Endodontist combines passions to create auto-themed office

by Pat M. Knapp, Dental Tribune

Walk into Dr. Steffan Scherer’s Bismarck, North Dakota, office and you’ll do a double-take, wondering if the hallway was some sort of weird time/space machine.

Where’s the bland, sterile environment you’ve come to expect from a dental office? What’s with the 1940s-era Texaco gas pump, the Standard Oil signs and the vintage banners from an old Plymouth dealership? What about the seating area that looks like the waiting room of a 1950s auto repair shop? Does the neon sign above the reception desk really say “Service manager”?

Booth canal who? Maybe you’re here for an oil change.

Dr. Steffan Scherer’s endodontic office in Bismarck, ND, features a retro auto shop theme. The reception area and waiting room look like the counter and waiting area in a 1950s garage. Dr. Scherer wears a shop mechanic’s uniform instead of the typical lab coat.

A tale of two specialties: the endodontic/implant algorithm

by Kenneth S. Serota, DDS, MMSc

Change is a significant evolutionary tool provided it rests upon a solid and secure foundation. Innovations in materials and technologies occurring within the dental field are impacting powerfully on its art and science; however, dentistry, like all health care, is both a business and a profession. The pendulum swings that predicate trends and transitions within that nexus must be viewed from a macroeconomic perspective lest we fall prey to expediency in treatment recommendation and execution. There is an almost Faustian reliance on broad outcomes data, which in truth, may not be sufficiently specific to directly impact clinical decision-making.

Rudiments and fundamentals are the abc’s of process. While the change from need dentistry to want dentistry is consistent with the societal trends championing botox, collagen, and silicone, it doesn’t necessarily reflect an enhanced awareness of the basic precepts of dental health by our client base. Their focus has been shifted to equilibrated function to whitening in all its myriad applications. Nowhere is the disruption in the logical and sequential protocol to optimal dental health more evident than the trend to replace natural teeth with implants. At-risk patient cohorts may simply be encouraged to opt for virtual surgery and immediate function as an alternative to rehabilitative therapy.

Implant-driven treatment planning can, if incorporated with vision, foster a melding of the specialties and offer patients a less confusing and factionalized approach to their dental care. Orthodontists are training to place mini implants for the purpose of anchorage. Endodontists can predictably retreat procedural failures; however, if these teeth are determined to be non-restorable, they can be replaced with osseo-integrated fixtures. Endo/ortho/prosthetic treatment plans include modalities to grow bone where there was none and obviate aggressive bone harvesting procedures. Everything from enamel matrix derivatives to bone morphogenic proteins to stem cell research is directed toward cellular and structural reconstitution. The issue of who does what is not of consequence; what matters most is that we educate patients to understand their options and as a profession work to endlessly elevate the standard of care.

Welcome to Custom Endodontics, a 5,600-sq.-ft. office Scherer renovated to showcase his other passions in life. A history buff and avid car collector, he has amassed a huge collection of vintage signs, old photographs, displays, collectibles and “automobilia.” Most of his collection has been in storage for years, but in April 2006, Scherer and his staff moved into a downtown Bismarck landmark: a former grocery warehouse built in 1914. It provided 12-ft. ceilings and plenty of room to create a unique, memorable office space.
DENTSPLY posts record sales for 2006

YORK, Pa. – DENTSPLY International Inc. (NASDAQ: XRAY) announced record sales and earnings for the three months and year ended December 31, 2006.

Net sales in the fourth quarter of 2006 increased 5.4% to $471.5 million compared to $447.4 million reported in the fourth quarter of 2005. Net sales, excluding precious metal content, increased 5.5% in the fourth quarter of 2006. Sales of specialty products, including implants and orthodontic products along with all-ceramic Cerec products, experienced double-digit sales growth. Sales decreased in the U.S. reflecting the short-term effects of the implementation of the U.S. Strategic Partnership Program.

Net income for the fourth quarter of 2006 was $65.0 million, or $0.42 per diluted share, compared to a net loss of $0.7 million in the fourth quarter of 2005. Net income in the fourth quarter of 2006 includes the net tax impact of both expensing stock options of $3.6 million ($0.02 per diluted share) and of restructuring and other related items of $1.0 million ($0.01 per diluted share). The fourth quarter also includes a net reduction to income tax expense of $0.8 million ($0.01 per diluted share) from the resolution of certain tax matters.

Sales for all of 2006 increased 5.6% to $1.81 billion compared to $1.72 billion in 2005. Sales excluding precious metal content, increased 5.6% in 2006. Net income for 2006 was $223.7 million, or $1.41 per diluted share. The 2006 earnings included the following items: net of tax impact of expensing stock options of $13.5 million ($0.08 diluted share); restructuring and other related expenses of $7.8 million ($0.50 per diluted share); and net reduction in income tax expense of $4.8 million ($0.05 per diluted share) related to the resolution of certain tax matters.

Bret Wise, chairman and CEO, said, “We are pleased that we have delivered earnings performance at the high end of our range of expectations for 2006. During the year, we have made strategic investments in several key initiatives, including implementation of our Strategic Partnership with our U.S. distributors, the expansion of our sales force in key markets, and the January 1, 2007 implementation of the merger of our U.S. endodontic and implant businesses. We believe these initiatives will generate substantial benefits in 2007, and beyond. We remain confident about the opportunities in 2007, and we anticipate earnings in the range of $1.50 to $1.61 per diluted share.”

www.dentsply.com

Genetic profiling tags cavity-causing bacteria

by John Hoffman, Dental Tribune

The American Society for Microbiology (ASM) says that new genetic profiling techniques may help identify the types of bacteria that cause severe tooth decay in children.

In the January 2007 issue of the Journal of Clinical Microbiology, ASM notes that severe early childhood caries (S-ECC), an extremely destructive form of bacterial tooth decay that often attacks several teeth at once, may be caused by Streptococcus mutans. However, researchers have not yet determined whether S-ECC is caused by a single strain of bacteria or a group of bacterial species. Testing based on cultivation has been difficult because nearly half of the bacteria in saliva and dental plaque cannot be cultivated, ASM explains.

Researchers collected plaque samples from 20 children, some with S-ECC and some caries-free, and evaluated the difference in bacterial diversity using denaturing gradient gel electrophoresis (DGGE), a cultivation-free method that isolates total microbial genome DNA. The researchers found that the S-ECC group exhibited 94.5 bacterial populations while the S-ECC group exhibited 113.4 bacterial populations while the caries-free children exhibited 113.4 bacterial populations. The researchers noted that the S-ECC children “begin to dominate plaque biofilm.

“Our study also demonstrated that PCR-based 16S rDNA gene DGGE is a sufficiently valuable tool for differentiating the microbial composition of the oral plaque in S-ECC children than in caries-free children,” the researchers note. “Our study also demonstrated that PCR-based 16S rDNA gene DGGE is a sufficiently valuable tool for differentiating the microbial composition of the oral plaque in S-ECC children than in caries-free children.”

We invite and encourage submissions to Endo Tribune. If you would like to contribute case studies, news items, new product information, trends articles, practice management tips, office happenings, or feature story ideas, contact Fred Michmerhuizen, managing editor, at f.michmerhuizen@dental-tribune.com, or call 212.215.6252.

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If you’d like to contribute an article on the same topic, please write us a quick note telling us the subject you’d like to address and how long an article you would like to write.

New products

Have you introduced a new product to the endodontic market?
Hu-Friedy launches endo company

Dental instrument manufacturer Hu-Friedy® has launched an endodontic products company named EI (Endo Ingenuity) and its first product, an obturation device called DownPak.

“Hu-Friedy and corporate settings. His research into the formal training of dental health professionals.”

Heaton said a 2005 Journal of the American Dental Association survey showed half of the general dentists surveyed viewed smoking cessation education in the school’s curricula.

“The overarching goal of this project is to provide a model for smoking cessation training in dental schools nationwide by drawing upon an already validated program,” says Brenda Heaton, an instructor in the university’s department of health policy and health services research and the study’s principal investigator. BUSDM will “establish a precedent for the integration of tobacco cessation education into the formal training of dental health professionals.”

Heaton said a 2005 Journal of the American Dental Association survey showed half of the general dentists surveyed viewed smoking cessation education as peripheral to dentistry. She believes ensuring BUSDM students receive formal smoking cessation education will help them feel comfortable advising their patients on the oral health risks of smoking and how to quit.

The school will administer an annual survey, adapted from BUSDM’s Prevention and Cessation Education (PACE) program, to MD students to assess their general knowledge of smoking cessation treatment and level of comfort talking to patients about their options, among other areas. Staff will research faculty and administrators’ attitudes and behaviors related to smoking cessation education.

Rivera is new UNC endo chair

Dr. Eric M. Rivera has been appointed chair of the University of North Carolina-Chapel Hill School of Dentistry’s Department of Endodontics, effective Feb. 1.

Rivera, a faculty member at the school since 2005, previously served as interim chairman of the department.

He received his bachelor’s degree in chemistry, his DDS degree and his master’s degree and certificate in endodontics from UNC-Chapel Hill. After serving as graduate program director and chairman of the Department of Endodontics at the University of Iowa College of Dentistry, Rivera joined the UNC-Chapel Hill faculty as an associate professor.

Rivera’s career experience has spanned academic, private practice, and corporate settings. His research areas include the biochemical and functional aspects of collagen cross-linking and structure of dentin related to tooth fracture and the use of calcium hydroxide as a medicine in root canal therapy.

In his new role, Rivera will lead efforts to increase the national and international prominence of the department, identify ways to advance international prominence of the department, and to achieve tenure and promotion. His current research program, which will include the promotion of dentistry’s value to society and the delivery of high-quality dental care.

According to Dr. Rivera’s career has been distinguished by dedication to mentorship and the advancement of dental education in the school’s curricula.

FDA warns on topical anesthesia

FDA’s warning follows the deaths of a 22-year-old woman and a 25-year-old woman who took for skin conditions and recent dermatological procedures. The Food and Drug Administration (FDA) has issued a warning that using large amounts of skin-numbing cream and lotions can cause irregular heartbeats and seizures. Numbing creams and lotions, both prescription and over the counter, often contain lidocaine, tetracaine, benzocaine or prilocaine.

Tooth implants may be next drug delivery device

European scientists are preparing to test a new drug delivery device implanted inside dental prosthetics. The Intellidrug tooth implant is seen as an alternative to pills, especially for patients who cannot monitor their own drug intake.

“The dental profession consists of a drug-filled reservoir, a valve, two sensors and several electronic components,” explains Dr. Oliver Scholz of the Fraunhofer Institute for Biomedical Engineering IBM in St. Ingerhart, where the sensors and electronics were developed. The device is designed to fit inside two artificial molars.

“Saliva enters the reservoir via a membrane, dissolves part of the solid drug and flows through a small duct into the mouth cavity, where it is absorbed by the mucosal membranes in the patient’s cheeks,” adds Scholz.

The patient has to have the agent refilled every few weeks, says Scholz. This could be done using a deposit system whereby the patient swaps the empty prosthesis for a newly refilled one. At the same time, the battery could be replaced and the device could be serviced, says Scholz.

The prototype was on display for the first time at the MedTech trade fair in Stuttgart, Germany, beginning Feb. Intellidrug will undergo clinical testing this year—filled with a drug called Naltrexon, which is taken by drug addicts undergoing withdrawal therapy.

FDA’s warning follows the deaths of a 22-year-old woman and a 25-year-old woman who used numbing creams after having hair removed with lasers. The women wrapped their legs in plastic wrap to make the creams more potent.

A dentist administering anesthetic may be unaware if a patient has received topical anesthesia on a part of the body that is covered.

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A dentist administering anesthetic may be unaware if a patient has received topical anesthesia on a part of the body that is covered.
Radiopacity of endodontic materials on film or a digital sensor

Basmicik B, Shah B, Deutsch A, Muskatik B
Essential Dental Systems, South Hackensack, NJ

Objective: Compare the radiopacity of 3 endodontic points and 6 endodontic sealers as visualized on D speed film or a digital x-ray sensor.

Methods: The 5 sealers analyzed were EZ-Fill (EZ), Pulpdent Root Canal Sealer (C manipulate), Epiphany (EP), and ResoSeal Auto (RSA). The 5 points analyzed were Demiray Gutta-Percha (DGP), Schein Gutta Percha (SGP), and Resilon (RLS). Samples (10/g) approx. 1.0 mm thick were cured for 12 hours and then radiographed along a step wedge of aluminum alloy 1100 consisting of 15 mm thickness steps. Each sample was radiographed on both a Genex eIDl sensor and Kodak Ultra-speed film (film speed D). Both systems used a source voltage of 70 kVp and a target distance of 50 cm. The exposure time was 0.1 s for the digital system and 0.5 s for film. For every radiograph, the average gray scale value of the material was converted into absorbance notation and compared with that of the reference step wedge in order to determine the equivalent radiopacity in terms of mm Al 1100 per mm material. Comparisons were made by interpolating between the 2 adjacent steps in each radiograph. The data were subjected to 2-way repeated measures ANOVA and SNK (P<0.05).

Results: The measured radiopacity significantly depended (P<0.05) on the visualizing device for RL, ZOE, RSA, EP, SGP, and EZ. Most materials appeared more radiopaque on the digital sensor; IE was 56% more, ZOE was 14% more, and RSA was 10% more. The mean radiopacity of the materials (in mm Al 1100 per mm material) was significantly different (P<0.001). The SNK ranking of the digital radiography was RLS(8.5±0.5) > EP(7.3±0.4) > EZ(6.4±1.3)=DGP(6.3±0.1)=SGP(6.1±0.2) > RSA(4.9±0.2)=ZOE(4.8±0.4) > IE(3±0.2).

Conclusion: The radiopacity of a material can be determined on the method of visualization.

Sealing ability of innovative silicatecements for endodontics

University of Bologna, Italy; King’s College London, United Kingdom

Objective: Mineral trioxide aggregate (MTA) has been advocated for post perforation repair or as root-end filling material. The achievement of a good seal between the tooth and the filling material is essential in order to prevent re-contamination and to ensure long-term clinical success. This study compared the sealing ability of two new chemically-modified mineral cements to MTA using a fluid transport system. Furthermore, the dentine/cement marginal adaptation was evaluated using a SEM-Replica technique.

Methods: The experimental cements (CS1 and CS2) were characterized by the presence of a phospholipidic as plasticizer and of CaO as accelerator. Thirty single-rooted extracted teeth were endodontically treated. Copious irrigation with NaOCl 5% and CaCl2 as accelerant. Thirty single-rooted extracted teeth were endodontically prepared. Cephalometric study with NaOCl 5% and EDTA 17% was used throughout the instrumentation. Finally, they were obturated with gutta-percha without sealer. A horizontal apicectomy and a root-end preparation (3 mm) were carried out. The gutta-percha was removed after root-end filling with the experimental cements and MTA. The root samples were prepared for the permeability tests and fixed to Plexiglas plugs (2x2x0,5 cm). Fluid flow measurement was conducted under a hydraulic pressure of 6.9kPa for 5 min. after 4, 24, 48 hours, after 7, 15 days and after 1, 5 months from the endodontic treatment. The fluid flow data were statistically compared using a two-way ANOVA. A SEM-Replica technique using a polivinyl/siloxane impression material was used to evaluate the dentine/cement marginal adaptation.

Results: All tested cements showed a fluid flow reduction over time. The experimental cements presented a fluid flow rate similar to MTA, but lower at the 4 hours-evaluation. SEM-Replica observations indicated an excellent marginal adaptation to dentin walls of all tested cements.

Conclusion: The experimental cements showed suitable properties to be considered as alternative to available root-end filling materials.

Statistical assessment of interim restorations following endodontic therapy

Kunz KR, Linebaugh ML, Wagner WC, Yaman P
University of Detroit Mercy, Detroit, University of Michigan, Ann Arbor, MI

There is concern that endodontically treated patients are waiting too long and the presence of definitive restorations and this wait is causing a problem. There is concern that endodontically treated patients are waiting too long and the presence of definitive restorations and this wait is causing a problem. This wait period closer to the required one week period, more leak-proof filling material which is root-end filling material. This is almost always achieved after one week healing period. As patients approach a wait period of 6 weeks beyond the recommended 1 week healing period.

Objective: To determine the amount of time patients are waiting follow endodontic treatment before placement of definitive restorations.

Method: Patient records with endodontic therapy performed during the past 10 years were pulled from the school database. The time interval was determined between completion of endodontic therapy (endodontic obturation) and the next procedure. Data was separated into groups A and B. Literature review showed that the mean time interval for endodontic re-treatment (B) was 256 days which is longer than the recommended 1 week healing period. As patients approach a wait period closer to the recommended 1 week healing period.

Results: Mean (103 days) and median value of the re-treatment group (122.5 days), their chance of re-treatment was increased. Because patients are waiting too long and the presence of definitive restorations and this wait is causing a problem. This wait period closer to the required one week period, more leak-proof filling material which is root-end filling material. This is almost always achieved after one week healing period.

Conclusion: The measured radiopacity of the materials was significantly different (P<0.001). The SNK ranking of the digital radiography was RLS(8.5±0.5) > EP(7.3±0.4) > EZ(6.4±1.3)=DGP(6.3±0.1)=SGP(6.1±0.2) > RSA(4.9±0.2)=ZOE(4.8±0.4) > IE(3±0.2).

Push-out bond strength of an endodontic obturation system (Resilon)

Sly MM, RSD, Zionsville, Ind.; Moor Be, Indiana University School of Dentistry, Indianapolis; Platt JA, RSD, Indianapolis

Endodontic sealers ideally should demonstrate adhesive properties to dentin in order to reduce the risk of root-end leakage of the obturation of the canal space and seal the canal space both apically and coronally, thus decreasing the chance of treatment failure. The Epiphany/Resilon obturation system is a new thermoplastic synthetic polymer-based root canal filling material which is claimed to form a monoblock which bonds to the dentinal walls when the Epiphany points are used in conjunction with the Epiphany dual-cured resin sealer (Resilon) and the Epiphany primer.

Objectives: It is the purpose of this in vitro study to evaluate the push-out bond strength to intraradicular dentin of two polymeric endodontic obturation systems, Epiphany/Resilon and gutta-percha/ AH 26.

Methods: In this study, human single-canal canals were endodontically treated and obturated with two different endodontic obturation systems (Epiphany/Resilon system and gutta-percha/AH 26). Thirty roots (divided into two groups) were horizontally sliced for a push-out strength test, which was performed from apical to coronal in a universal testing machine. Differences in push-out bond strength between the two different materials systems were obtained using repeated measures analysis of variance on ranks.

Results: The mean push-out bond strength was 0.51 (± 0.50) MPa for Group Epiphany (EP) and 1.70 (± 0.73) MPa for Group Gutta percha (GP).

Conclusion: GP had significantly higher push-out bond strength than EP (p<0.0001). The results of this study challenge some of the claims made for this new obturating system.
Comparative outcome analysis of endodontic treatment and single implant restoration

Carter J, Jones D, Solomon E, He J
Baylor College of Dentistry, Dallas

Endodontic treatment and implant-supported restoration are both viable treatment options to restore the functionality and esthetics of the dentition. Both treatment modalities have high success rate and predictability. Clinical decision making is often influenced by many factors, in addition to success rate such as cost, time, function, and esthetics. Patient perception and preference play an important role in the ultimate clinical decision making.

Objective: The purpose of this study was to compare endodontic treatment (Endo) and single implant restoration (Implant) regarding time to function, cost, and patient satisfaction.

Materials and methods: 254 patients were recruited to the study. Patient satisfaction surveys were sent to patients who received single implant restoration or endodontic treatment to the posterior mandible at Baylor College of Dentistry. Survey questions included patient satisfaction (5-point Likert scale) and the cost, duration of the treatment, appearance and the ability to eat after the treatment. 33 responses from Endo patients and 36 responses from Implant patients were received. Treatment records of responded patients were reviewed to record the duration of the treatment, number of visits, treatment protocol, post-op intervention, and cost. Patient survey results were evaluated using Pearson Chi square analysis to determine difference in the response to each question between the groups. Overall satisfaction was analyzed by Student’s t-test using a derived summative score.

Results: Time to function was significantly longer in Implant patients compared to Endo. Implant also required more post-op interventions. Endo patients were significantly more likely to report satisfaction with treatment cost (p<0.05) and less likely to report dissatisfaction regarding treatment duration, as compared to Implant patients (p<0.05). However, there is no statistical difference in overall satisfaction between the two groups.

Conclusion: Implant treatment requires more time and intervention to achieve function compared to Endo treatment. This delay causes significant dissatisfaction among patients. However, Endo and Implant treatments have similar overall patient satisfaction.

Mesenchymal stem cell-mediated functional tooth regeneration in swine

Center for Craniofacial Molecular Biology, University of Southern California School of Dentistry, Los Angeles

Mesenchymal stem cell-mediated tissue regeneration is a promising research for regenerative medicine for a wide range of applications. Here we report a new population of stem cells isolated from the root apical papilla of human teeth (SCAP), stem cells from human papilla. Using a minipig model, we transplanted both human SCAP and periodontal ligament stem cells (PDLSCs) to generate a root/periodontal complex capable of supporting a porcelain crown, resulting in normal tooth function. This work integrates a stem cell-mediated tissue regeneration strategy, engineered materials for structure, and current dental crown technologies. This hybridized tissue engineering approach led to recovery of tooth strength and appearance.

Factors influencing the treatment time of endodontic procedures

Tootla S, Wits Dental School, Houghton, South Africa

Background: Witwatersrand Den tal School forms the epicentre of endodontic treatment in Gauteng, South Africa. There is very little research conducted with regard to patients presenting for endodontic treatment, thus far.

Objective: To assess the time taken to endodontically treat patients; presenting with a multitude of clinical and demographic factors.

Method: A prospective, randomised trial of 100 patients presented to both endodontically treat patients; presenting with a multitude of clinical and demographic factors.

Results: In 2006, 100 patients presented for endodontic treatment. Data was captured in Excel Spreadsheet where demographic and clinical variables (sex, spontaneous pain, type of pain) were dummy coded into 0 or 1. The data was cleaned then imported into SAS version 9.1. Multiple linear regression was used to predict treatment time in patients who presented themselves with demographic and clinical variables. Bi-variate relationships were established between response and the explanatory variables by means of scatterplots and Pearson correlation coefficient. The residuals as well as normal probability plots were established in order to inspect the variation of the residual values with each of the continuous explanatory variables. Statistical significance was considered at 90% confidence interval (0.10). An increase in age caused a decrease in treatment time by 0.44 units. Similarly, females contributed 14.44 units less towards treatment time than males did. However, patients who reported spontaneous pain and described pain of sharp pain, on average, experienced decreased treatment time by 14.37 and 10.26 units respectively.

Conclusion: We managed to establish that the main predictors for treatment time were description of pain, spontaneous pain, age of patient, sex, and clinical variables (sex, spontaneous pain, type of pain) were dummy coded into 0 or 1. The data was cleaned then imported into SAS version 9.1. Multiple linear regression was used to predict treatment time in patients who presented themselves with demographic and clinical variables. Bi-variate relationships were established between response and the explanatory variables by means of scatterplots and Pearson correlation coefficient. The residuals as well as normal probability plots were established in order to inspect the variation of the residual values with each of the continuous explanatory variables. Statistical significance was considered at 90% confidence interval (0.10). An increase in age caused a decrease in treatment time by 0.44 units. Similarly, females contributed 14.44 units less towards treatment time than males did. However, patients who reported spontaneous pain and described pain of sharp pain, on average, experienced decreased treatment time by 14.37 and 10.26 units respectively.

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Improving endodontic success through coronal leakage prevention

by Gregori Kurtzman, DDS

Introduction

Endodontic failure has been associated with coronal leakage within the canal system following obturation. The literature suggests that coronal leakage is far more likely a determinant of clinical success or failure than apical leakage. Recent advances in resin obturation materials have been shown to provide superior sealing of the canal system, but without addressing the coronal aspect of the tooth, failure endodontically may occur. Studies confirm that a sound coronal seal is of paramount importance to the overall success of root canal treatment. Regardless of the obturation method, the best rule is: a properly cleaned, shaped, and obturated tooth should be permanently restored as soon as possible.

No matter what our intentions are following obturation of the canal system, patients may delay restoration of the tooth that has been treated. Financial concerns and time constraints often influence when the final restoration is completed. Additionally, between visits an adhesive material will prevent leakage and contamination of the canal.

Coronal leakage

Coronal leakage has been indicated in the literature as the major determinant of endodontic success or failure. No matter what we place in the canal, if the coronal portion of the tooth is not sealed with materials that bond to tooth structure and are resistant to dissolution by oral fluids, then over time endodontic failure may be inevitable.

It is not unusual to have a patient present with decay at the margin of the crown of a tooth that had prior endodontic therapy. Because the tooth was treated endodontically, sensitivity that may indicate a problem under the crown will not alert the patient to seek dental care. Coronal leakage for even a minimal amount of time may quickly lead to apical migration of bacteria. When the patient does present coronal leakage, it may have been ongoing for an extended period of time complicating treatment or rendering the tooth non-restorable and necessitating extraction.

The literature indicates significant coronal dye and bacterial leakage following exposure of sealed root canals to artificial and natural saliva leading to complete bacterial leakage that may occur within two days. Supported in an in vitro study, researchers found that dye leakage can occur in as little as three days. It has been suggested that gutta-percha does not offer an effective barrier to crown-down leakage when exposed to the oral environment. An additional study using gutta-percha and various sealers indicates that gutta-percha will allow bacterial leakage. But use of an adhesive sealant can significantly slow or stop coronal apical bacterial migration.

The predominant bacteria found in root-filled teeth with coronal leakage and persistent apical periodontitis is the gram-positive facultative anaerobe Staphylococcus. This is followed by the groups Streptococcus and Enterococcus; all normal salivary flora. Coronal leakage provides a constant source of microorganisms and nutrients that initiate and maintain periapical inflammation and may well be the largest cause of failure in endodontic therapy.

Endodontic obturation materials do not prevent coronal microleakage for an indefinite period of time. In a sample of 957 root filled teeth that had not received restorative treatment during the previous year, the data showed that the technical standard of both coronal restoration and root filling were essential to periapical health. It is not uncommon for coronal leakage to occur following a conservative treatment as a result of the presence of deficient composite resin fillings and secondary caries under restorations.

Yet the endodontic materials utilized over the past fifty years have shown that they do not prevent coronal leakage when challenged. In yet another investigation, forty-five root canals were cleaned, shaped and then obturated with gutta-percha and root canal sealer using a lateral condensation technique. The coronal portions of the root filling materials were placed in contact with Staphylococcus epidermidis and Proteus vulgaris. The number of days required for these bacteria to penetrate the entire root canals was determined. Over 90% of the root canals were completely contaminated after a 19-day exposure to S. epidermidis. Fifty percent of the root canals were also totally contaminated when the coronal surfaces of their fillings were exposed to P. vulgaris for 42 days.

When comparing AH-26 and other commonly used sealers after 45 days of exposure to the oral cavity, none of the sealers was capable of preventing leakage and coronal dye penetration. So we can see that the quality of both the coronal restoration and obturation materials is essential to periapical health as none of the present-day root canal sealers may hermetically seal “the root canal wall – gutta-percha filling interface.” In this respect, the importance of perfectly sealing coronal restorations (both temporary and permanent) needs to be emphasized.

Pre-endodontic therapy buildups (canal projection)

Endodontic leakage is a major contributor to endodontic failure. A bonded core placed prior to disinfection and obturation of the canal system of the tooth can greatly diminish the leakage potential both during and after endodontic therapy.

Isolation of the pulp chamber can be a challenging task when minimal structure remains. As a result, endodontic therapy is required as part of the oral rehabilitation (Fig. 1). Coronal reinforcement has traditionally been addressed following the endodontic phase. But a coronal bonded buildup can simplify the endodontic phase and strengthen the tooth, decreasing the possibility of further damage to the tooth due to the dam clamp or mastication before a full coverage restoration can be placed. The canal Projector core allows isolation of the individual canals by surrounding them with a resin buildup (Fig. 2). Sealing the pulpal floor and area surrounding the canal orifices also will decrease coronal leakage potential during and following endodontic treatment.

Following identification of the canal orifices and carries removal, a Canal Projector cone (CJM Engineering, Santa Barbara, CA, www.cjmengineering.com) is placed on a hand file and inserted into each canal. A dentin adhesive is placed on all exposed surfaces and light cured. This is followed by injection of a dual-cure build-up material around the projector cones. When set of the buildup material has been completed, the hand files and projectors can be removed, leaving straight-line access into each individual canal. Visualization of the orifice is elevated to the occlusal plane instead of deep within the tooth, and a bonded seal coronally around each orifice is achieved. Should the restoring dentist wish to place posts in to the tooth, post space preparation is simplified and misdirection of the post preparation is minimized.

Coronal restoration (access sealing)

Microorganisms can penetrate through different temporary restorative materials and supposedly well obturated root canals. The use of adhesive sealers may play an important role by minimizing coronal leakage. In addition, the importance of an immediate definitive coronal seal should be emphasized after obturation of the canal system.

Seventy extracted single-rooted mandibular premolars were studied to determine the length of time needed for bacteria present in natural human saliva to penetrate through three commonly used temporary restorative materials and through the entire root canal system obturated with the lateral condensation technique. The average time for broth contamination of access cavities closed with Cavit temporary restorations (7.25 days), IRM (12.95 days) and Cavit-G (8.80 days) indicated that even in the short periods of time normally permitted between visits, complete leakage may result. IRM, long a common temporary material, was shown to leak to a significantly higher degree than glass ionomers. Due to its adhesive nature, glass-ionomer cement may prevent bacterial penetration to the periapex of root-filled teeth for over a 1-month period as compared to IRM or Cavit temporary restorations.
Another important consideration with regard to the temporary restorations is to prevent coronal leakage. The material behaves under mechanical load and thermocycling. Non-adhesive temporary fillings show an increased percentage of marginal breakdown and increased microleakage after thermocycling and loading. There was no significant improvement with increased thickness of the temporary material.2–4

When crowns were sealed with IRM, recontamination was detected between 15.5 days in the canals medicated with chlorhexidine, after 12.7 days in the group medicated with CaOH₂, and after 11.9 days in the group medicated with both chlorhexidine and CaOH₂. The group with no medication, but sealed with IRM, showed recontamination after 8.7 days. There were statistically significant differences in the time between the teeth with or without coronal seal. The coronal seal delayed but did not prevent leakage of microorganisms.2,4 Other studies confirm that IRM started to leak after ten days, whereas Cavit and Dyrract leaked after two weeks.2,7

The use of a resin based temporary restorative material or glass ionomer over partially removed resin composite restorations could be beneficial in achieving better resistance to marginal leakage (Fig. 3). Maintaining partially removed permanent restorations does not seem to cause a problem with achieving marginal seal.26 Glass ionomer cement provided a statistically better coronal seal than glass ionomer cement restorations. This may be because the composite resin prevents salivary dissolution of the glass ionomer over the long term.32

Results indicate that the sealing ability of adhesive and flowable materials can decrease coronal leakage potential.5 Because of the risk of coronal microleakage, endodontically treated teeth should be restored as quickly as possible.24 It is more prudent to use a permanent restorative material for provisional restorations to prevent inadequate canal sealing and the resulting risk of fluid penetration.8

To minimize the potential for contamination, when reentering the tooth to place either a post or to retreat endodontically, placement of a coronal sealant is recommended (Fig. 5). These are available in pink (PermaFlo® Pink) or purple (PermaFlo® Purple) from Ultradent (South Jordon, UT), dark red (Flow-it dark gingival) from Pentron Clinical Technologies (Wallingford, CT) or dark blue from DenMat (Santa Maria, CA).

Coronal microleakage has received considerable attention as a factor related to failure of endodontic treatment and much emphasis is placed on the quality of the final restoration. Intracanal posts are frequently used for the retention of coronal restorations. Many authors have examined coronal microleakage with respect to gutta-percha root fillings and coronal restorations, but have not investigated the coronal seal afforded by various post systems.43

Maintenance of the smear layer enhances sealability as evidenced by increased resistance to bacterial penetration.36 The incidence of apical leakage was reduced in the absence of the smear layer and the adaptation of gutta-percha was improved no matter what obturation method was used later.40–41 However, regardless of the obturation technique (thermo-plastized, lateral or verti- cal condensation or single cone) when a non-adhesive seal was used, leakage increased after 50 days.52

What is used to obtu- rate the canals is important, however, the manner in which the canal is prepared prior to obtu- ration also determines how well the canal is sealed when therapy is completed. Instrumentation with NiTi files has shown less microleakage than hand-instrument prepared canals, irrespective of what was used to obturate the canal.41 The machining of the canal walls with NiTi rotary instruments provides smoother post contours and shapes that are easier to obturate than can be achieved with stainless steel files. The better the adaptation of the obturation material to the instrumented dentinal walls, the less leakage is to be expected along the entire root length. The better the canal walls are prepared, the more smear layer and organic debris is removed, which is beneficial to root canal sealing.

Smear layer removal is best achieved by irrigating the canals with NaOCl (sodium hypochlorite) followed by 17% EDTA solution.44 Whereas the NaOCl dissolves the organic portions of the smear layer exposing the dentinal tubules lining the canal walls, EDTA, a chelating agent, dissolves the inorganic portion of the tubules in the dentinal tubules. Alternating between the two irrigants as the instrumen- tation is being performed will permit removal of more organic debris further into the tubules, increasing resistance to bacterial penetration once the canal is obturated.45,46

Obturation

The purpose of the obturation phase of endodontic therapy is twofold: to prevent microorganisms from entering the root canal system and to isolate any microorganisms that may remain within the tooth from nutrients in tissue fluids. No matter how well we seal the canal, if the coronal portion of the tooth is not thoroughly sealed then bacterial leakage may only be a matter of time.

Accessory canals may be present in the pulp chamber leading to the furcation area. This may be an additional source of leakage that often goes unaddressed either following...
obturation of the canals or during the restorative phase. Placement of a layer of resin-modified glass ionomer cement or adhesive resin to seal this area immediately following obturation can prevent leakage prior to final restoration of the tooth.5 It must always be remembered that success will only be achieved if the root canal system has been thoroughly debried of infected material as possible. Irrigation is key for removal of this smear layer lining the canal walls. The obturation material is a double-edged sword. Which sealer is used is as important as which core material is placed within the canal. Gutta-percha has limitations in resistance to coronal leakage that have been overcome with the newer resin alternatives. Although sealers can form close adhesion to the root canal wall, none are able to bond to the gutta-percha core material. Upon setting, shrinkage of the sealer allows the sealer to pull away from the gutta-percha core material. This occurs over a micro gap through which bacteria may pass. Several alternatives are available for core material selection.

Resilon, a resin gutta-percha alternative that is bondable with methacrylic sealers such as Epiphany (Pentron Clinical Technologies, Wallingford, CT) and Re- allon (SybronEndo, Orange, CA) was introduced three years ago after extensive studies. The core material Resilon is available in .02, .04 or .06 taper ISO sized cones from Pentron Clinical Technologies (Wallingford, CT) or SybronEndo (Orange, CA), and as sized apical plugs (Light-speed Technology, San Antonio, TX). Resilon showed significantly less leakage than gutta-percha. In studies performed at the University of North Carolina, the gutta-percha group demonstrated leakage in 80% of specimens and was not dependent on obturation technique or of specimens and was not dependent on obturation technique or age with AH-26 was not dependant on age with AH-26. Gutta-percha and AH-26 or AH Plus demonstrated bacterial leakage in 50% and 55% of the fungi samples. There was no statistically significant difference in penetration of bacteria and fungi between the two versions of the sealer.57

Comparative studies looking at periapical inflammation between teeth treated with gutta-percha with Resilon and sealers with methacrylic sealer found statistically less inflammatory response with the Resilon treated teeth. Mild inflammation was observed in 82% of roots filled with gutta-percha and AH-26 sealer compared with 19% of Resilon treated teeth. The monoblock provided by the Resilon system was associated with less apical periodontitis, which may be because of its superior coronal to root canal leakage.58 As AH-26 is unable to bond to gutta-percha, polymerization shrinkage of the epoxy resin can result in a micro gap leading to the leakage reported in the literature (Fig. 11). Additionally, the bond between the methacrylic sealer (Epiphany or Re-allon) and Resilon is sufficient to prevent micro gap formation as the sealer polymerizes (Fig. 12).

About the author

Gregori Kurtzman, DDS, is in private general practice in Silver Spring, Maryland. He has lectured both nationally and internationally on the topics of restorative dentistry, endodontics and dental implant.

Electrophoresis leakage studies recently completed at the University of Maryland comparing gutta-percha with AH-26 sealers and Resilon with Epiphany sealer found significant differences in leakage resistance. The gutta-percha/AH-26 group demonstrated an average resistance of 404.6 micro amps with 100% of the samples leaking, compared to the sealers resistance of 27.7 micro amps with 60% showing some leakage. The lower the value of resistance in micro amps, the more resistant the sealer is to leakage.59 These results support other studies indicating that when challenged, gutta-percha and AH-26 do not offer resistance to coronal leakage. Should a practitioner wish to continue using these materials, a permanent restoration needs to be placed at the appointment when endodontic therapy is completed.

Conclusion

Of 41 articles published between 1969 and 1999 (the majority from the 1990s), the literature suggests that the prognosis of root canal treated teeth can be improved by selecting a sealer that prevents the leakage of oral fluids and bacteria into the periapical areas as soon as possible after the completion of root canal therapy.60

Endodontic success is a multifactorial issue. Like a jigsaw puzzle, the full picture can only be seen when all the pieces are fit together. How the pieces fit together is as important as what is used to obturate the canal system. This is also influenced by what is placed coronally and when the coronal aspect is sealed. Niti rotary instruments and an irrigation protocol that includes NaOCl and EDTA will maximize the sealing ability of glass ionomer or the newer methacrylic resin sealers. The last piece of the puzzle, sealing the coronal restoration is as important as the root canal therapy.61

A complete listing of references is available from the publisher. Contact r.goodman@dental-tribune.com.
Irrigation has an important role during endodontic treatment. To achieve the best chemical preparation possible, we propose an optimal sequence for the use of various irrigating agents.

The main goal of the root canal treatment is to completely eliminate the different components of the pulpal tissue, calcification, and bacteria, and to place a hermetic seal to prevent infection or reinfection and to promote healing of the surrounding tissues if needed.

There are many techniques available to accomplish the root canal preparation. There are also many techniques for filling the root canal system (i.e., vertical compaction of warm gutta-percha, System B, lateral condensation, etc.).

We must ask ourselves the question: "Why do we irrigate and what irrigation protocol will provide the cleanest canal?" In this context, remember that shaping is the result of endodontic instruments, while cleaning results from irrigation. Therefore, we have two types of preparation: chemical and mechanical. This article addresses chemical preparation.

The close correlation between these two types of preparation has been proven. In fact, with greater tapered preparations, the quantity and the concentration of the irrigating solution will be greater and will therefore better eliminate the smear layer. Files can clean only parts of the root canal system. They create a reservoir that can hold the different irrigating solutions, which will access and clean portions of the root canal system that the instruments cannot reach.

In endodontics, the most commonly used irrigating solution is sodium hypochlorite (NaOCl). It has many desirable qualities and properties. It performs bactericidal cytotoxicity, dissolution of organic material, and minor lubrication. But sodium hypochlorite by itself is not sufficient for total cleaning of the endodontic system. It has no effect on the smear layer and its high surface tension does not allow for cleaning and disinfection of the root canal system's totality. For this reason, and according to individual clinical situations, we must use other irrigants in combination with sodium hypochlorite.

This article does not address retreatments and dissolving obturation material. Our discussions here are limited to vital and necrotic teeth, as well as those teeth with internal resorptions. The various irrigants that will be used according to the clinical situations are:

- EDTA (Ethylene diaminetetra-acetic acid) (17%) (Smear Clear, SybronEndo, Orange, Calif.)
- Chlorhexidine 0.2%
- Sodium hypochlorite 5.25%
- Citric acid 50%
- Distilled water

In general, the most common step after accomplishing the access cavity is the introduction of an endodontic file in the root canal. But this step should not be considered automatic, for many reasons. These include:

- The spread of bacterial toxins in all of the endodontic system and in the periapical area will affect a successful prognosis for the endodontic treatment due to the post-operative "flare-up" that may occur.
- The breakdown and accumulation of pulp tissue with its collagenic may create an organic plug within the root canal.

Remember that the access cavity, having four walls, will create a "reservoir" for the irrigation solutions to be frequently and continuously refreshed.

Vital teeth

In clinical cases such as the one shown in Figs. 1a and b, we are challenged with treating the complexities of the different components of the pulp, and eventually the presence of bacteria. For these cases we suggest the following irrigation sequence.

Step 1: Apply sodium hypochlorite and/or urea peroxide

The purpose of this mixture is to:

- Create a collageneric anti-aggregant effect due to the proteolytic and lipcid affinity of urea peroxide.
- Destroy the biggest amount of pulp tissue inside the access cavity and provide a better view of the canal orifices by controlling bleeding and preventing any collagenic plugs from forming.

At this stage the EDTA is only important for its antibacterial effect in combination with other anti-bacterial agents.

Step 2: Irrigate with 2ml of sodium hypochlorite 5.25 percent (60°C)

The warm NaOCl is more efficient in destroying the collagen and this will reduce the time needed for the elimination of the organic portion of the tissue. This irrigation will create an effervescent effect between the sodium hypochlorite and urea peroxide. This "elevator effect" will evacuate the debris outside the access cavity, disorganize the coronal pulp tissue, and help to better detect the canal orifices.

Step 3: Apply sodium hypochlorite again and activate using a K file (08-10)

This will disorganize the pulpal tissue in both the cervical and middle thirds of the endodontic system. This step has to be preceded by an abundant irrigation with distilled water in order to eliminate the first mixture present in the access cavity.

Step 4: Once the preparation of the canal has begun, apply Smear Clear (SybronEndo, Orange, Calif.) (17 percent EDTA ceitride, and surfactants)

The EDTA is an organic acid that eliminates the mineral part of pulp tissue; the surface tension inhibitor will allow better contact with the dentin for higher efficiency.
We advise alternating the use of EDTA from the beginning of the preparation in order to eliminate the mineral layer before it thickens and condenses inside the canal systems, closing the entrances of lateral and accessory canals and dentinal tubules.

Each time a rotary file is working inside the canal, irrigating solution must be present. Ultrasonic activation of the irrigating solution, using a small-diameter file, is advised for a more efficient chemical preparation.

The early use of EDTA facilitates the flow of the different irrigants in the lateral canals, permitting a chemical preparation of the endodontic system. EDTA also plays an important role in the reduction of inflammatory reaction by inhibiting the affinity of macrophages to the vaso-active peptides of the pulpal tissue. The EDTA should not be inside the canal for longer than 4 or 5 minutes.

Chlorhexidine can be used for a total elimination of the bacteria inside the canal. Distilled water is used between each irrigating solution to prevent an acid/base reaction between sodium hypochlorite and EDTA and for a more efficient action of the chemicals on the tissues. Copious irrigation is necessary to neutralize all the chemical agents by the end of the preparation and before the fitting of the gutta percha cones so that the master cone does not push any of the chemicals outside the canal, potentially causing an inflammation of the surrounding tissues.
Necrotic teeth
The main difference between vital teeth and necrotic ones is the absence, not in total, of the pulpal parenchyme and the abundance of bacteria present in the latter. Figs. 2 and 3 illustrate necrotic cases.

Irrigation should be initiated with either sodium hypochlorite (5.25%, 60°C) for its bacterial effect or with chlorohexidine (0.2%) (10 minutes) for the elimination of various bacterial types present in the root canals and dentinal tubuli. Distilled water should be used to neutralize the effect of these irrigants. Then the same irrigation sequence described previously for vital teeth should be repeated.

By eliminating the smear layer and opening the dentinal tubuli, the EDTA will permit an easy flow of NaOCl or chlorhexidine for a better disinfection of the endodontic system. In both clinical situations (vital and necrotic teeth) it is necessary to end our sequence by using distilled water to eliminate the chemical agents or to neutralize their effects. This will inhibit their flow toward the periodontal tissues, the alteration of the filling material, and the formation of a precipitating layer due to the crystallization of sodium hypochlorite after drying the canal walls.

Presence of resorptions
When we suspect an internal resorption, the irrigation sequence is the same as was described for vital teeth. But this sequence should be followed by the use of citric acid 50 percent (10 minutes) to eliminate the granulation tissue and to obtain smooth dentinal walls. This will ameliorate the adaptation of the filling material. The citric acid is eliminated by NaOCl and distilled water. The same sequence is adopted for external apical resections but with an activation of the patency.

Discussion
Many types of irrigants can be used in endodontic treatment, such as H2O2, anesthetic solutions, physiological serum, and de-ionized water. Our proposed sequence of irrigation can become more complex to address different clinical situations (Fig. 4).

The alternate use of urea peroxide, sodium hypochlorite, chlorhexidine, citric acid, distilled water, and EDTA is essential for the cleaning of the endodontic system.

The time we gain by using rotary NiTi instruments should be offset by abundant irrigation for a better cleaning of the endodontic system. This will contribute to the increased success rate of endodontic treatment.

Chemical preparation is a double-edged sword; it will help us achieve adequate cleaning of the main canal and its systems, but it must be followed by a 3-dimensional obturation to fill all the spaces that have been cleansed and prepared.
Perfect absorption of the fluid is essential in the main canal and all of its systems. If this is not accomplished, adherence between the sealer and the dentin will be compromised. In addition, the presence of the fluid inside the systems can create negative hydraulic pressure, preventing the obturation material from entering the complexity of the root canal systems and accomplishing a 3-dimensional obturation.

With the introduction of new materials for root canal obturation and progress toward adhesive endodontics, the root canal irrigation/chemical preparation is comparable (with some small modifications) to dentine and enamel conditioning prior to the use of adhesive restorative materials.

Conclusion
Irrigation is often dismissed during endodontic treatment, but must not be overlooked. It is one of the major keys of success for endodontic treatment. Irrigation—usually reduced to a needle on the tray—has to be systematically evaluated in order to become an endodontic entity having a precise chronology and codification.

References

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(Editor’s note: This article originally appeared in Oral Health and Dental Practice Management, and appears here in revised form by permission of the author.)
A tale of two specialties: the endodontic/implant algorithm

There are a myriad of problems in choosing between implant and endodontic therapies, as they differ profoundly. Different modes of outcome measurements frustrate direct comparison. The factors to be considered include patient-related issues (systemic and oral health, as well as comfort and treatment perceptions), tooth and periodontium-related factors (pulpal and periodontal conditions, color characteristics of the teeth, quantity and quality of bone, and soft-tissue anatomy), and treatment-related factors (the potential for procedural complications, required adjunctive procedures, and treatment outcomes). Long-term, large, clearly defined studies, with simple and clear outcome measures—for example, survival in combination with defined treatment protocols—are needed to measure the clinical performance of endodontic and implant therapies. Jan Lindhe has stated that implants should be used to replace missing teeth, not teeth. The tragedy of using mathematical manipulation to provide accurate information for informed consent is that the very way in which the multivariate analysis derived results is that the cohort(s) used and may be altered to prejudice results.

Figs. 2a and 2b: The mandibular right second bicuspid demonstrated an asymmetry in the floor of the chamber bonded with flowable composite resin (Permull, Ultradent, South Jordan, Utah). If the biological mandate for endodontic success is followed during the initial procedure or if reengineering of a failing procedure addresses the microflora as the etiologic vector, predictable clinical success is possible in the majority of cases. With crown lengthening, creation of a proper circumferential ferrule for both teeth, a successful resolution should be achieved.

In a recent article on paradigm shifts reflecting dentistry’s future, a reputable educator reported polling audiences of dentists at continuing education programs as theoretical scientific evidence (“Hands up” if you’ve had root canal therapy and residual pain, sensitivity, or awareness of the presence of something untoward remaining associated with the endodontically treated tooth.) The same question posed to the same cohort in regard to those who had implant placement elicited no complaints. The presumption was that dentists seek out other dentists as care providers, thus the expectation that the results should reflect the highest standard of care. He summarized that the trend to remove endodontically suspect teeth and replace them with implants will continue.

The creation of a trend must have substantialization in objective fact, not subjective interpolation. One can only hope that the excesses of the periodontium swing to biomimetic replacement will reverse and dentistry will reframe yet again. The profession needs to revisit all aspects of treatment planning to create a more functionally integrated perspective. The specialties, and those areas with aspirations to be specialties, have operated independent of one another or at best with minimal linkage. The result has been a failed interdisciplinary approach, with the concept of comprehensive care relegated to fulfilling the art of dentistry, but not the biologic science. Nowhere is this more appalling than in the dismissal of endodontic success potential.

Endodontics and implant dentistry are continual experimental states of flux in regard to success predictors and treatment outcome protocols. Any procedure that can be validated by evidence-based science should be factored into comprehensive care. A rush to judgment and anecdotal, empirical bias must never replace case selection, treatment planning and ultimately respect for the healing capacity of a hi-
In 1998, Dr. Kenneth Serota founded the Roots cybercommunity and the rxroots.com website to provide educational and networking opportunities to endodontic specialists and general dentists practicing endodontics. In January 2007, the rxroots.com site was revised and its features replicated in a new website for the implant dentistry community, rximplants.com. Dr. Serota recently took the time to speak with Endo Tribune about the new and renovated websites and what he calls the “nexus” of the endodontic and implant specialties.

ET: Why did you want to integrate Roots with an Implants site? What does this say about the synergies between the two disciplines?

Serota: I chose to integrate Roots and Implants simply because endodontics is the essential foundation of all reconstructive dentistry. Implants is the biomimetic exemplar of reconstructive dentistry. There is a very realistic algorithm that is essential in choosing one instead of the other. Essentially, they both work. Where they both seem to fail is in the realm of the restorative component. Essentially, they both work. Essentially, they both work.

ET: What’s in the future for the Roots online community?

Serota: We may well one day include sites for ortho, lasers, occlusion, cosmetics, etc. That’s why our parent site is called rxdentistry.com. For now, it’s Roots and Implants. The others will come if we can get folks to realize that integration and unification is the goal, not commerce, banners, and idle chatter.

If opinion leaders and academics in each of the fields participate in this type of forum, the potential of journals, cross-postings, and other channels will in time create true comprehensive care treatment planning—or as I feel it will be called in time—unification treatment planning: an integrated, harmonious synergy of all disciplines in staged and defined sequencing.

The rxroots.com and rximplants.com sites share a common portal designed to illustrate the synergies between the two specialties.

ET: What about Coaches Corner? How does it work and what is its intent?

Serota: Coaches Corner is basically an email link to info@rxroots.com and info@rximplants.com. You don’t have to belong to the cybercommunity and receive all the mail. If you have a question or concern about a treatment or diagnosis, you can post the inquiry to the “coach,” remain anonymous to the group, but have the question answered by as many as 2,000 members.

ET: Why do you think endodontists and implant specialists need to be talking to one another?

Serota: I think all specialists need to be talking to one another. Comprehensive care has always been the necessity, just sadly not the reality in far too much treatment. The trees are often treated, not the forest. I feel that implants have become a force of nature that is driving by default, but will in time drive by design, the integration of all the ‘specialties’ of dental care. Regardless of how you practice or where you practice, the essence of quality is integration of all the parts in harmonious function. Nowhere is that more integral than in the foundation components.

ET: Why do you think endodontists and implant specialists need to be talking to one another?

Serota: I think all specialists need to be talking to one another. Comprehensive care has always been
When the natural tooth can no longer be treated within predictable parameters, then the biomimetic option should be presented, taking into account all variables that impact upon its success rate (Figs. 3a-f). The choice is not between implants and endodontics, but between what is restorable and salvageable periodontally vs. implant replacement as an algorithm of functional success. The true decision is not between endodontics and implants, but greater accuracy in diagnosis of fractures of endodontically treated teeth, the success of crown lengthening procedures, and the success of periodontal therapy in regard to marginal periodontitis.

A treatment risk assessment algorithm is one of many tools that will optimize predictable clinical success. In order for the practitioner to successfully integrate any new treatment approach, it must represent inclusion of the new; however, not at the expense of exclusion of the traditional. As such, endodontics and implantology must acknowledge and ultimately embrace the strengths each brings to the equation that creates dental health.

All credibility, all good conscience, all evidence of truth come only from the senses. Friedrich Nietzsche

A complete listing of references is available from the publisher. Contact j.michmershuizen@dental-tribune.com.

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Dr. Kenneth S. Serota is in private endodontic practice in Mississauga, Ontario. He is the founder of the Roots (www.rx-roots.com) and Implants (www.rximplants.com) cybercommunities. He can be reached at kendo@endosolns.com.

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**Fig. 3a:** A radiographic survey identified a rarified apical area associated with a traumatized maxillary lateral incisor.

**Fig. 3b:** The canal was identified and instrumented, then sealed with calcium hydroxide.

**Fig. 3c:** Two weeks later, the canal space was obliterated.

**Fig. 3d:** Eighteen months later, the apical lesion had increased in size and it was decided to remove the tooth and replace it with an implant fixture.

**Fig. 3e:** The tooth was removed atraumatically and the socket site grafted.

**Fig. 3f:** Four months later a fixture and healing abutment were placed. The algorithm sequence followed was logical and sequential, the patient understood her options and chose to retain her natural tooth if at all possible.
Endodontist combines passions to create auto-themed office

It all started with a tractor

Scherer grew up in the Minneapolis/St. Paul area, and as a teenager on his father’s hobby farm, he did much of the repair work on the farm’s vehicles. Soon, he knew a lot about old trucks and tractors, and grew to admire them. In 1984, 20 years old and purchasing his first car, he chose a 1955 Dodge Coronet.

Scherer earned his dental degree in 1991 from the University of Minnesota, where he graduated with Distinct Honors and was awarded the Dinh Quan Award for Excellence in Endodontics. He completed his endodontic training at the University of North Carolina, Chapel Hill. Even in dental school he was a “motor head,” constantly fixing and driving old cars. “During my residency in North Carolina, I had a 1965 Cadillac and a 1968 Chrysler New Yorker and drove them to school every day. I was happy because there was no salt on the roads in North Carolina and I could drive them year-round.”

He still owns his first car, and 23 years later has a car collection that would interest even Jay Leno. (As a matter of fact, Leno, who owns about 100 cars himself, soon plans to visit Bismarck to see Scherer and another local collectors’ cars.) Scherer won’t say how many cars he owns now, but a friend puts it this way: “He owns two wreckers, so how many cars do you think he has?”

Scherer’s collection includes many specimens of his favorite automobile era: the 1950s. “I like cars with big fins and big motors, mostly Chryslers, Dodges, Plymmouts and DeSoto’s,” he says. The jewel of his collection is a beige and gold 1957 DeSoto Adventurer convertible, which he purchased 10 years ago and spent six years restoring. He doesn’t drive it: “Only 300 were made, and there are only nine left in the world.” But he does drive his...
other cars, choosing a different one each week of the year, weather permitting.

Bringing it to work

Intertwined with his love of cars is Scherer’s affection for automobile-related collectibles, or “automobilia,” as well as historic items. “I tell my wife and friends it’s not a hobby, it’s a lifestyle,” he laughs. “Everything I do is swimming in history.” Family vacations with his wife Lisa and their three children, Erik (15), Peter (15) and Esther (9) are often planned around a car swap meet or historical destination.

The idea to deck the office with part of his automobilia collection was his staff’s. Scherer worked with The Levin Group, a dental practice management consultancy, a few years ago to build practice productivity, and Levin consultants also encouraged the themed approach. When the practice moved to a new location in 2006, it allowed Scherer even more space—and a custom-designed environment—to display his collection.

“We want them to forget about the fact they’re going to have a root canal and just be fascinated with the office.”

Patient reactions have been overwhelmingly good, says Scherer. “Most people walk in and look kind of confused, like they think they’ve come to the wrong place,” he says. “They usually think it’s either a bar or a restaurant.”

The first thing they see when they arrive is a “service counter” reception area that recalls a 1940s or 50s auto repair shop. Neon signs, an old gas pump, period-chair looks and black-and-white photos of Bismarck and the surrounding area reinforce the theme, and Scherer and his staff wear “shop shirts” instead of the typical lab coat and scrubs. Other memorabilia is everywhere: in bathrooms, in the operatories and sterilization room and even in the hallway.

While the office may look old-fashioned, the practice is anything but. In addition to his surgical microscope, Scherer has a completely paperless office and has integrated wireless notepads for patient charts and records, digital x-rays and multiple flat-screen monitors in each of his three active operatories. The retro environment is just a fun bonus. Scherer, who has the only endodontic practice in a sparsely populated region, draws patients from three states and 110 referring dental offices. Often, patients drive a substantial distance to arrive at his office, and he wants to make it worth their while.

“Our goal was to really have a psychological impact on the patient who may not be thrilled to be coming to an endodontist’s office,” Scherer explains. “We want them to forget about the fact they’re going to have a root canal and just be fascinated with the office. The point of the theme is to take their minds off the procedure they’re going to be having. They tell us it works.”

Photos by Dan Masseth, Magic Photo Art, Bismarck

Scherer renovated 3,600 sq. ft. of a 1914 grocery warehouse in downtown Bismarck. Twelve-foot ceilings posed a challenge when he wanted to hang his Global Surgical microscope from the ceiling.

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Scherer renovated 3,600 sq. ft. of a 1914 grocery warehouse in downtown Bismarck. Twelve-foot ceilings posed a challenge when he wanted to hang his Global Surgical microscope from the ceiling.
Planning your exit strategy: key questions to address

by Thomas L. Snyder, DMD, MBA

Part 1 of 2

In the early days of 2007, you may be reflecting on how your career will end. In any life transition, proper planning can be the difference between success and disappointment. If you are thinking of a practice transition in the next five years, today is a good time to get started. Designing a strategy, timeline and objectives will create the roadmap for your journey into retirement. In this two-part article, we’ll review 10 key points you should consider to maximize a successful practice transition.

A realistic outlook is needed to properly strategize for retirement. In this issue we’ll address five key questions to get the transition planning process started:

1. Can I afford to retire?

When wanting to retire collides with being able to retire, the outcome can be devastating. Enlist the services of a financial planner to quantify the answer through a retirement income need analysis, which will project what you will need to live comfortably, for how long, based upon your current assets. If a shortfall is uncovered, plan now so you can make adjustments to your lifestyle or income before it’s too late.

2. Will anyone buy my practice?

The condition of your physical plant will either help or hinder your ability to sell. If your practice has a worn out look, and if your equipment is old, finding a young dentist willing to buy could prove difficult. If you are going to practice five years or more, consider updating equipment, or updating your office through smart interior decorating. You will receive tax breaks for Section 179 expense or depreciation, as well as recouping some of the value when your practice is sold. Remember that in an urban or suburban area, competition will be fierce for buyers. Enhancing your physical plant will help you compete in the long run. For practices located in small towns or rural areas, more time is needed for recruitment of potential candidates since the number of potential purchasers is far less than in metropolitan or suburban areas.

3. How efficient and profitable is my practice?

Building up your practice before retirement is not counter-productive. In fact, increasing your net income for the years leading up to the sale of the practice may increase the value of your practice quite hand-somely as well as possibly provide more funds for your retirement plan. Most practices benefit from professional consulting and making that investment should provide good returns.

4. What are my real estate issues; is my building worth more than my practice?

Since most solo practitioners own their office space, special consideration must be made for the majority of buyers who will not want to purchase the real estate with the practice. Most buyers will want to pay rent initially and then make a purchase after a few years of practice ownership. If a deferred real estate sale is part of your future, be sure that your Agreement of Sale for your practice includes a future purchase option, which allows a buyer the first right of refusal to purchase the building. Not being able to sell your practice and your office space may detrimentally affect your financial plan. Work with a financial adviser to allow for this possibility.

5. Am I up to date with technology?

In cases where your real estate’s value is greater than the value of your practice, selling both assets together may create problems with funding for potential buyers. If a buyer cannot obtain funding for the down payment for the real estate transaction, you may need to become a landlord, until a purchase can be made. If so, be sure to charge rent that is comparable to other professional practices in your area. Set lease terms to a minimum of five years with a five-year renewal. This provides lenders with assurance that the tenant will remain.

About the author

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