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Endodontists are heroes. We save teeth— which is worth every effort, if you ask me. But to stay on top of your game, you have to stay up to date on the latest technology and treatment options. In this issue of roots, you can find many articles designed to enhance your knowledge.

Dr. Javier Martínez Osorio and Dr. Sebastiana Arroyo Bote offer a case report on a 17-year-old patient who came into their clinic because she noticed a color change of the upper-left central incisor. A pulp necrosis of the 2.1 incisor was diagnosed and treated. Dr. Jason H. Goodchild reports on the materials he finds most useful in restoring endodontically treated teeth. In an interview, Dr. Robert S. Roda, president of the American Association of Endodontists, discusses his background, those who influenced him most in his career, his passion for diagnosing and treating patients and the latest initiatives of the AAE. We also offer a preview of the AAE’s upcoming annual meeting, to be held this May in Seattle.

There’s even more.

By reading the article by Dr. Osorio and Dr. Bote in this issue of roots, and then taking a short online quiz about their article at www.DTStudyClub.com, you will gain one ADA CERP-certified C.E. credit. Keep in mind that because roots is a quarterly magazine, you can actually chisel four C.E. credits per year out of your already busy life without any lost revenue and time away from your practice.

To learn more about how you can take advantage of this C.E. opportunity, visit www.DTStudyClub.com. You need only register at the Dental Tribune Study Club website to access these C.E. materials free of charge. You may take the C.E. quiz after registering on the DT Study Club website.

I know that taking time away from your practice to pursue C.E. credits is costly, 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.

For those of you attending the upcoming AAE meeting this spring in Seattle, be sure to say hello to me in person. I’ll also be at the Midwinter Meeting in Chicago and at CDA Presents the Art and Science of Dentistry in Anaheim, Calif.

As always, I welcome your comments and feedback.

Sincerely,

Fred Weinstein, DMD, MRCD(C), FICD, FACD
Editor in Chief
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Pulp necrosis in the left upper incisor as a consequence of neurovascular pedicle compression

Abstract

We report a case of a 17-year-old patient who came into the clinic because she noticed a color change of the upper-left central incisor (2.1) of 48 hours’ duration. During clinical inspection, the 2.1 incisor presented a darker color than the rest of the teeth. After performing a complete exploration and obtaining no response to vitality tests, a pulp necrosis of the 2.1 incisor was diagnosed.

Differential diagnosis begins with the completion of the medical record. The patient had received orthodontic treatment, and she had been operated to extract a supernumerary tooth in the anterior region of the upper maxilla. The patient does not remember having suffered injuries or trauma in the incisal region. An oral orthopantomography is requested, which shows the presence of a supernumerary in the periapical 2.1 region, located in palatine and upward oriented. Necrosis by compression of the neurovascular pedicle of 2.1 due to the eruption-follicle growth of the supernumerary is diagnosed. Pulpectomy and surgical removal of the supernumerary are performed. During surgical removal of the supernumerary, the 2.1 neurovascular pedicle is located edematized-congestive and cause of the 2.1 pulp necrosis.

Clinical case

A 17-year-old patient who had undergone orthodontic treatment four years before came into the clinic because she noticed a color change in her upper right central incisor lasting a few hours. The patient noted a pink color (Fig. 1) with a slight pain that ceased with anti-inflammatory (AINE). In an initial visit to her general dentist, vitality tests were
performed, detecting a slight response. After that, the patient was referred to a specialist.

When she visited the endodontist, the tooth had changed color and had darkened over to a gray-brown color. In addition to that, the tooth did not respond to pulp vitality tests anymore. During the visit, the endodontist performed periapical radiographs of the area (Fig. 2). The existence of a supernumerary at the apical level of the incisive growing toward the floor of the nasal cavity was confirmed. The endodontist requested a cone-beam computed tomography (CBCT), to study the position and assess the possibility of surgical extraction.

CBCT images show the position of the supernumerary relative to the roots of neighboring teeth, confirming growth toward the apical region of 2.1, i.e. 180 degrees relative to the orientation, it should have to erupt within the dental arch. 3-D reconstruction shows this phenomenon very didactically (Figs. 3–6). Endodontic treatment of 2.1 was performed, removing the congested pulp and observing some bleeding during the course of it. The length of the shutter-percha obturation was deliberately longer than usually in order to facilitate surgery (Figs. 7–9).

Surgical treatment was planned based on a semilunar flap on the periapical region of 2.1 and a minimum root resection without bezel, using a 0.23 round bur, with a straight handpiece, of about 2 mm approx, exposing the supernumerary’s crown. The supernumerary’s crown was sectioned by the middle third coronal level, incisal portion was removed (Fig. 11). A hole was made in what would be the middle and cervical third of supernumerary, to force up (Fig. 12) and make the extraction through the oste-
otomy practiced for apicoectomy, thereby achieving a complete extraction (Fig. 13) with minimal trauma to the bone and roots of the incisors.

The edematous pedicle that was compressed by the follicle eruption of the supernumerary, and caused a lack of blood supply to the pulp left central incisor, can be observed in the image, pressed by a hemostat (Fig. 14).

Afterward, a preparation a retro was performed using a Satelec Ultrasonic system and a proper insert. Conduit was sealed a retro with SuperEBA, thereby achieving sealing of the conduit at apical level (Figs. 15, 16). The flap was closed with three silk sutures (Fig. 17), which were removed after seven days.

Supernumerary tooth after extraction can be observed in the picture (Fig. 18).

Two months after the intervention, an internal bleaching treatment was performed to improve the color of the incisor.

In the last two pictures, we can observe the clinical appearance (Fig. 19) and the radiographic progression (Fig. 20) after three years of evolution.
Discussion

Diagnostic and anatomical data provided by CBCT studies, which has been widely used in endodontic diagnostics including fractures and fissures or in implant studies, is not commonly used in surgical planning yet. The relevant and detailed information that this imaging technique provides, especially about the position of supernumerary tooth, is further proof that it should be present in the protocol of the case during the surgical planning.

The second point of discussion is the pathway used to approach the supernumerary. We could have used a palatal pathway, but the CBCT study revealed that the vestibular pathway was less risky, provided greater visibility and better respected the important anatomical structures, such as neighboring teeth, without injuring them by accident or increasing the risk of causing an iatrogenic injury.

Another important point to be observed is the pathophysiological mechanism that resulted in pulp necrosis. We suspected an apical or periapical resorption of 21 because of the expansive growth of the erupting follicle and secondary osteolysis, which cannot be excluded. To eliminate the greatest amount of cells involved in the resorptive-destructive process, an apicoectomy was performed. Nevertheless, pulp congestion suggests that the most probable pathophysiological mechanism involved was venous stasis of the venous pack that enters the incisor, just before apex.

Last point of discussion is when these supernumerary teeth should be removed. If possible, the best moment for removal is before showing any pathology signs, always individualizing each patient, performing a clinical and radiographic follow-up of the case in order to choose the right time is necessary.

Conclusion

The presence of supernumerary teeth in the permanent dentition has a frequency of between 0.1 and 3.8 percent, one of the possible complications being necrosis of adjacent teeth, so we must take into account the possibility of supernumerary teeth existence during diagnosis, especially in patients with pulp necrosis without previous traumatic dental pathology.

About the authors

Javier Martínez Osorio graduated in medicine in 1981 from Barcelona University. He specialized in dentistry in 1983 and plastic surgery in 1987. He is a member of the Spanish Society of Implantology, Endodontic, Conservative Odontology and Maxillofacial Surgery. He is associate professor of conservative dentistry and endodontic, faculty of odontology at Barcelona University since 1996. He maintains a private practice in implants and endodontic surgery in Barcelona, Spain. He is an author of publications and lectures around the world on current concepts in endodontic surgery and implantology. He may be contacted at 16486jmo@comb.cat.

Sebastiana Arroyo Bote graduated in medicine in 1983 from Barcelona University. She specialized in dentistry in 1985. She is a member of the Spanish Society of Endodontology and Conservative Dentistry. She is associate professor of conservative dentistry and endodontology, Barcelona University, since 1992. She maintains a private practice in conservative dentistry and endodontic treatment in Barcelona, Spain. She is an author of publications and lectures on current concepts in endodontology and aesthetic conservative dentistry. She may be contacted at 20506sab@comb.cat.
Successful restoration of the endodontically treated tooth continues to be one of the most challenging procedures in dentistry. This is largely because of the complexity of the process, a myriad of available treatment options and a confusing array of dental literature dealing with individual components of this multifaceted treatment equation.\(^1\)

Long-term retention of an endodontically treated tooth is dependent on the collective success of the tooth canal filling and coronal restoration. Put simply, if the root canal filling or the coronal restoration is inadequate, either is equally contributive to an unsuccessful outcome.\(^2\) Therefore, the first step in developing an appropriate treatment plan for a tooth requiring root canal therapy is to determine if the tooth will be restorable. Factors that may influence this determination include: the amount of remaining coronal tooth structure after caries excavation and the ability to develop a 1.5- to 2-mm circumferential ferrule, periodontal health, occlusion, crown-to-root ratio, tooth location, number of adjacent teeth, requirement to use the tooth as an abutment for a fixed partial denture or removable partial denture and the presence of para-functional habits.\(^3\)

If the tooth has been judged restorable and has received adequate root canal therapy, the next treatment-planning decision involves the need for a post and core, or just a crown build-up. A post or dowel has been historically placed to retain the foundational core and to add retention of the crown that would have normally been gained from coronal tooth structure.\(^4\) Determining factors at this stage include evaluating the height and thickness of remaining dentin after tooth preparation, the number of dentin...
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walls remaining and the final occlusal scheme. In clinical situations where there is little dentin remaining (less than 4 mm of the coronal tooth structure, but at least 2 mm dentin ferrule), the use of a post is indicated (e.g., DENTSPLY® Core and Post System including X.Post™).

With two or more walls remaining, or greater than one half of the coronal tooth structure remaining, the dentist may choose to forgo a post and simply use composite to place a crown build-up. In selecting the material best suited for a build-up material, dentists must consider the size and geometry of the preparation, as well as access to enable light transmission. In areas where light transmission is difficult or impossible, a dual or self-cure composite (like core.X™ flow) is indicated. However, in areas where the tooth can be isolated with a sectional or circumferential matrix and it can be accessed with a curing light, SDR® is an excellent material choice because of its cavity adaptation and bulk-filling properties.

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In most cases, the last step in restoring the endodontically treated tooth involves the decision to place an indirect restoration to achieve cuspal or full coverage. In general, cuspal or full coverage is recommended to prevent fracture and increase long-term survival.6,7

Learn more about how SDR can help simplify composite placement at www.dentsply.eu.

References


Source: Caulk newsletter, Issue 17, August 2014.

Fig. 5. The final crown build-up on tooth No. 4. Because a full coverage restoration was planned for a subsequent appointment, the crown build-up was completed with a 2-mm layer of hybrid composite, to cap SDR.

Fig. 6. The final radiograph of tooth No. 4, showing the completed root canal filling and composite core. Note the excellent adaptation and radiopacity of SDR.

Jason H. Goodchild, DMD, is a graduate of Dickinson College in Carlisle, Pa. He received his dental training at the University of Pennsylvania School of Dental Medicine, where he still holds a faculty position as a clinical associate professor in the Department of Oral Medicine. Goodchild is a research dentist at DENTSPLY Caulk, involved in educating dentists on new materials and techniques to improve clinical practice. He has published numerous articles and lectures internationally on the topics of treatment planning, restorative dentistry, pharmacology, emergency medicine in dentistry, enteral sedation dentistry and dental photography.
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Interview: ‘A time of unprecedented change in our profession’

Robert S. Roda, DDS, MS, runs a private endodontic practice in Scottsdale, Ariz., and serves as a visiting lecturer at the Arizona School of Dentistry and Oral Health and as an adjunct assistant professor at Baylor College of Dentistry in Dallas.

In an interview, he discusses his background, those who influenced him most in his career, his passion for diagnosing and treating patients and the latest initiatives of the AAE.

Please introduce yourself to our readers. What is your background, and where do you work?

I graduated from university and dental school at Dalhousie University in Halifax, Nova Scotia, and worked there for 10 years as a general dentist. I returned to do my endodontic residency at Baylor College of Dentistry in Dallas, where I received my MS, and began private endodontic practice in Scottsdale, Ariz. I became very active in the Arizona Dental Association, the American Dental Association and the AAE. I went through the board process and became a diplomate of the American Board of Endodontics in 1998.

I have lectured extensively, published in dental journals and am the mentor for the East Coast Endodontic Study Club in Nova Scotia. I have always wanted to give back to my profession and the patients we serve, so for me it is not work but a very enjoyable part of my career.

The AAE recently launched a new Root Canal Safety website. How do you work to educate the public and the profession about endodontics?

False claims that root canals cause cancer or other diseases are circulating on the Internet, and the AAE offers tools to help endodontists and other dental professionals talk to patients who may have read this misinformation and have questions. It’s important that we provide authoritative and reliable information about the safety of endodontic treatment, while debunking myths that root canal treatment causes health problems. Resources are available at www.aae.org/rootcansafety.

We also provide patient education, information and clinical resources to support saving the natural tooth. We recently released new treatment videos that help patients understand endodontic procedures and hopefully steer them to an endodontist for treatment. You can view them at the AAE’s YouTube channel, www.youtube.com/rootcanalspecialists.
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Robert S. Roda, DDS, MS

The AAE website, www.aae.org, also has valuable clinical information to help educate practitioners in areas like case assessment, treatment planning, traumatic dental injuries and other issues that impact patient care.

What else is new at the AAE?

One of our newer programs is the Cracked Tooth Initiative. Cracked teeth are becoming a modern epidemic that is robbing people of otherwise perfectly good teeth. So little is truly known about it that we are left with few options to help retain the tooth. Our initiative will facilitate the opening of new venues of research, with the long-term goal of eliminating cracked teeth as a cause of tooth loss.

On a personal note, what do you like best about the specialty of endodontics?

I have always been intrigued by diagnosis. It’s like a complex puzzle, but it is real time, it’s important and this patient’s health depends on my efforts. What is this patient feeling? What is causing it? What should I look for? What tests do I need? Over the years, by a combination of formal education and close observation of patients, I have developed a skill set that helps me to diagnose a patient’s problem. This is the skill set of the endodontist.

We are the diagnosticians of the teeth and surrounding structures, and — along with performing root canal therapy at the highest level (which I also enjoy doing) — this is the cornerstone of our type of practice.

Who influenced you most in your career?

I studied at Baylor under three of the four people who had the greatest influence on my endodontic career. From Dr. Jack Harrison, I learned to be a critical thinker. From Dr. Jerry Glickman, I learned how to get things done efficiently and well. Finally, from Dr. Jim Gutmann, I learned the value of putting all of the information (and there were volumes of it) together, adding what’s new, and applying it to unique situations in patient care.

The fourth person who had a large influence on my career was Dr. Jim Kramer, who was the first endodontist to graduate from Baylor’s program and the first endodontist I worked with. His combination of hard work, caring about others and knowledge on how to run a patient-centered practice has left me with enduring attitudes and philosophies that I pass on to any who will listen. He knew, as I did, that if all of your clinical decision-making was about what is best for the patient, that everything else would fall into place.

Is there something that people might be surprised to know about you?

I grew up all over the world. My father worked for Trans World Airlines, and I was born in Paris, bounced around the United States through junior high, went to high school in Germany at the Frankfurt International School, and attended university and dental school in Canada. I’m a third culture kid, and I am as comfortable in a restaurant in a foreign country where no one speaks English as I am in a fast-food joint in Chicago.

With all of this travel, I learned to never make snap judgments about people. Everyone has a different point of view based on different cultural, religious and historical experiences, but deep down inside, we all have similar basic needs. I’ve learned to try to understand what is below the sometimes-strange surface of people to see what it is they are made of. Some of my most long-term friendships started that way.

Do you have anything you would like to add?

It is a time of unprecedented change in our profession. Economic, demographic and political

Root Canal Awareness Week is one of the many initiatives of the AAE. The poster for this year’s campaign says, ‘Root canals don’t cause pain — they relieve it.’

The poster for this year’s campaign says, ‘Root canals don’t cause pain — they relieve it.’
forces are colliding to reshape the practice environment for America’s dentists. Dental spending by patients is flat. Alternative methods to clinical delivery are consuming a growing part of the dental market share each year. Reimbursements from third-party payers are expected to continue to decline. And students are leaving dental schools with extremely large debts. Managing these changes by ourselves would be impossible, but we don’t have to face this alone, because the AAE offers help and resources that span a wide spectrum. It gives me a great sense of encouragement to see that my association is so engaged in all the facets of my specialty. Coupled with the work of the ADA and its tripartite system, the AAE gives us the tools and information and action to help us help ourselves navigate these stormy waters.

Understanding change in the environment, embracing change in our membership and creating change in how we do things are among the hallmarks of a successful organization, and the AAE is a successful organization.

I am honored to serve as its president.
Registration is now open for AAE15, the annual meeting of the American Association of Endodontists, taking place May 6 to 9 at the Washington State Convention Center in Seattle. The AAE’s annual meeting is billed by the association as “the most comprehensive endodontic education summit, vendor exhibition and networking opportunity in the world.”

“AAE15 will provide our members and guests with outstanding education, entertainment and networking events,” said AAE President Dr. Robert S. Roda. “Our program will focus on future trends and growth to help practitioners prepare for the next generation of advancements in the art and science of endodontics.”

AAE15 offers more than 100 high-quality educational sessions in a variety of tracks, including “Future Directions on Nonsurgical Root Canal Treatment,” “Surgical Endodontics — What Lies Ahead” and “Where Will Biology and Technology Take Endodontics?” Attendees also can register for hands-on workshops featuring leading experts in microsuturing, cone-beam computed technology and resorption.

In addition, AAE15 includes the largest endodontic exhibit hall in the world, with nearly 100 vendors offering the latest in endodontic equipment, materials and supplies.

Consistent with the meeting’s future-looking theme, the keynote speaker for AAE15 is Dr. Michio Kaku, best-selling author of “The Future of the Mind,” who will share his vision for the future of science and technology during the general session.

Other special events include the President’s Breakfast; the Louis I. Grossman Ceremony, recognizing the newest diplomates of the American Board of Endodontics; and the Edgar D. Coolidge Luncheon, honoring the AAE’s 2015 award winners.

To view the entire meeting schedule and register, visit www.aae.org/AAE15.

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. You 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/savingyourteeth.
Wykle Research has announced the release of two new Calasept Endo products, which it distributes for Nordiska Dental of Sweden, the manufacturer of Calasept and Calasept Plus.

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Wykle Research distributes Calasept Endo products by Nordiska Dental, a Swedish manufacturer of dental supplies. Wykle Research and Nordiska Dental will continue to provide new endo products.

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For more information, contact Planmeca._
You’re invited to:

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Register Today at www.agd2015.org!
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.
submissions

formatting requirements

Please note that all the textual elements of your submission:

• complete article
• figure captions
• literature list
• contact info (email address please)
• author bio

must be combined into one Microsoft Word document. Please do not submit multiple files for each of these items. In addition, images (tables, charts, photographs, etc.) must not be embedded in the text document. All images must be submitted separately, and details about how to do this appear below.

If you are interested in submitting a C.E. article, please contact us for additional instructions before you make your submission.

Text length

Article lengths can vary greatly — from a mere 1,500 to 5,500 words — depending on the subject matter. Our approach is that if you need more or less words to do the topic justice, then please make the article as long or as short as necessary.

We can run an extra long article in multiple parts, but this is usually discussing a subject matter where each part can stand alone because it contains so much information. In addition, we do run multi-part series on various topics. In short, we do not want to limit you in terms of article length, so please use the word count above as a general guideline and if you have specific questions, please do not hesitate to contact us.

Text formatting

Please use single spacing and do not put extra space between paragraphs. We also ask that you forego any special formatting beyond the use of italics and boldface, and make sure that all text is left justified.

If you would like to emphasize certain words within the text, please only use italics (do not use underlining or a larger font size). Boldface should be reserved for article headlines, headers and subheads please.

Please do not “center” text on the page, add special tab stops or use underlines in your text as all of this must be removed manually before layout. If you require a special layout, please let the word processing program you are using help you to do this formatting automatically rather than doing it manually.

If you need to make a list or add footnotes or endnotes, please let the word processing program do it for you automatically.

There are menus in every program that will help you apply all sorts of special formatting.

Image requirements

Please number images consecutively by using a new number for each image. If it is imperative that certain images are grouped together, then use lowercase letters to designate the images in a group (i.e., Fig. 2a, Fig. 2b, Fig. 2c).

Insert figure references in your article wherever they are appropriate, whether that is in the middle or end of a sentence, but before the period rather than after. Our preference is to have figure references noted in the appropriate place within the text, as it helps the readers to orient themselves when moving through the article. In addition, please note:

• We require images in TIF or JPEG format
• These images must be no smaller than 4 x 4 inches in size at 300 DPI
• Images should be 1 MB in size each

If you have an image that is greater than 1 MB, please do not bother “sizing it down” to meet our requirements, but send us the largest file size available. The larger the starting image is in terms of bytes, the more leeway the designer has in terms of resizing the image to fill up more space should there be room available.

Also, please remember that you should not embed the images into the body of the text document you submit. Images must be submitted separately from the textual submission.

You may submit images through a zipped file via e-mail, unzipped individual files via email or post a CD containing your images directly to us (please contact us for the mailing address as this will depend upon where in the world you will be mailing them from).

Please do not forget to send us a head shot photo of yourself that also fits the image requirements noted above so that it can be printed along with your article.

Abstracts

An abstract of your article is not required. However, if you choose to provide us with one, we will print it in a separate box.

Contact info

At the end of every article is a contact info box with contact information along with a portrait photo of the author.

Please note at the end of your article the exact information you would like to appear in this box and format it according to the previously mentioned standards.

A short bio (50 words or less) may precede the contact info if you provide us with the necessary text.

Questions? Comments?

Please do not hesitate to contact us for our International C.E. Magazine Author Kit or if you have other questions/comments about the article submission process:

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