ENDO TRIBUNE

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Negotiating around anatomic impediments

Tactile clues, bypass techniques, procedural flow

By L. Stephen Buchanan, DDS, FICD, FACD

Impediment [im-ped-*uh*-m*uh*'nt]
1. Obstruction; hindrance; obstacle.

Perform endodontic therapy on 10 molars and chances are you ran into at least one anatomic impediment. Despite the significant occurrence rate, few of us have been taught how to identify and manage apical impediments, let alone those that occur in the coronal third.

Without a clever technique for these cases, the right instruments, and an accurate mental image of the canal space you are in, you have virtually no chance of reaching the end of the root canal space, significantly increasing the chances of persistent apical infection. With the right stuff, managing these endodontic challenges can be a fascinating procedural experience requiring little extra time and delivering remarkably predictable outcomes.

Let's begin with a look at the different types of impediments.

Anatomic impediments

1. Apical irregularity at the terminus of a relatively straight canal.
2. Irregularity on the outside wall of a curved canal.
3. Abruptly curved canal.

Fig. 1: Mini-Apex Locator with cord caddy (J. Morita).
Photos/Provided by Dr. L. Stephen Buchanan

Fig. 2: Unbent #15 negotiating file to length around 120-degree curvature in the ML canal.

Iatrogenic impediments

1. Apical blockage.
2. Apical ledging.
3. Remnant of instrument.

How do you know you have met an impediment? That's easy: by the tactile sensation felt as loose resistance to file advancement. Tight resistance to file advancement is the sensation felt when a file moving apically binds and then exhibits tug-back upon removal. Tight resistance means the file is binding on two opposite sides. Usually in this case, working the file (push-pull, balanced force, rotary, etc.) will allow it to progress apically.

Loose resistance to file advancement means that the file tip is caught either in some type of an irregularity (lateral canal, isthmus, fin), or the file tip is bumping into the outside wall of an acutely curved canal. All that remains in the diagnosis of apical impediment is to apply an apex locator (Fig.1) lead to the file and confirm a short reading (and obviously an apex locator is the best method of determining when you have actually reached the Holy Grail — length).

OK, so how do we deal with the aforementioned *impedimento*?*

First off, we do not ever attack or even firmly engage an impediment with the tip of any instrument. That's how ledges happen, and a ledged canal is waaaay

▸ See IMPEDIMENTS, page B4

'History & Heritage — Forging the Future'

AAE's 2012 Annual Session to be held April 18-21 in Boston

See page B8

Photo/Cpenler, Dreamstime.com

Root Canal Awareness Week

While 63 percent of Americans would like to avoid getting a root canal, even more, 69 percent, want to avoid losing a permanent tooth, according to a recent survey by the American Association of Endodontists (AAE). During Root Canal Awareness Week, March 25-31, the AAE wants to dispel myths surrounding root canal treatment and encourage general dentists to involve endodontists in case assessment and treatment planning to save patients' natural teeth. Endodontists' mix of advanced training,

'It's important to patients that we save their natural teeth whenever possible,' says AAE President Dr. William T. Johnson. Photo/AAE

▸ See AWARENESS, page B2

◂ AWARENESS, Page B1

techniques and magnification technology maximize the potential for a comfortable patient experience and successful treatment outcome.

"It's important to patients that we save their natural teeth whenever possible. Putting them in the hands of qualified specialists is a win-win for the patient and the dentist," says AAE President Dr. William T. Johnson. "By referring patients to an endodontist, dentists demonstrate the concern they have for quality and outstanding treatment of each individual in their care."

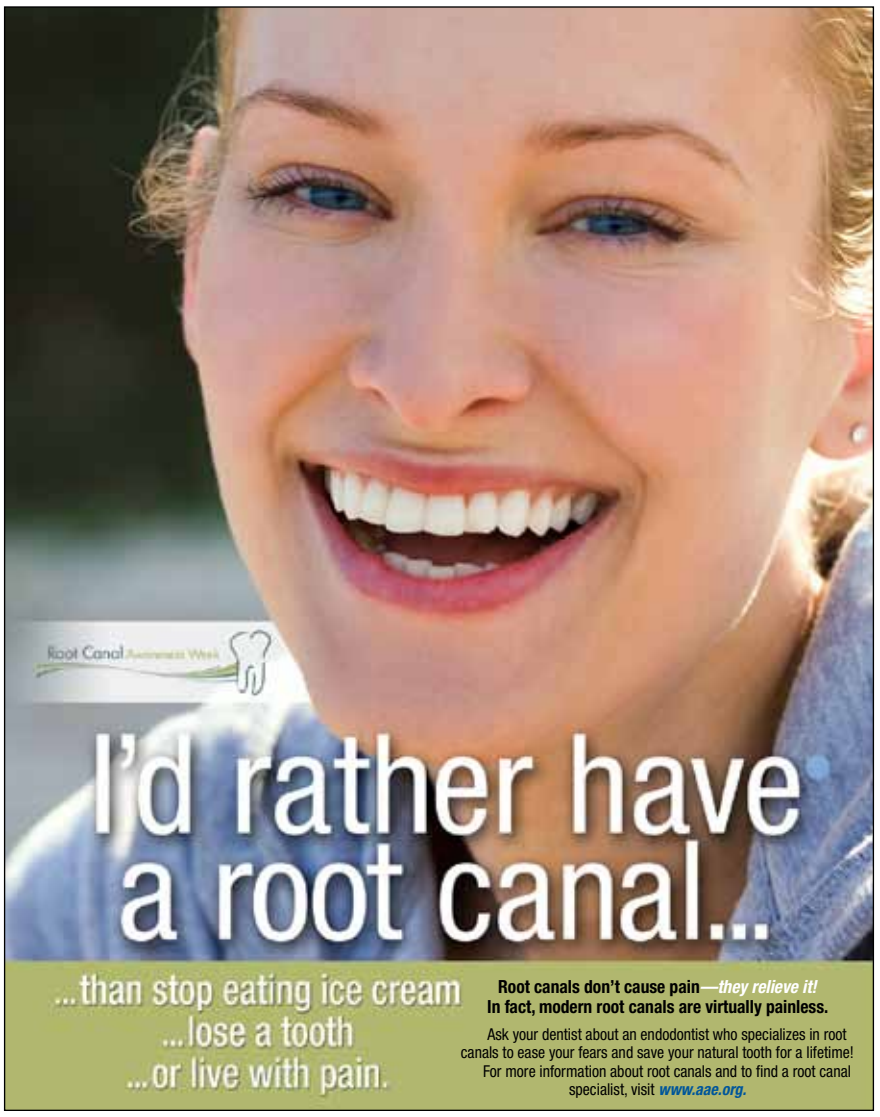
More than half of Americans, 56 percent, say root canals are the dental procedure that makes them most anxious, according to the AAE's January survey of 1,014 U.S. adults. A dentist partnering with an endodontist can put patients more at ease, and when dentists refer their patients to endodontists for root canal treatment, the patients are more likely to be satisfied, according to a 2007 national consumer survey.

Endodontists and general dentists have always enjoyed positive partnerships, with 94 percent of dentists reporting a very positive or positive perception of endodontists. The AAE video, "Endodontists, Partners in Patient Care," features general dentists discussing the positive relationships they share with their endodontist colleagues. It is a great resource to show patients when a referral to a specialist is needed.

The AAE also provides general practitioners with many educational resources that encourage high standards of endodontic care and support collaboration. Treatment Options for the Compromised Tooth: A Decision Guide includes case examples with radiographs of successful endodontic treatment in difficult cases and is designed to encourage general dentists to assess all possible endodontic treatment options before recommending extraction. The Case Difficulty Assessment and Referral Form can be used to evaluate a patient's condition and assess risk factors that may affect the outcome of treatment. Biannual mailings and online archives of the ENDODONTICS: Colleagues for Excellence newsletter highlight clinical topics of interest to dentists who perform their own endodontic treatment and benefit from coverage of best practices and the latest advancements in the specialty.

By using these tools during Root Canal Awareness Week and throughout the year, general dentists ensure they are developing the best treatment plans to save natural teeth, and keeping patients happy.

Additional clinical resources are available at *www.aae.org/dentalpro*.



The AAE has made this poster and many other resources available online. Photo/AAE

"Our main goal as endodontists is to provide patients with a seamless transition between their dentist and specialist through emergency care, timely treatment, appropriate follow-up and referral back for restorative treatment. Communication and collaboration between the doctors is an essential component of the partnership," Johnson says. "At the end of the day, patients want to know they can trust their dentists to do the right thing for them at the right time — it's our responsibility to earn and maintain that trust."

To help promote Root Canal Awareness Week, print the AAE poster to share in your offices or clinics. For more information, follow the AAE on Twitter at *@savingyourteeth* or search *#rootcanal*. You also can contact Meredith Friedman, public relations coordinator, at *mfriedman@aae.org*.

(Source: AAE)

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AAE selects endorsed website provider

The American Association of Endodontists (AAE) has selected dental website provider PBHS Inc. as the endorsed website design firm for the association's 7,400 members. The company will provide its endodontic custom and semi-custom website development services to participating AAE members.

"The powerful combination of PBHS expertise in website design and AAE's leadership in the endodontic specialty will directly enhance the practice growth and patient satisfaction of the AAE membership," said Jay Levine, president of PBHS. "With over 30 years of experience providing patient education and marketing services, PBHS can equip participating endodontists with a high-impact, interactive website that pre-educates patients, promotes the practice and facilitates treatment planning."

PBHS website packages cover every endodontic procedure with detailed animations, time-saving patient presentations, AAE informational libraries and proven search engine results. PBHS also offers powerful enhancements such as secured online patient registration, referral collaboration, and practice management software integration.

A 2011 AAE Member Survey exploring practice busyness demonstrated that 58 percent of member endodontists do not currently have a website presence; a related survey of member needs showed that a majority of members would appreciate the AAE's endorsement of a custom website design and hosting firm. The goal of an AAE endorsement for website design services is to assist endodontic professionals with outreach to current and prospective patients, as well as referring dentist partners.

"Our goal is to provide AAE members with services that will enhance the growth potential of each practice, enabling them to take advantage of all available technologies for patient education and the development of strong referral partnerships," said William T. Johnson, AAE president. "Helping our members choose a trusted partner for website communications is a step we're very excited to take."

(Source: AAE)

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◂IMPEDIMENTS, Page B1

more difficult to manage successfully than just a severely curved canal. Aspire to the maxim, "If you can't fix it, don't fix it so nobody else can fix it."

Managing impediments is all about file bending, mental visualization and patient, skilled technique. So let's discuss file bending.

When and how to bend negotiating files

You might be surprised to read that I find it unnecessary to slightly curve all negotiating files before use — a method most of us were taught. Due to their exceptional flexibility, unbent K-file sizes smaller than #15 will easily traverse impediment-free canals with greater than 90-degree curvatures (Fig. 2).

Try using only straight negotiating files for a time — assuming you negotiate through a lubricant and start with an 08 K-file in small canals. You will be amazed at how often you get to length without bending them. At the end of the day, using cotton pliers with that ribbon-curling motion on your smallish files is a waste of time, so my advice is to stop yourself. You don't have to do that anymore. Not doing that could save weeks of your life over a career.

Fig. 3: File against an apical impediment in the distal canal of this lower molar.

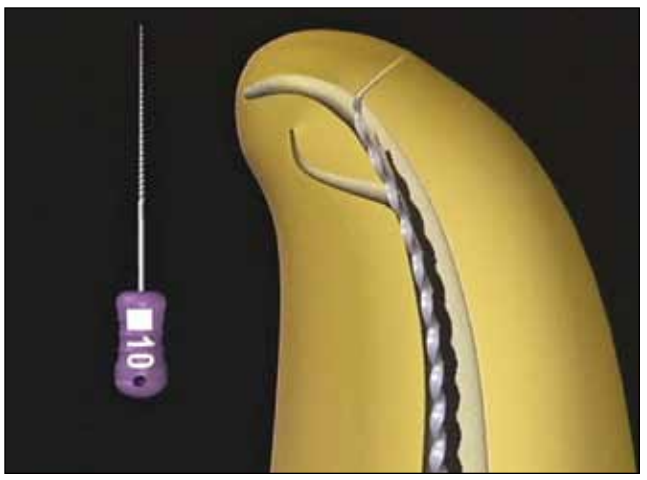

Fig. 4: Illustration showing file tip engaging lateral canal acting as an impediment.

Mental imaging

To understand this better try this thought experiment:

Be the file.

Imagine that you are the negotiating file moving into a canal. You have a subtle curve along your whole length, and because you are being used in a watch-winding motion your tip is waving back and forth "scouting" loosely through the canal — and, just as estimated length nears, "dink, dink" — loose resistance to apical advancement! Shoot! We pull back, re-approach and get the same result, regardless of how we manipulate the instrument (Figs. 3, 4).

To better understand why this has occurred, ribbon-curl a #10 K-file with cotton pliers along its full length and then clamp the file with a hemostat about 4 mm back from the tip. Look at the tip portion with magnification and you will see an essentially straight instrument tip. And this is the part of the file that is supposed to make its way around a canal path that is radically more bent.

Another way to say it is that the file tip was not bent acutely enough to keep the file tip centered as it moved into the tightly breaking canal curvature. When a file is curved 25 degrees along its whole length, it will never make it around a canal curvature that is 90 degrees along its last 1-2 mm.

Clever technique

Mentally imaging the canals you are treating, coupled with the use of appropriately curved files just needs a bit of clever technique to conquer the apical impediment. The first clever technique trick is to pre-bend the last 1-2 mm of the file with an EndoBender (SybronEndo) (Fig. 5), look down the length of the file and carefully adjust the indicator on the stop (notch, line or point) to be in line with the bend of the file.

Now, as you scritch-scratch into the canal, hunting for the path of least resistance, you feel and see the file passively drop deeper into the canal as you advanced in a new direction. Now, after you have successfully snaked the file around this one-of-a-kind, difficult anatomy, the next question is "How will I get back here with my next instrument?"

All you have to do is to look at the indicator on the stop, note the direction and after bending the next file and aligning the stop to the bend, you simply move the file to length with its bent tip point-

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ing in the same direction as the previous file to length.

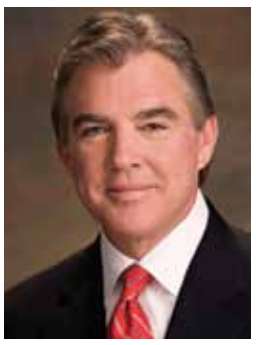
Final advice

• Remember that there is little forgiveness in a tightly curved canal, so for goodness sake, do anything to avoid blocking the end of the canal. Most often, compacted blockage at a canal curvature will never allow re-entry along the original canal path, so, despite a lot of effort spent attempting to regain patency, the most likely outcome will be apical perforation with these small instruments.

• Use an apex locator, or you are working waaay too hard without a clue as to where you are. Is that acceptable to you when you could spend less time and definitively nail length with an apex locator (Fig. 6)?

• Never initially thread the apical half of a small canal with larger than a #08 K-file. Never negotiate any canals without a lubricant in the access cavity.

Fig. 5: EndoBender (SybronEndo) and correct bend at the very tip of the file.



DR. L. STEPHEN BUCHANAN was valedictorian of his class at the University of the Pacific School of Dentistry, and he completed the endodontic graduate program at Temple University in Philadelphia in 1980. He began pursuing 3-D anatomy research early in his career, and in 1986 he became the first person in dentistry to use micro CT technology to show the intricacies of root structure. In 1989 he established Dental Education Laboratories, through which he has lectured and conducted participation courses around the world. Buchanan holds a number of patents for dental instruments and techniques, including variably tapered shaping instruments for use in endodontics. He pioneered a system-based approach to treating root canals. He is a diplomate of the American Board of Endodontics. He maintains a private practice limited to endodontics and implant surgery in Santa Barbara, Calif. Contact him at 1515 State St., Suite 16, Santa Barbara, Calif. 93101, (800) 528-1590 or (805) 899-4529, *info@endobuchanan.com*, *www.endobuchanan.com*.

• Once you battle your way to length with that tiny first instrument, don't just get patent a mm out the end of the canal — in this case I suggest you go 3-4 mm long and do 30-40 push-pull filing strokes to loosen the file and slightly enlarge the canal. This act will greatly improve your chances of avoiding blockage with the next largest file. There are few experiences more frustrating than to have cleverly and heroically battled your way to length through a hideously tortuous root canal, never to return again.

• Distal canals of lower molars and DB canals in upper molars commonly have severely, abruptly curving canals enclosed inside remarkably straight external root structure. Look for loose resistance to apical advancement, when you feel it whip that instrument out, bend the very tip just short of 90 degrees, adjust the stop indicator, and go hunting!

Fig. 6: Prebent file to length beyond the impediment and around 160 degrees of curvature.

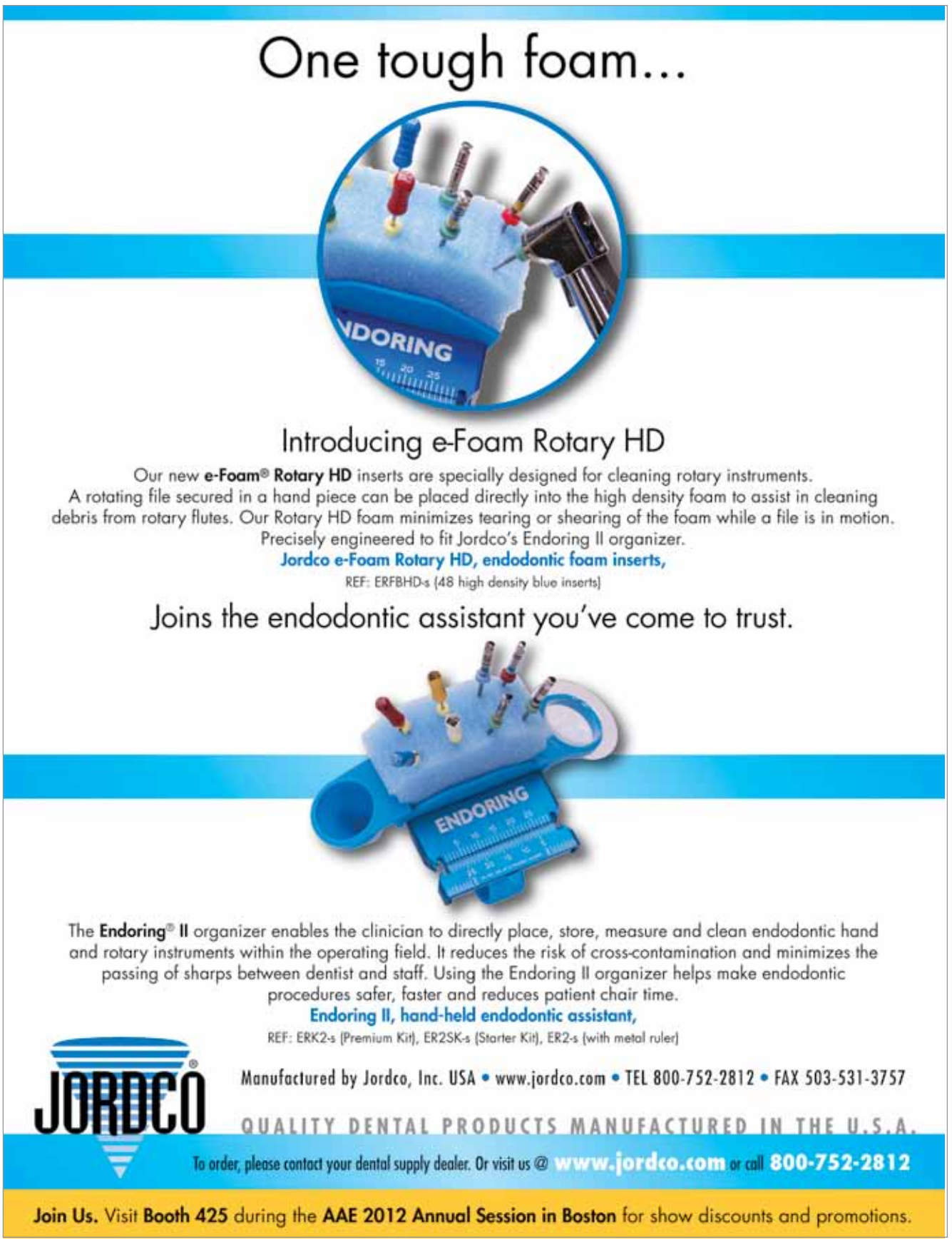
Fig. 7: Post-operative X-ray showing three portals of exit in the distal root.

Blocking, ledging or just never getting to the terminus because of a mishandled impediment is not the end of the world, but it's not the end of the canal either.

Gone are those halcyon days when we could get away with telling curious patients that blocked canals were calcified apically. Never mind, apply these principles (Fig. 7) and I'll see you at the apex!

**Italian for* impediment.

AD



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AAE fuses history with the latest technologies

The American Association of Endodontists Annual Session offers endodontists, general dentists and other specialists the opportunity to participate in a large selection of endodontic courses as well as learn about the rich history of the specialty and the United States. "History & Heritage — Forging the Future" takes place at the Hynes Convention Center in Boston, April 18-21.

During the four days of education and entertainment, meeting attendees can earn up to 26 hours of continuing education credit from eight different educational tracks, three of which are new this year: Exploring the Future, Evidence Based-Endodontics and Orofacial Pain, Oral Pathology and Trauma. The sessions include something for everyone, with timely topics, a variety of learning formats, opportunities for professional staff and more.

"Remembering how endodontics got to where it is today is important in order to learn how to continue our forward movement in the specialty," said AAE President Dr. William T. Johnson. "Sixty-five years after the association's first gathering in Boston, we will meet to reflect on the advancements of the specialty and participate in a variety of programs highlighting the art and science of endodontics."

The popular Master Clinician Series will showcase live, state-of-the-art surgeries, including implant placement, regenerative endodontic therapy, molar endodontic microsurgery, the use of cone-beam computed tomography and more. This year's master clinicians include Dr. Paul D. Eleazer, Dr. Shepard S. Goldstein, Dr. Mani Moulazadeh, Dr. Richard A. Rubinstein, Dr. Wyatt D. Simons and Dr. John D. West.

Annual session attendees also can view the newest advancements in endodontic products in the largest endodontic exhibit hall in the world, featuring representatives from more than 100 major dental and medical suppliers. Another unique feature of the 2012 meeting is a Support the Troops care package collection drive, for which meeting attendees are encouraged to donate approved care package items or make financial contributions to aid U.S. military personnel.

The 2012 Annual Session will be held April 18-21 in Boston.
Photo/Cpenler, Dreamstime.com

Themed entertainment and tours will abound at the meeting, offering many opportunities for networking. Presidential historian Doris Kearns Goodwin keynotes the Opening Session, and other special events include a performance by Pitch Slapped, a nationally known a cappella group from Berklee College of Music, member-led tours of the Boston Public Library and the Ether Dome at Massachusetts General Hospital, and a chance to "Celebrate Boston!" at the original House of Blues with entertainment from the Fab Four, a Beatles cover band.

The 2012 Annual Session boasts the latest in communications technologies as well. The AAE introduced a new Annual Session app for iPhone, iPad, Android and Blackberry, which features access to the full Annual Session program, a schedule builder, networking with other attendees, an interactive exhibit floor map, easy access to C.E. verification and more. Download the app by visiting your mobile device app store and searching for "2012 AAE Annual Session," or access *crwd.cc/AAEAnnual12* from your mobile device. Attendees can also connect with the AAE through the AAE Facebook page at *www.facebook.com/endodontists*, the AAE YouTube channel at *www.youtube.com/rootcanalspecialists* and Twitter at *www.twitter.com/AAEMeetings*.

For more information and to register, visit the AAE website at *www.aae.org/annualsession*. Dental professionals who join the AAE receive a member discount on meeting registration of more than 40 percent — learn more about AAE membership at *www.aae.org/join*.

(Source: AAE)

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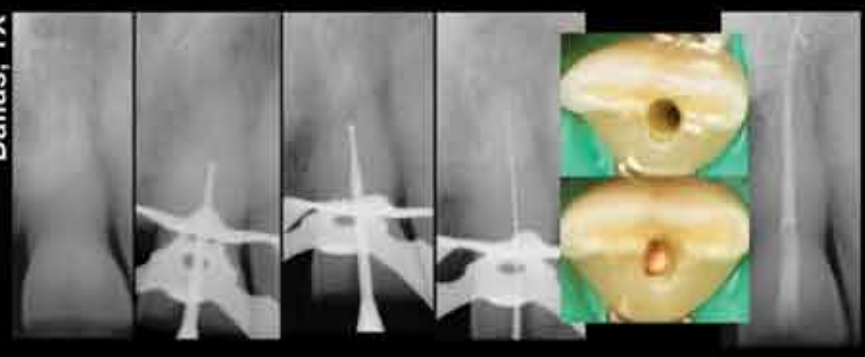

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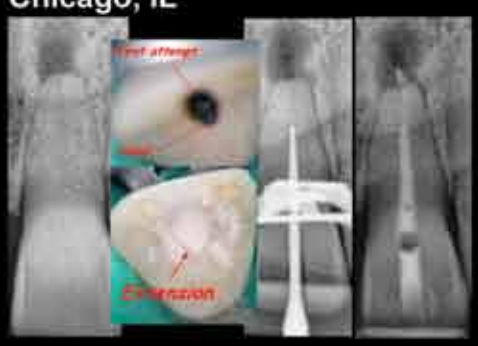

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