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Remembering
Dr. Fred Weinstein

He was wearing a Royal Canadian Mounted Police uniform the first time I met him. It was 2007, and I had just started a new job as an editor with Dental Tribune, covering the specialty of endodontics. With his red blazer, hat and tall boots he looked genuine — and approachable. I just had to talk with him. After all, how often does one get a chance to meet a Mountie?

He turned out to be none other than Dr. Fred Weinstein, and he was dressed up to promote the IFEA meeting, which was being held that year in his hometown of Vancouver, British Columbia. Over the next decade I got to know him quite well. He was always generous with his time, and he was always helpful to me, a non-dentist, with information on the specialty and also about key personalities, tools and equipment, and the industry in general.

Weinstein had already retired after a long and successful career in private practice and as an educator and product innovator, but in 2012 he agreed to serve as editor in chief of roots magazine. Over the years we not only worked together on the publication, but we also became friends. We would often meet up at various dental meetings, where I was busy on the exhibit hall floor taking pictures for our show daily. He would be there to partake in the various educational sessions and to visit with his many friends. It seemed he knew almost everybody.

The last time we were together was at last year’s AAE in New Orleans. Weinstein and his wife, Heather, and I met up before the meeting got underway for dinner and a stroll in the French Quarter. At this year’s AAE gathering in Denver, Weinstein, who passed away last October, will be missed. I sure will miss him. Turn to page 11 of this issue of roots for a tribute to Weinstein in which a number of prominent endodontists share their fond memories.

The centerpiece of this publication, however, is an article by Dr. Frank C. Setzer, “The dental operating microscope in endodontics,” which originally appeared in AAE’s ENDODONTICS: Colleagues for Excellence newsletter. The article is being made available in this issue of roots with the permission of the AAE. By reading this article, and then taking a short online quiz at www.DTStudyClub.com, you will gain one ADA CERP-certified C.E. credit.

You can also access the vast library of C.E. articles published in the AAE’s clinical newsletter by visiting www.aae.org/colleagues.

I can imagine that taking time away from your practice to pursue C.E. credits is costly in terms of lost revenue and time, and that is another reason roots is such a valuable publication. I hope you will enjoy this issue and that you will take advantage of the C.E. opportunity.

Sincerely,

Fred Michmershuizen, Managing Editor
f.michmershuizen@dental-tribune.com
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A diaphonized mesial root of a lower left second molar, showing the vascularity stained within the demonstration of the pulp canal system, as prepared and photographed by Craig Barrington, DDS. Barrington may be contacted at cbdds002@yahoo.com. You may also follow him on Facebook, Craig Barringtondds.
nothing changes if
nothing changes

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1 Images courtesy: Khong T. L., D.D.S.
5 Nair N.P. et al. (2014) Int Endod J. 47:103-1011
The practice of endodontics requires precision and great attention to detail. These depend on the training, skills and experience of the clinician. Most endodontic procedures are carried out in dark and confined places, and fractions of millimeters may decide the outcome of treatment. Over the past decades, endodontics has gained not only basic and clinical scientific knowledge, but also has taken technological quantum leaps. Due to the intricate nature of endodontic treatment, practitioners have always sought to improve their vision of the operational field.

Advantages of dental microscopes

Better vision requires enhanced magnification and illumination, and both microscopes and loupes have been widely adopted. Operating microscopes have a number of advantages compared with loupes. Loupes are worn on the head and may be used with or without external light sources. This necessitates weight limitations and restricts the oculars to the bare minimum of lenses needed for magnification. By contrast, the microscope is a self-supported unit; therefore, additional lenses or prisms are not a concern. This has meaningful implications with regard to ergonomics and visualization.

The attachment of loupes to glasses dictates a design that angles the binoculars inward in order for the viewer to focus on the object. As a result, the practitioner’s eyes also rotate medially. This is similar to near object accommodation by the naked eye, which can lead to eye muscle strain and fatigue. By contrast, microscope binoculars are arranged in a parallel orientation. This arrangement is facilitated by prisms that let the incoming light beams reach the eyes also in a parallel direction. This simulates the observation of a distant object: a straight, forward-looking gaze that causes less muscle stress and fatigue. In addition, from an ergonomic perspective, working correctly with a dental microscope improves overall body posture and may reduce neck and back pain.

Commercially available microscopes provide adjustable magnification ranging from approximately 4x–25x magnification, while most loupes provide fixed magnification between 2.5x–6x. Magnification can be divided in low magnification (~2x–8x), mid magnification (~8x–16x), and high magnification (~16x–25x). Low, mid and high magnification are applicable for different procedural steps throughout nonsurgical and surgical endodontic treatment. Low magnification is mainly applicable for an overview of the operating field.

Mid magnification is used for the main procedural steps throughout root canal therapy and endodontic surgery. High magnification is used for the identification of minute structures and documentation of the finest details. Using a microscope significantly increases a practitioner’s accuracy. However, it must be mentioned that there is a learning curve and working at both mid and high magnification will require the practitioner to slow down movements to avoid unintended actions on the smallest of anatomical structures. As a result of working in a small-scale environment, new types of micro-instruments also were introduced to the dental profession.

History of microscopes in endodontics

The idea of using microscopes in dentistry is not new. Bowles suggested and used a dental microscope as early as 1907. In endodontics, dental operating microscopes were first introduced by individual clinicians and then adopted by endodontic specialty programs throughout the United States. The American Association of Endodontists was an early proponent of training in microscopes for endodontic residents and successfully advocated for the Com-
mission on Dental Accreditation to add a microscope proficiency standard to the CODA educational standards for postgraduate endodontic programs in 1998. The latest standard requires the teaching of magnification devices “beyond that of magnifying eyewear” at an in-depth level, which is the highest of the levels of knowledge prescribed by CODA. Based on two surveys, in 1999 and 2008, the accessibility and use of the microscope by endodontists increased from 52 percent to 90 percent. It is now also increasingly being used by other specialties and in dental education.

Microscope use for nonsurgical procedures

For the endodontic practitioner, the dental microscope is useful for diagnosis and clinical procedures. The microscope may aid diagnostically in identifying caries, insufficient crown or restorative filling margins, or assessing craze or fracture lines. During root canal therapy, magnification and illumination provided by the operating microscope aids with caries removal, access preparation, removal of pulp chamber calcifications, identification of root canal orifices, identification of cracks and fracture lines (Fig. 2), and the treatment of internal resorptions. Under the microscope, subtle changes in dentin color and texture become apparent, such as developmental lines on the pulp floor guiding the practitioner toward root canal orifices, or the darker color of the pulp floor itself, allowing the practitioner safer dentin removal.

High magnification can help in the localization and instrumentation of obstructed and calcified canals, the identification of canal bifurcations (Fig. 3), the removal of canal obstructions such as denticles and calcifications, and obturation (Figs. 4a,b). Additional primary endodontic procedures benefiting from microscope use include vital pulp therapy and regenerative endodontics by allowing careful and gentle manipulation of the pulpal tissues or a blood clot, respectively. Enhanced vision also aids in the treatment of dental anomalies, such as dens invaginatus, or fused teeth.

In endodontic retreatments, the microscope is helpful in identifying and removing leftover filling materials, such as sealer remnants, pastes or gutta-percha, silver points and carrier-based materials, posts or fractured instruments (Figs. 5a-d). It also aids in nonsurgical perforation repair, allowing the practitioner to clean the perforation site and place the perforation repair material more precisely.

Microscope use for surgical procedures

Surgical endodontics has been completely transformed by microscopic procedures. For many years surgical burs and amalgam for root-end fillings were the standard of care. The incorporation of the microscope, and also to a certain degree the endoscope, together with the use of ultrasonic tips and biocompatible filling materials, has evolved the classical apicoectomy into modern endodontic microsurgery. All steps of endodontic microsurgery are carried out under varying degrees of magnification, including flap preparation, osteotomy, identification of root apices, root-end resection, inflammatory tissue removal, observation of the resected root surface (Fig. 6), root-end preparation, root-end filling, and suturing. The microscope is also helpful for cervical or external resorption or perforation repairs.

Treatment effects

There has been great debate over whether the use of magnification would actually increase the success rate of endodontic procedures. It is an accepted fact in endodontics that microbes and their endotoxins are responsible for the majority of inflammatory periapical lesions. Healing of these lesions in cases of a diagnosis of pulp necrosis has been associated with disinfection of the root canal system, reduction of the microbial content, filling of the root canal system and the permanent restoration of the tooth.

It is thus assumed that the identification and treatment of all parts of the root canal system increase the chances of a successful treatment and good long-term prognosis. Ample literature has been published with regard to the identification of additional canals with the help of higher magnification.
and illumination.\textsuperscript{16,17} The effectiveness of vision enhancement for the detection of second mesio-buccal canals (MB2) in maxillary molars was assessed both in vitro and in vivo. The detection rate of MB2 canals in vitro was shown to be 90 percent with the operating microscope and 52 percent without aided vision. Gorduysus et al.\textsuperscript{18} demonstrated that the percentage of MB2 canal negotiation increased with the aid of higher magnification.

Burley et al.\textsuperscript{19} described the successful identification of MB2s in 312 maxillary first and second molars in 57.4 percent of the cases when using the operating microscope, 55.3 percent with dental loupes and 18.2 percent with unaided vision. In first maxillary molars, the incidences of MB2 identification were 71.1 percent, 62.5 percent and 17.2 percent for the microscope, dental loupes and no magnification groups, respectively. Stropko\textsuperscript{20} treated a total 1,732 maxillary molars working at times with unaided vision and at times with a dental microscope. With more experience and a dental microscope, the incidence of locating MB2 canals increased from 73.2 percent to 93.0 percent in first molars and from 50.7 percent to 60.4 percent in second molars. Microscope use also increased the number of root canals orifices located in mandibular molars,\textsuperscript{21} and significantly increased the quality of access cavity preparation and the accuracy of canal identification when treatment was performed by dental students recently instructed in microscope use.\textsuperscript{22}

\textbf{Nonsurgical treatment outcomes}

It was long uncertain if microscope usage resulted in improvements in nonsurgical treatment outcomes. Del Fabbro et al. conducted two Cochrane Reviews, in 2009\textsuperscript{23} and 2015,\textsuperscript{24} to identify randomized controlled trials and quasi-randomized controlled trials comparing endodontic therapy performed with or without one or more magnification devices. Neither in 2009, nor in 2015, were the authors able to identify a single study reporting the outcome of either nonsurgical or surgical endodontic therapy matching the strict criteria put forward in their study. Hence, the authors concluded that it was unknown if and how any magnification device affected the treatment outcome, in particular, since a great number of factors besides the microscope can have a significant impact on the success of endodontic procedures. The authors suggested future long-term, well-designed randomized clinical trials.

Recently, however, a study published by Monea et al.\textsuperscript{25} assessed the impact of the operating microscope on the outcome of nonsurgical treatments of a consecutive series of 184 comparable teeth diagnosed with pulp necrosis and chronic apical periodontitis performed by postgraduate students. Success was defined as a decrease or disappearance of the radiolucency following the recommendations of the European Society of Endodontology. After follow-up periods of six months and 18 months, there were significant differences between microscope and control groups, with 94.8 percent versus 87.5 percent (healed and improved) at six months, and 95.9 percent and 91.9 percent at 18 months. At 18 months, 89 percent of cases available for follow-up in the microscope group were classified as completely healed.

\textbf{Surgical treatment outcomes}

Another systematic review by del Fabbro et al.\textsuperscript{26} to investigate the use of magnification devices in endodontics identified three prospective clinical trials evaluating the outcomes of endodontic surgery. The authors were unable to identify significant differences in outcomes depending on treatment with loupes, microscope or an endoscope and suggested that different magnification devices could only minimally affect the outcome. In two meta-analyses, Setzer et al. described the differences in outcome of three techniques for endodontic surgery.\textsuperscript{27,28} Investigated were clinical studies that applied traditional endodontic surgical techniques (TRS), including 12 studies with a total sample size of 925 teeth using no magnification, straight surgical handpieces and
amalgam root-end filling and a cumulative success rate of 59.0 percent; seven studies using contemporary surgical procedures (CRS) with a collective sample size of 610 teeth, employing magnifying loupes, ultrasonic root-end preparation and biocompatible filling materials and a cumulative success rate of 88.1 percent; and nine studies on endodontic microsurgery (EMS) with a total of 699 teeth using the identical techniques as CRS with the only differences being the use of high-power magnification devices such as microscopes or endoscopes instead of loupes and a cumulative success rate of 93.5 percent.

The cumulative success rate of the EMS group was significantly higher than the CRS group, which only employed loupes, and the TRS group, which used no magnification. The EMS group combined studies that employed both the dental microscope and the endoscope. It needs to be mentioned that these studies are comparable as both microscopes and endoscopes provide high-power magnification and illumination and also because the microscope is used for the majority of the steps of the surgical procedure in the studies where an endoscope was used during root-end preparation.

The endodontic microsurgery procedures demonstrated significantly better cumulative success rates than the studies that only employed loupes when all 16 studies with a total of 1,309 teeth were compared. Seven of 16 studies provided information on the individual tooth type (four for CRS and three for EMS), demonstrating a significant difference in probability of success between the groups for molars. Tsesis et al.29 provided an updated systematic review on endodontic surgery in 2013 and also confirmed a statistically significant difference in successful outcomes of both microscope and endoscope-assisted procedures compared with loupes.

**Microscope features and upgrades**

Modern dental microscopes have evolved considerably with regard to features and options available to the dental clinician. Depending on personal preferences and possible locations in the operatory, floor-standing, wall- or ceiling-mounted units are available. While standard microscopes come with basic optics and light options, certain accessory features are recommended for endodontic purposes. Surgical procedures will require greater angulations to view resected root surfaces and other surgical details. At a minimum, a microscope should be equipped with 180-degree-tiltable binoculars to address the angular requirements and an eyepiece with a reticle.

A reticle is a set of fine lines, most commonly in the shape of crosshairs or concentric rings, that provides proper centering on the object in focus and allows for easier individual calibration (parfocaling) of the microscope. It also is an indispensable tool for documentation. Since light and the object image reach the binoculars virtually free of shadows, microscope photography and recording allow for excellent image quality for documentation and clinical operations. However, this requires perfect calibration with an external monitor and a reticle to center the image. Full high-definition and three-chip cameras are the gold standard for video recording and available as external or internal solutions. Screenshots from video recordings can be obtained at higher quality by using post-processing software applications that allow for image stacking.30 For still photography, new generation digital mirrorless cameras have demonstrated advantages compared with DSLRs.

There is a variety of additional upgrades for core microscope functions. Instead of fixed focal distances that limit the microscope to an object distance of 200 mm, 250 mm or 300 mm, variable focal distance adapters have become available, allowing for easier switching between practitioners and easier adjustment to patients of different statures. These are offered in top-of-the-line microscopes, often in conjunction with electrical zoom and fine focus options that allow smooth and stepless adjustments of both magnification and focus. Extendable (foldable)
binoculars were introduced for better ergonomics. Magnetic arrest functions [clutch] are available for increased stability, particularly for microscopes with several documentation ports and attachments. The practitioner can choose from a variety of light sources. The traditional standard is still halogen (yellowish hue, peak at 600–700 nm, ~3300K) and the brightest option is xenon (like daylight, homogeneous spectrum 400–700 nm, ~5500K), making it most useful for the identification of fine details in deeper areas of the root canal system and documentation. Recently LED lights (green part of emission spectrum, low at 450 nm and 550 nm, ~5700K) became available and offer a significantly longer lifetime, however, at a reduced brightness compared with xenon.

**Case study**

Mandibular right first molar. Nonsurgical root canal treatment had been completed five years ago. Originally, a new crown restoration had been planned. However, the periapical radiograph revealed periradicular radiolucencies (periapical and in the furcation area) (Fig. 7). The patient received a recommendation to extract the tooth due to the bone loss in the furcation.

There were no symptoms, and periodontal probing depths were within normal limits, suggesting an endodontic problem as the origin of the furcation defect. Nonsurgical retreatment was initiated. The clinical image shows the previously treated four canals with infected gutta-percha filling (Fig. 8). Under high magnification, a furcation canal (Fig. 9, arrow) and a third distal canal (Fig. 10) were located.

The post-operative radiograph shows the retreated tooth with five main canals (Fig. 11). The one-year follow-up radiograph demonstrates the complete resolution of the periradicular radiolucencies and permanent restoration of the tooth (Fig. 12).

**Conclusion**

The dental operating microscope has become an integral part of endodontic practice. For both nonsurgical and surgical endodontic therapy it is indispensable for excellency. Besides the obvious benefits for clinical practice, evidence has become available that demonstrates better outcomes compared with treatment without vision enhancement or magnifying eyewear. Treatment rendered using the dental operating microscope results in superior care for patients, and modern endodontic therapy is more effective because of its use.


The following exclusive online bonus materials associated with this article are also available at www.aae.org/colleagues:

- **Full-text article:** Monea M, Hantoiu T, Stoica A, Sita D, Sitaru A. The impact of operating microscope on the outcome of endodontic treatment performed by postgraduate students. Eur Sci J. 2013;305–311.

A complete list of references is available from the publisher, and also at www.aae.org/colleagues.

**About the author**

Frank C. Setzer, DMD, PhD, MS, is a diplomate of the American Board of Endodontists, and an assistant professor at the Department of Endodontics at the University of Pennsylvania School of Dental Medicine. He teaches undergraduate students and post-doctoral residents. Setzer specializes in root canal therapy, trauma and surgical root canal procedures. He received his first dental degree from the Dental School of the Friedrich-Alexander-University Erlangen-Nuremberg, Germany, in 1995, where he also received his doctoral degree in 1998. He pursued his endodontic specialty training at the University of Pennsylvania after working for nine years in a multi-specialist private practice as associate and partner. Setzer graduated from the endodontic program of the University of Pennsylvania in 2006, receiving the Louis I Grossman Postdoctoral Award in Endodontics. He earned a master of science in oral biology and a DMD degree in 2008 and 2010, respectively. Setzer is teaching as clinic director and pre-doctoral program director at the Department of Endodontics of the University of Pennsylvania. Setzer lectures frequently nationally and internationally, has published in peer-reviewed journals and serves, among others, as the associate editor for endodontics for Quintessence International and on the editorial advisory board of the Journal of Endodontics and the Journal of the American Dental Association. He can be contacted at fsetzer@upenn.edu.
He will be remembered as a friend, a teacher and a healer. Fred Weinstein, DMD, a retired endodontist from Vancouver, British Columbia, died Oct. 15, 2017, at the age of 78, after a brief illness. His fellow specialists expressed sadness at his passing and acknowledged how his passion for the profession rubbed off on them through many decades of friendship. Many are also remembering him for his ability to have fun — especially when it came time to promote an international endodontic conference hosted in his native country.

"Fred has been an inspiration for me for all these years, ever since we met over 30 years ago," said Gerald N. Glickman, DDS, MS, professor and chair at Texas A & M College of Dentistry in Dallas, one of many endodontists who shared fond memories of Weinstein.

"What a remarkably kind and insightful individual he was — always inquiring about me and others and never letting on about himself," Glickman remembered. "He brought a world of enthusiasm and knowledge to the global endodontic community. I will miss him dearly."

"Fred was that special kind of person who would do anything he could to help out when needed. He cared for everyone and was a dear friend," said John J. Stropko, DDS, of Prescott, Ariz. "Fred was a teacher, always encouraging others to use the latest technology to..."
Dr. Fred Weinstein

Deliver better treatment results for their patients. During the process, he went to great lengths to clearly communicate his beliefs in an easy-to-understand manner. Our specialty has lost one of its great members.

“I knew Fred for more than 25 years, and I always found it entertaining to be in his company,” said Anne Lauren Koch, DMD. “We went to hockey games, basketball games and endodontic meetings together. Fred was a character, but in the best sense of the word. He was entertaining, charming and unpredictable. That was Fred. But to those of us who knew and loved him, he was much more than that. He was a loyal friend who made a maximum effort to understand each of us in a personal and supportive way. Really, at the end of the day, Fred was a mensch. He will be very much missed.”

Weinstein was born in 1939 in Winnipeg, Manitoba. He graduated from the University of Manitoba at the age of 22 with a degree in general dentistry, and then he went on to study endodontics at the University of Pennsylvania School of Dental Medicine in Philadelphia, under the tutelage of Dr. Louis Grossman, known as the “Father of Endodontics.” After receiving his Certificate in Endodontics from the University of Pennsylvania in 1969, he moved his family to Vancouver and established an office in the Fairmont Medical Building, where he would go on to practice for more than 40 years.

“He loved his patients, and he equally enjoyed teaching and lecturing throughout the world to advance the learning within dentistry,” his family wrote in an obituary published in the Vancouver Sun.

Weinstein’s accomplishments within the profession were notable. He served as an assistant clinical professor at the University of British Columbia and was a past president of the Canadian Academy of Endodontics, the British Columbia Society of Endodontics, the Interspeciality Society of British Columbia and the International Federation of Endodontic Associations (IFEA). He was a member of the Royal College of Dentists, and he was a fellow of the American College of Dentists and the International College of Dentists.

He served on advisory boards for several leading dental manufacturers, and he lectured extensively throughout the world. He also served as a volunteer endodontist at the 2010 Vancouver Winter Olympics, and performed root canal treatment on world boxing champion Sugar Ray Leonard in the 1980s.

He was especially proud to have served as the general chairman for the 2007 IFEA World Congress in Vancouver. To drum up excitement for that meeting, he dressed as a Royal Canadian “Mountie” at several events leading up to it — something that friends and colleagues remembered for years.

“Fred always had a smile and was known as ‘the Canadian Mountie’ for his outfit that he wore at every dental meeting to promote the IFEA meeting in Vancouver in 2007,” remembered Samuel O. Dorn, DDS. “He was truly dedicated to the Canadian Academy of Endodontics and its place in global endodontics. His passion for endodontics and his friendship will never be forgotten.”

“I cherish my photo of us with him dressed as a Mountie when he was president of IFEA,” said Dr. William Ben Johnson. “Fred and I started out as endodontic colleagues, then became friends. So much so he would go snow skiing with me even when he didn’t care for skiing, and I would drink wine with him when I preferred scotch. I’ve lost a friend.”

After his retirement from practice, Weinstein continued to travel to dental meetings to keep his knowledge of the specialty current and to visit with his many friends.

For many years, Weinstein was editor in chief of roots magazine, the international C.E. magazine of endodontics, published by Dental Tribune America.

“Above all of Fred’s accomplishments and titles, his family remained his number one priority in his life, always,” his family wrote in the Sun. “He had a gentle heart of gold, compassion and sincerity and a smile that would illuminate a room.”

**Left to right:** In a print ad published in the August 2007 issue of Endo Tribune, Dr. Fred Weinstein dressed as a Royal Canadian ‘Mountie’ to promote the IFEA meeting, held that year in Vancouver, British Columbia.

Dr. Fred Weinstein with ‘Queen Elizabeth,’ at the IFEA meeting in 2007. (Photo/Fred Michmershuizen, Managing Editor)

Dr. Fred Weinstein in Hamburg, Germany, in the summer of 2017. (Photo/Haye Hinrichs)
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Ready-to-use bioceramic materials in apical resorption: A clinical case

Author: Ricardo Affonso Bernardes

Introduction: Bioceramic materials, with their biocompatible type and excellent physic-chemical properties, are frequently used in endodontics. They can be used as cements, root repair materials, root canal sealers and filling materials, which have the advantages of greater biocompatibility, antibacterial properties and sealing capacity. A further advantage of these materials is their ability to form hydroxyapatite and ultimately create a bond between dentin and the material.

Calcium phosphate silicate cement (CPSC) is a new generation of biological cement first proposed in 2006. It contains phosphate salts in addition to hydraulic calcium silicates. The purpose of its development was the hope that the hydration method would improve the cement’s mechanical properties and biocompatibility. As examples of CPSCs, Endosequence Root Repair Material Putty and Endosequence Root Repair Material Paste (ERRM Paste; Brasseler, Savannah, Ga.) have been industrialized as ready-to-use, premixed bioceramic materials. Their main inorganic components include C3S, C2S and calcium phosphates. The institution of premixed CPSCs eliminates the possibility of heterogeneous consistency during on-site mixing. Because the material is premixed with non-aqueous but water-miscible carriers, it will not set during storage and hardens only on exposure to an aqueous environment.

Objective: The aim of this study was to show the ability and facility to use a novel line of bioceramic endodontic materials.

Method: A 67-year-old female after orthodontics treatment with a symptomatic right upper central incisor was assessed at a private endodontic clinic. She complained of spontaneous pain. Clinical examination showed a buccal abscess with fistula. The tooth was sensitive to percussion and to palpation. Cold test was negative. Radiographic examination demonstrated an apical resorption. Cone beam CT showed apical resorption in both central incisors, bigger in #8. The root canals were instrumented with Root Zx 2 (J Morita Corp., California) and Endossequence Rotary limes 35.04 until 50.04 (Brasseler) using 2.5 percent sodium hypochlorite and EDTA, as well as with the tip 20.01 (Helse Ultrasonic Ocoee, USA). Calcium hydroxide was used as root canal dressing for 14 days and, after remission of symptoms, the apical buffer was performed with the new, ready-to-use Bioceramic BIO-C REPAIR cement (Angelus, Londrina, Brazil), and root canals were filled with the new, ready-to-use BIO-C SEALER (Angelus, Londrina, Brazil) and single gutta-percha cones 50.04 (Tanari Amazonas, Brazil). The cones were then cut with touch heat and condensed.

Conclusion: Both products showed the ability and efficiency to be used in repair of resorptions and filling root canals, respectively.

References

About the author
Ricardo Affonso Bernardes graduated in dentistry from the University of Uberaba in 1990. He graduated in endodontics from Bauru Dental School at the University of Sao Paulo in 1994. He received a master of science in endodontics in 2002 and a PhD in endodontics from the Bauru Dental School at the University of Sao Paulo in 2013. He is a visiting professor and post doctoral at University of British Columbia, Vancouver, 2013. He is teacher and chairman, Endodontics Department, School of Dentistry, Brazilian Association of Dentistry, Brasilia DF.
Minimally invasive root canal treatment uses fluids, acoustics

Author_Sonendo Staff

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References

The importance of irrigation and PUI in modern endodontics

Author_ Vista Dental Products Staff

The goal of root canal cleaning and shaping is the removal of vital or necrotic tissue, microorganisms and their byproducts while providing space for placing obturation material. The ultimate goal being the complete removal and disinfection of the endodontic space.

The tools used in mechanical enlargement of the root canal space are unable to conform to the intricate root canal anatomy. It has been shown that conventional instrumentation leaves as much as 35 percent of the canal anatomy untouched. Instrumentation and irrigation, although important factors in canal disinfection, cannot in themselves be relied upon for optimal canal cleanliness. As the market trends toward fewer required instruments, there is a resulting negative impact and consequence of less associated irrigation. This has impacted endodontic retreatment rates.

Acoustic streaming and cavitation have been proven to significantly enhance cleaning of difficult anatomy. When ultrasonic activation is introduced, irrigant streaming and cavitation occur, resulting in significantly improved debridement of canal spaces, disruption of biofilm and improved penetration of irrigants into dentinal tubules. The ultrasonic activation of irrigants greatly reduces bacteria levels and improves root sealing.

EndoUltra™ is the only cordless, activation device available. Not tied to a wall, the cordless device is easily incorporated into one’s existing irrigation protocol. Incorporating this product as well as enhanced irrigants into irrigation protocol is an effective, predictable method of improving endodontic care, according to the company.

Vista Dental Products asserts that its patented solutions Chlor-XTRA™ and SmearOFF™ 2-in-1 are ideal with the EndoUltra cordless activation device. (Photo/Provided by Vista Dental Products)

Chlor-XTRA™ is an enhanced NaOCl. Proprietary chemistry gives this 6 percent NaOCl a lower surface tension, allowing for improved penetration into canal anatomy and significantly faster tissue dissolution compared with standard NaOCl.

SmearOFF is an EDTA-based formula enhanced with chlorhexidine. SmearOFF not only effectively removes the smear layer, but also kills bacteria in one easy step. Unlike other two-in-one mixes, SmearOFF is compatible with sodium hypochlorite and will not form a precipitate, eliminating steps and saving time with each procedure.

Enhanced irrigants paired with ultrasonic activation is key to thoroughly cleansing canal anatomy. Vista Dental Products asserts that it offers a fantastic product line to not only simplify the irrigation process, but to more predictably achieve endodontic success.

For more information, call Vista Dental Products at (877) 418-4782 or visit www.vista-dental.com.
There is a better way (and LVI can show you how to get there)

Author: Mark Duncan, DDS, FAGD, LVIF, DICOI, FICCMO, Clinical Director, LVI

You know how those days go — all morning long, it felt like you were struggling to keep on track with the schedule. Your team is frustrated because they haven’t had their full hour lunch more than one day a week in as long as they can remember. You walked by the sterilization room 15 minutes ago, and it sure sounded like they were complaining to each other because you said to work in that emergency, and they were struggling to figure out how to pick up their kid from daycare on time. Again.

You want them to enjoy working here, but you have to be able to pay the bills. And your best assistant asked you again if she can have that raise you have been promising her. Don’t they understand?

Today will be another day of three chairs and patient after patient asking you questions about treatment, all eager to get started with getting their mouth fixed, but yet you still won’t see any of them show up on the schedule. They said they wanted to do the work, but for some reason, they never seem to come back and do it.

They say insurance doesn’t cover it, or they ask for a pre-determination. Too bad they don’t know the pre-determination doesn’t mean much.

Today, you have 27 patients on your schedule and will work your butt off and still not have a chance to pee. It looks like you should be able to be done by 5, but today will finish worse than yesterday.

It feels like half of your patients are crankier than you are, and your team isn’t really talking to you today, and you know when you get home, all you will want to do is go to sleep and wake up on Saturday — except it’s still Tuesday!

It doesn’t make sense — you have taken C.E. courses every time they come to town. The new insurance plan was supposed to make things easier. You bought a bunch of new equipment to save money on taxes — of course now you have to pay for it every month — but why does it seem like the harder you work, the further behind you get? There has to be a simple reason.

Well, it turns out there actually is — and it’s something that you learned when you were about 5! Do unto others. More specifically, build systems in your office so that you can treat your patients the way you would want to be treated — comprehensively and with exceptional information to make good decisions — and produce a consistent experience time after time.

While doing that, add exceptional care — esthetic adhesive excellence like you see in the journals. But how? Well, the answer happens to be the foundation that LVI was built upon — building the excellence in a patient-centered practice. And the programs at LVI have been teaching clinical excellence and communication and business systems for almost 20 years to help doctors do a better job of not only seeing the patient but, more importantly, connecting with them. Two decades of not only communication but comprehensive diagnosis and clinical excellence. As a result, the doctors at LVI have a statistically higher professional satisfaction and income.

Isn’t it time you go find out what they are doing differently? Yes. Yes it is — and congratulations on the journey you are about to start.
roots
the international C.E. magazine of endodontics

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"LVI has changed the way I do dentistry and view my role as a dentist. It has taught me how to look at dentistry comprehensively and to focus on the physiological cause of disease. I can honestly say that I am so happy that I became a dentist. I love what I do! And LVI has been a huge part of that!"

DR. REBECCA TAYLOR, EDMONDS, WASHINGTON

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