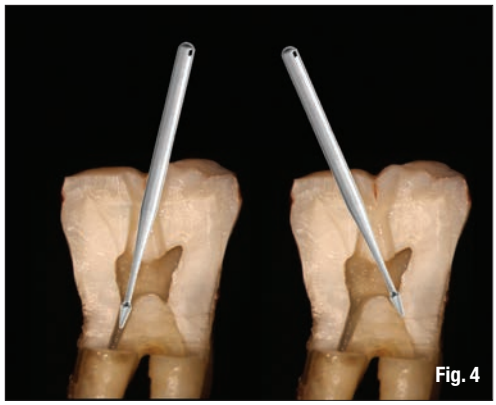
_Endodontic access and instrumentation

Two factors in the endodontic phase aid in determining how conservative treatment will be. Those are endodontic access and instrumentation.

The goal of endodontic access is to locate the canal orifices and allow straight-line access into those canals to permit instrumentation. Traditionally, endodontic access in molars recommended a large access that allowed the files to drop into the canal from a vertical direction essentially parallel to the long axis of that molar. Unfortunately, this approach removes







a considerable amount of coronal tooth structure and can weaken the cervical region of the tooth (Fig. 2). Yet anatomically the canals in the molar tend to angle toward the center of the tooth, with the mesial canals tipping to the distal and the distal canals tipping to the mesial. An orifice-directed approach takes this into consideration, and the orifice for the mesial canals has a straight-line access from the distal and the distal canal orifice is approached from the mesial direction (Fig. 3). The goal is preserving critical tooth structure and not potentially weakening the tooth to functional loading following treatment. The Endoguide bur (SS White) is a long shaft friction grip or latch-style bur with a small, pointed head that is designed to aid in location of the orifice and aid in conservative tooth removal laterally to allow access for the file into the canal (Fig. 4). It is recommended that the bur should not be advanced into the canal beyond the length of the bur's head to prevent potentially perforating the tooth in the cervical region.

Anterior teeth, whether maxillary or mandibular, can pose some potential challenges when the practitioner does not understand the tooth's anatomy in relation to the canal and its orifice. When an anterior tooth is viewed laterally from the proximal, the canal following a straight axis places the canal orifice either directly under the incisal edge or slightly lingual to the incisal edge for incisors (Fig. 5). Canines will typically have the canal orifice directly under the cusp tip, and this should be kept in mind when treating those teeth. A frequent approach in anterior teeth is to initiate access in the middle of the lingual surface, which can place the access too lingual to where the orifice actually lies. Additionally, if the bur is not held parallel to the tooth's long axis of the root it is possible in attempting to locate the pulp chamber the bur may perforate the tooth on the facial cervical, creating additional treatment problems (Fig. 6). Use of a long shaft bur such as the Endoguide makes paralleling the tooth's long axis easier then with standard-length burs.

File taper determines how much dentin is removed, especially in the cervical region of the tooth. Depending on the manufacturer, files will have either a constant or a variable taper. With a constant taper, the file taper is the same as it moves from the file's tip toward its shaft. A variable taper file will taper typically in the apical half, then the remainder of the instrument either does not taper or has a lesser degree of taper. Clinically, what this means is when instrumentation is completed a greater amount of cervical root dentin will be removed with a constant taper file than with a variable taper file, potentially weakening the cervical tooth structure.

When we compare taper between several constant taper files that are commonly used (Wave One, ProTaper Gold and ProTaper Next) and a variable taper file (ExactTaperH DC), we are able to observe that for files with the same apical size greater amounts of dentin is removed as the cervical is approached (Fig. 2). So, utilization of a variable taper file aids in conservation of tooth structure and yields when instrumentation is completed a tooth that is stronger cervically due to preservation of more pericervical dentin. When looking at the files in the ExactTaperH DC, a variable taper system, we can see that at different distances from the file's tip the taper varies for each of the files in the system (Fig. 3). Additionally, variable taper files tend

Fig. 2_Traditional endodontic access with an attempt at straight line entrance into the canal orifice typically follows a vertical path necessitating more coronal tooth structure removal.

Fig. 3_An orifice-directed access conserves more tooth structure as it follows the direction of the canal, resulting in a smaller access opening and preservation of critical tooth.

Fig. 4_Orifice-directed access in a molar utilizing Endoguide burs to conserve tooth structure while giving straight line access into the canals.

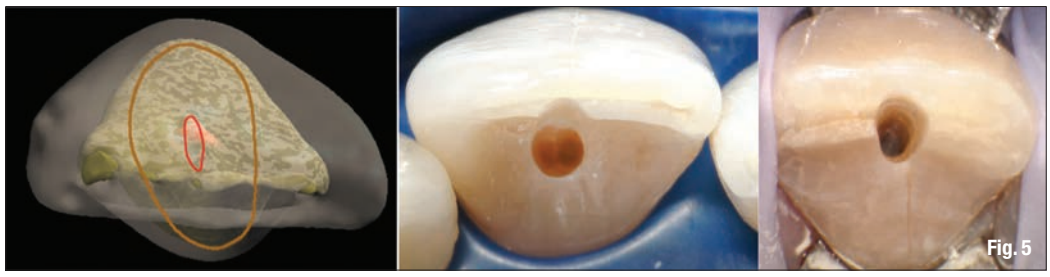


Fig. 5_In anterior teeth, the canal orifice is typically located just lingual to the incisal edge in incisors and the cusp tip in canines (middle) or directly under the incisal edge or cusp tip (right).