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Journal

JANUARY 2013

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Journal

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Wind Me Up

KERRY K. CARNEY, DDS, CDE

I know this only happens to me. The other day I saw a long-time patient whom I like very much. She has a complicated medical history and a complicated personal life. Our plan was to prep two teeth for crowns. This patient needs lots of TLC and my undivided attention. To meet her needs, we scheduled her for a day and time when I would have no hygiene exams and no other patients. She needed a quiet morning. That was the plan; however, circumstances in her personal life required those plans to change.

She could only come in now when hygiene patients were being seen as well. Also, now she could only come in the afternoon. The receptionist appointed her for the end of the day so there would be no pressure on us from patients waiting to be seen after her appointment. That was the new plan. Then life happened.

Our patient arrived late. Our patient now had carpool commitments that required her to be out by a specific time (shorter than we had planned). Our patient was upset that we had to complete a hygiene exam before beginning her treatment. Our patient wanted a guarantee that we would have her out in time for her carpool.

It was at that moment that I decided it was time to check my stress-O-meter and evaluate the dynamics of the situation.

I once read an article about the psycho dynamics of the doctor/patient relationship. The author described how in the dental environment, waves of anxiety slosh back and forth between the dentist and the patient. The patient is anxious and may or may not express that anxiety verbally or nonverbally. The dentist is busy dealing with the complexity of the procedure and constantly monitoring the patient's anxiety level.

It was at that moment that I decided it was time to check my stress-O-meter and evaluate the dynamics of the situation.

The anxious patient can cause the dentist to unknowingly transmit verbal or nonverbal signs of his/her own mounting tension. The perception of this by the patient can increase the patient's own mounting tension. This escalation of stress is transmitted to and heightened by the dentist. It is a vicious cycle of ever-increasing stress and denial (not unlike a family get-together over the holidays).

When I was new to dentistry, I would have accepted the patient's invitation to get wound up in her anxiety and fear of losing control. I would have thought: "I am a good dentist. I can do this in record time, get the patient out in time for her carpool commitment, complete the treatment and fulfill the day's projected production."

Some dentists may thrive on this kind of challenge, but not me.

I know from experience that even when I can complete the assignment in record time it is not satisfaction that I feel. Maybe the stress of the challenge does not take its toll immediately, but like a clock wound too tightly, all the gears and wheels of my emotional clockwork start to seize up. It takes the joy out of the everyday interactions with my patients and team members. Things just don't feel right. I get cranky.

So here I stand, with my patient unconsciously winding me up and trying to take control over the timing and execution of the procedure she is about to undergo. I know this will not produce a good experience for my patient or me. I know the entire time she (and I) will be distracted by the ticking clock. If any complications arise during the procedure, she may be late for her carpool commitment and that will not be good.

We need a time-out; stop the clock.

It is time to reevaluate the game plan and adjust the strategy.

Let us deal with the time problem. She begins to blame my staff for making the appointment at this time. I offer to reschedule for a more convenient time for her. She feels it will be too long before we can find a time slot for her. (She is painting herself into a corner and looking to assign the role of oppressor.) I reassure her that I can give her a guarantee that she will be out in time for her carpool if we prepare only one tooth today.

She is not ready to wind down yet. She begins to bargain.

Maybe she can call her husband (who never answers his cell phone) and see if he can call her back and let her know he can take over the carpool commitment, or not. (Another turn of the watch stem). This plan will, of course, require her to hold her cell phone at the ready and she will need to interrupt treatment to answer the phone. (Another turn of the watch stem). I suggest

that we let the front desk staff hold her phone and answer should her husband call. That way she can relax knowing someone else will handle the communication.

She has been given the ability to decide whether or not to reschedule. She has been given a realistic assurance of what can be done in the time frame she has allotted. She has been given a way to communicate with her husband.

She is beginning to wind down.

I advise her that should everything go very smoothly, I could evaluate after the preparation of the first tooth whether there is sufficient time remaining to complete the preparation of the second tooth.

She is calm and able to relax. The psychodramatic tension has wound down. We can begin.

Restart the clock.

Everything turned out fine. At the end of the procedure, the patient was happy with her decision and the experience.

I know this patient; this is the way she reacts to anxiety. I know me; I am a happier person when I can avoid unnecessary stress. Despite pressures, external and internal, my stress-O-meter did not wind up in the danger zone.

Many factors contribute to burnout in our profession.

It is important to enjoy what you do every day. It is important to avoid getting wound up into someone else's emotional clockwork. Life is too short and money cannot compensate for the time one spends at the wrong end of the stress-O-meter. That day turned out to be very pleasant for all of us.

Now, if I could only get this to work at our next family get-together. ■■■■

The *Journal of the California Dental Association* welcomes letters.

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Thank You to the *Journal* Reviewers

Authors have their names on their articles. Contributing editors, staff members and outside vendors have their names in the masthead. But the *Journal* involves more people than those whose names are printed in each issue. There are also professionals who formally review manuscripts and offer their recommendations as well as others who contribute to Tech Trends. On this page are the names of people whose reward comes in the form of a thank you letter and a listing here. In addition, there are many others who have provided information counsel to the *Journal*. It is impossible to list them all. The *Journal* extends its thanks to everyone who assists us in our endeavor.

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The Next Game Changer?

Because silver agents solve difficult clinical problems, the reintroduction of silver salts is a potential "game changer" for dentistry, but only if they are widely accepted. The November 2012 *Journal* publication of Dr. Duffin's "Back to the Future: The Medical Management of Caries Introduction" on the use of silver nitrate has the potential to begin such an event.

In our two offices, we have been using several silver fluoride solutions ($AgNO_3$ 38%; NaF 4%) followed by 5% varnish for almost three years with positive results similar to Dr. Duffin's report. Our use has been directed toward its inclusion into our CAMBRA protocols to prevent and arrest root and dentine decay in our high-risk patients. By using silver nitrate/sodium fluoride solution followed by fluoride varnish, we are observing dramatic improvement in the management of the most challenging decay issues dentists face: rampant root decay in patients who are compromised by medical, neurological or behavioral reasons and are unable to care for themselves.

Additionally, for the past 12 months, we have been using various preparations of AgF to treat deep-enamel caries to prevent endodontic involvement. In a combined case sample of more than 20 patients without symptoms prior to AgF treatment but with peri-pulpal caries, none have become symptomatic.

AgF-treated lesions are black. When used on younger adults for management of multiple enamel decays that might require a delayed restorative plan, the black area is changed to a light brown with use of KI. This change is typically not objectionable to the patients and helps them plan for their restorative treatment.

Effective desensitization of cervical areas and protection of clinically suspect crown margins are benefited by sealing of dentinal tubules with silver compounds.

Recent studies not included in the article's bibliography inform our clinical protocols for the use of AgF. A high-quality prospective study with comparative groups found that silver ions can arrest decay in more than 90 percent of patients for significant periods of time and has a dose-frequency effect.[1,2] The preventive capability of silver compounds, which is well-known in medicine as an inhibitor of biofilm, has been shown to enhance prevention of root decay better than fluoride varnish alone.[3]

We have experienced the inclusion of silver compounds into the CAMBRA armamentarium as a way to expand treatment options and more effectively and accurately personalize care for each patient.

Thank you for publishing this article. It is a step toward the clinical acceptance of the disease model of caries and will prepare us for coming advances.

NATHAN KAUFMAN, DDS,
ASSISTANT CLINICAL PROFESSOR UCSF
MICHAEL GRIFFITH, DDS, MS
San Francisco, Calif.

1. Peng J J-Y, et al,"Silver compounds used in dentistry for caries management: A review," *J Dent* 40, 531-541, 2012.
2. Zhi QH., et al, "Randomized clinical trial on effectiveness of silver diamine fluoride and glass ionomer in arresting dentine caries in preschool children," *J Dent* 40, 962-967, 2012.
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Toothbrushing Alone: No True Value for Stopping Dental Caries

I enjoyed the letter by Scott Thompson, DDS, in the July 2012 *Journal of the California Dental Association* called "Access to Care! Missing the Point." He stressed that dental disease needs to be addressed and I strongly agree. For prevention, his main emphasis was on toothbrushing, and he recommended toothbrushing without toothpaste. For school-age children and teens, the toothbrush, without a fluoridated toothpaste, will not stop dental caries. In

dental school, we were indoctrinated that toothbrushing was extremely important for dental health and this is true.

After dental school, I spent two years in a pediatric dentistry program in New York. One of our main objectives was to evaluate dental literature. Initially, I believed that toothbrushing was the best dental treatment for caries prevention. At the pediatric dental program, somebody mentioned that toothbrushing does not stop caries for children. Initially, I was upset and I asked where there was research to justify the belief that toothbrushing did not stop dental caries. Because there are so many factors that influence tooth decay, it is difficult to have a good study just studying toothbrushing. I was given the best published study that I have seen. It documented the effect of toothbrushing, and I still have a copy of the publication. Most studies are not controlled for just toothbrushing, i.e., other uncontrolled factors influence the studies, e.g., fluoridated toothpaste, home care, diet, social factors, etc.

Goran Koch and Jan Lindhe, from the University of Gothenburg, Sweden, have published extensively on oral hygiene. A study was performed on 299 pupils, aged 9-11 years, attending the same elementary school in Malmo, Sweden. There were three groups to study toothbrushing: a control group and two supervised toothbrushing groups, one with a fluoridated dentifrice and one with a placebo dentifrice. For both toothbrushing groups, the parents were

given instructions and the appropriate toothpaste for home use. Once a day during the six school terms, in small groups, the children brushed their teeth for 2-3 minutes under the supervision of a trained dental nurse. The caries rates were evaluated at the end of the six terms (three years) and two years later. At the end of the school terms, the children who used a fluoridated toothpaste had significantly fewer caries, but the children who used a non-fluoridated toothpaste had essentially no difference in caries compared to the non-brushing group.

How could just toothbrushing not stop dental caries for school-age children? It is very simple. For school-age children and teenagers, initially more than 95 percent of dental caries start in the pit and fissures or the interproximal surfaces. The macroscopic toothbrush bristles do not remove all plaque or bacteria from these areas. Toothbrushing is still extremely valuable and important, but toothbrushing has to be in combination with other preventive means.

For prevention, Dr. Thompson's only emphasis was the value of toothbrushing. For teaching toothbrushing and for toothbrushing before bedtime, he recommended not using toothpaste. Toothpaste can be messy, but at least a smear of a fluoridated toothpaste should be applied. In Dr. Thompson's letter, the most important preventive means were not mentioned, i.e., fluoride supplements, diet recommendations, flossing, sealants and regular dental visits. He did mention CAMBRA.

I agree that toothbrushing is extremely important, but toothbrushing alone stops very few caries for school-age children and teenagers.

CHARLES HALTERMAN, DDS, MA
Half Moon Bay, Calif.

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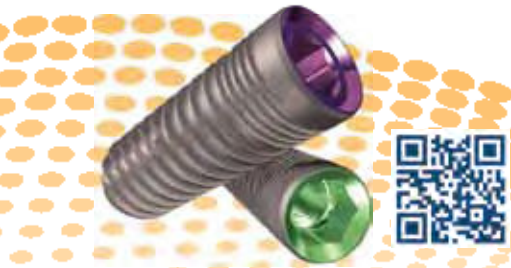

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Dancing With the Devil

DAVID W. CHAMBERS, PHD

In the little town of Sonoma where I live the north-south streets have numbers and those running east-west are named for countries such as Peru, Brazil and France. We used to have a Germany Street and an Italy Street, but during the Second World War, these became MacArthur and Patton. We don't dance with the devil.

The official policy of the United States is that we do not negotiate with terrorist devils and politicians must be free of conflicts of interest commercial devils. Dentists tend to see insurance companies and CE speakers sponsored by industry in this light.

Of course we dance with devils daily, and we complain loudly when others are dancing with more attractive ones. The government gives financial and arms support to dictators. Forty-five percent of den-

CONTINUES ON 15

Baby Banana Brush: Teether/Toothbrush

The Baby Banana Brush, an innovative combination teether/toothbrush, is a double duty device with an "a-peel-ing" design irresistible to babies. Safe and durable for teething babies, the flexible medical-grade silicone bristles work to clean and massage teeth and gums with a design that's much safer than traditional, hard toothbrushes. The banana's "peels" make it easy for small hands to grab and hold onto. And, new this year, is the Baby Banana Sharky Brush — the same concept but uses a shark design with bristles for teeth and fins for handles. Learn more about both of these designs at babybananabrushes.com.

Impact of Anxiety on Pain Perception

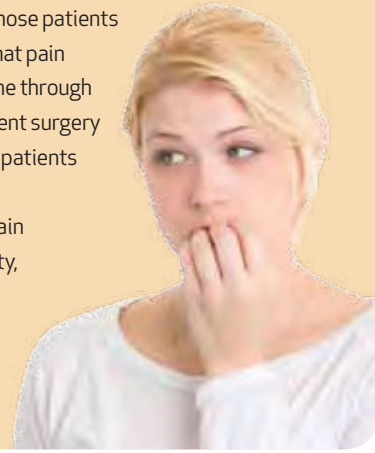
For periodontal surgery and implant treatments, pain perception may be affected by the patient's level of presurgical anxiety.

Researchers measured presurgical anxiety and surgical pain perceptions using visual analog scale (VAS) scores and interviews of patients who were undergoing periodontal or implant therapy in a private periodontal specialty practice. Patients reported the most uncomfortable experiences associated with periodontal or implant surgery as bad taste, receiving the local anesthetic and excessive fluid in the mouth.

Patients who presented high pretreatment anxiety scores reported periodontal and implant surgeries were more uncomfortable than what those patients with low anxiety scores reported. The study also found that pain perception and anxiety scores did not change on first-time through fourth-time surgeries, but patients undergoing retreatment surgery recorded higher perception and anxiety VAS scores than patients undergoing surgery for the third or fourth time.

For periodontal surgery and implant treatments, pain perception is affected by the level of presurgical anxiety, the authors concluded.

The full study can be found in the *Journal of Periodontology*, September 2012, Vol. 83, No. 9, Pages 1079-1085.



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Cranberry Substance May Repel Oral Yeast Infection

In a study published in the journal *BMC Complementary and Alternative Medicine*, scientists found that cranberries could potentially help prevent oral candidiasis. Oral candidiasis, frequently known as oral thrush, is a common fungal disease for which C. albicans is the major etiological agent.

Researchers at Rutgers University and the University of Laval in Quebec, Canada, conducted the lab study to investigate the effects of A-type cranberry proanthocyanidins (AC-PACs) on pathogenic properties of C. albicans as well as on the inflammatory response of oral epithelial cells induced by this oral pathogen.

The scientists found that "although AC-PACs did not affect growth of C. albicans, it prevented biofilm formation and reduced adherence of C. albicans to oral epithelial cells and saliva-coated acrylic resin discs," they wrote.

The ability to adhere and to form biofilms on biomaterials and oral mucosa allows C. albicans to accumulate in large amounts, the authors explained, so AC-PACs' ability to prevent adherence could decrease infection rates. Researchers found the AC-PACs also had an anti-inflammatory effect.

"The present study demonstrated that AC-PACs, by affecting the virulence properties of C. albicans and, parallely, attenuating the inflammation induced by this pathogen, may have a beneficial effect as a novel therapeutic in prevention and treatment of oral candidiasis," authors wrote, noting that clinical trials would be necessary to demonstrate whether the beneficial properties found under the assay conditions may be observed in vivo.

Find the full study, "Cranberry proanthocyanidins inhibit the adherence properties of Candida albicans and cytokine secretion by oral epithelial cells," in the January 2012 issue of *BMC Complementary and Alternative Medicine*.

BYU Biochemists Define Birth Defect Mechanism

By studying an ion channel that regulates the electrical charge of a cell, researchers at Brigham Young University may be one step closer to discovering what causes some birth defects.

Until recently, the cellular cause of birth defects, like cleft palates, missing teeth and problems with fingers and toes, has been an enigma for scientists. But Brigham Young University Professor Emily Bates and her biochemistry students have identified an important piece of that puzzle.

According to the research article, published in the journal *Development*, the team of researchers showed that by blocking the ion channel that regulates the electrical charge of a cell, the work of a protein that is supposed to carry development information to the nucleus is disrupted. Without those instructions, cells don't become what they were intended to become — whether part of a palate, a tooth or a finger.

The researchers believe this recently discovered mechanism may be what some syndromes have in common and now want to apply their findings toward the prevention of birth defects, specifically those caused by fetal alcohol spectrum disorders.

In addition, their findings might also have important implications for the fight against cancer.

"This protein signaling pathway is the same one that tells cancer cells to metastasize," Bates said. "We're planning to test a therapy to specifically block this channel in just the cells that we want to stop."

The study, titled "An inwardly rectifying K+ channel is required for patterning," is published in the October 2012 issue of *Development*.

Orthodontists and Patients with Craniofacial Anomalies

Although orthodontists have the motivation to treat patients with craniofacial anomalies, they may be lacking training and experience, according to a recent study.

In a 41-item survey conducted online, with 208 orthodontic resident responses, researchers asked about the importance of serving this group of patients, whether these residents planned to serve such patients in their future practices, and if they would charge higher than typical fees.

"Orthodontic treatment for these patients often requires increased complexity and difficulty, extended length of treatment time, and often limited financial benefit," study authors noted, adding that treatment for these patients is generally limited to hospitals and university centers.

When asked if they planned to treat this population, nearly 55 percent of those surveyed said yes, but 58 percent said they would charge a higher fee. Of those who indicated they did not plan to treat these patients, the primary reasons given were limited experience and lack of access to an interdisciplinary team, according to a news release.

Less than half of the residents surveyed were aware of the existence of fellowship programs focusing on cleft and craniofacial needs with roughly 29 percent indicating they would be willing to complete a 1-year fellowship program.

Full text of "Motivations of Orthodontic Residents in Canada and the United States to Treat Patients With Craniofacial Anomalies, Cleft Lip/Palate, and Special Needs" is available in the *Cleft Palate–Craniofacial Journal,* September 2012, Vol. 49, No. 5, pp. 596-600.

DANCING, CONTINUED FROM 13

tal care is underwritten by insurance. A few years ago the ADA signed a joint marketing agreement with Wrigley and the American Academy of Pediatric Dentistry accepted $1M from Coca-Cola. We have lobbyists in Sacramento and Washington.

There are two moral issues here: when should we dance with the devil and are we being hypocritical when we belly ache about the practice?

Every action has multiple motives. Whistle-blowers are entitled to handsome compensation under federal law. An ad in this journal may simultaneously turn a profit for the manufacturer and the dentist who uses it, as well as benefitting countless patients. We have to consider the whole set of pro and con reasons when deciding which devils to put on our dance card.

Here is where the conflict comes in. Dr. X sees the values associated with the ADA-Wrigley deal as reducing member dues, facilitating innovative programs, tarnishing the image of the profession and developing useful ties with industry – in that order. Dr. Y counts exactly the same benefits and liabilities, but with reputation of the profession as highest on the list. These dentists will disagree on the ADA's action and they probably will argue past each other, one saying it is a financial issue and the other saying it is a matter of professional integrity. Of course it is! Such conflicts are even internal. I have heard that at least one individual involved in the ADA-Wrigley deal has changed his mind. The priority of values depends on where we stand and when we look. Changing our value priorities after the fact is called moral regret.

Devil dancing is a rich opportunity for hypocrisy. Such double-steps usually take the form of emphasizing only the socially positive items on our own list of reasons and only the negative ones on others' lists. There is also hypocrisy of the loyal opposition. Those who do not receive a benefit from ADA's commercial activities because they are not members will be prompt in criticism of bent principles.

The Nub:

1. Few choices in life are completely determined by a single principle.
2. Different people choose different devils.
3. Envy may cause us to criticize others' choices of devils.

David W. Chambers, PhD, is professor of dental education, Arthur A. Dugoni School of Dentistry, San Francisco, and editor of the Journal of the American College of Dentists.

Spotting caries is a piece of cake,

"Nisin is a perfect example of this potential because it has been used safely in humans for many years, and now the laboratory studies support its anti-tumor potential."

YVONNE KAPILA

Food Preservative May Slow Squamous Cell Head and Neck Cancers

A recent University of Michigan study showed the commonly used food preservative nisin may slow or stop squamous cell head and neck cancers.

Researchers found nisin, a bacteriocin, induces preferential apoptosis, cell cycle arrest, and reduces cell proliferation in HNSCC cells, compared with primary keratinocytesl

According to the study's principal investigator, Yvonne Kapila, because the Food and Drug Administration and the World Health Organization approved nisin as safe for human consumption decades ago, obtaining FDA approval to test its suggested cancer-fighting properties on patients in a clinical setting will not take as long as a new therapy that has not been tried yet on people.

"The use of small antibacterial agents, like nisin, to treat cancer is a new approach that holds great promise. Nisin is a perfect example of this potential because it has been used safely in humans for many years, and now the laboratory studies support its anti-tumor potential," said Kapila, a professor at the University of Michigan School of Dentistry.

This study looked at the use of antimicrobials to fight cancerous tumors and found nisin, in part, slows cell proliferation or causes cell death through the activation of a protein called CHAC1 in cancer cells, a protein known to influence cell death.

"Our studies are the first to report CHAC1's new role in promoting cancer cell apoptosis under nisin treatment," claim the authors. Researchers also found nisin may stop tumor growth by interrupting the cell cycle in "bad" cells but not the good cells so it can stop cancer cell proliferation without hurting good cells.

Determining the optimal therapeutic dose for treatment of human oral squamous cell carcinoma is the next critical step in its validation process, the authors wrote.

Full text can be found in *Cancer Medicine*, October 2012, DOI: 10.1002/cam4.35.

Scientists Create Artificial Tooth Enamel

Researchers from Japan recently developed an artificial tooth enamel that can be used to prevent decay, make teeth appear whiter and stop tooth sensitivity.

The new, ultra-thin artificial tooth enamel is made of hydroxyapatite — the primary mineral in tooth enamel. Created in the lab, the biocompatible film measures just 0.00016 inches thick after firing lasers at compressed blocks of hydroxyapatite in a vacuum to make individual particles pop out.

"This is the world's first flexible apatite sheet, which we hope to use to protect teeth or repair damaged enamel," claimed Shigeki Hontsu, professor at Kinki University's Faculty of Biology-Oriented Science and Technology in western Japan.

Tiny holes allow liquid and air to pass through the material, preventing bubbles when applied to a tooth.

"The moment you put it on a tooth surface, it becomes invisible. You can barely see it if you examine it under a light," Hontsu added.

Current models of the film are transparent but researchers say they can make it white for future use in cosmetic dentistry. But researchers said it will most likely be another five years before this type of treatment could be implemented in practical dental procedures.

Hontsu and his research team have applied for a patent for the material's dental applications.

NYU Professor Developing Prototype Glass-Zirconia Composite Dental Crown

The National Institute of Dental and Craniofacial Research, National Institutes of Health, recently awarded Yu Zhang, PhD, an associate professor of biomaterials and biomimetics at the New York University College of Dentistry, a five-year, $1.9 million grant to develop and test a prototype glass-zirconia composite dental crown.

The funds allow Zhang to further research glass-zirconia composite formulation intended to serve as an alternative to porcelain-veneered zirconia designs. An estimated 10 percent of porcelain-veneered zirconia restorations develop fractures within the first three years, according to a news release from the university.

Zhang's glass-ceramic composite crown design consists of mostly a glass surface with underlying layers that gradually become more densely packed with ceramic. Esthetically, the crown is comparable to a porcelain-veneered zirconia version, but because it's thinner, less healthy tooth structure needs to be removed to make room for it.

"A composite crown with glass-rich surfaces will be less susceptible to top-to-bottom fractures from direct contact with hard food as well as to ruptures that occur when the bottom of the restoration buckles under pressure," said Zhang, who formulated the initial prototype glass-zirconia composite material with funding from the NIH and the National Science Foundation.

"In this new study, we will be using a mouth motion simulator — a machine that simulates chewing and grinding — to compare the fracture-resistance of eight glass-zirconia and eight all-zirconia crowns," said Zhang. "Each crown will endure two months and 1.25 million chewing cycles in the simulator – equivalent to three meals a day over a five-year period."

'Spin' in Media Reports of Scientific Articles

When press releases or news stories report the results of randomized controlled trials, they frequently include some type of "spin," French researchers report. This "spin" refers to the intentional or unintentional specific reporting strategy that emphasizes the beneficial effect of the experimental treatment, according to a study published in the journal *PLOS Medicine*, and typically comes for the study's abstract as opposed to reflecting a misinterpretation by the media.

Led by Isabelle Boutron from the Université Paris Descartes, the researchers used a sample of 70 press releases and 41 associated news stories looking for the presence and source of "spin" in the coverage of randomized controlled trials.

The authors found "spin" present in 47 percent of press releases, 40 percent of study abstracts in scientific journals and 51 percent of associated new stories — with news stories presenting basically the same "spin" as identified in the press releases and article abstract conclusions.

"This interpretation shift is probably related to the presence of 'spin' in peer-reviewed article abstracts, press releases, and news items and may be partly responsible for a mismatch between the perceived and real beneficial effects of new treatments among the general public," the study noted.

"Our results highlight a tendency for press releases and the associated media coverage of randomized controlled trials to place emphasis on the beneficial effects of experimental treatments," the authors concluded.

See the full study, "Misrepresentation of Randomized Controlled Trials in Press Releases and News Coverage: A Cohort Study," published September 11, 2012 in *PLoS Med* 9(9).

The study "demonstrated that a sinus membrane perforation can occur at any time during the sinus lift procedure, independent of the surgical method used."

Study: Sinus Membrane Perforation Can Occur Regardless of Surgical Method Used

In a recent pilot study, published in the *Journal of Oral Implantology*, researchers compared transcrestal surgical techniques for maxillary sinus floor elevation. Seeking to determine if any of the techniques carried a greater risk of surgical complications, study authors found that while endoscopy may be the preferred form of detecting membrane perforations, there were no significant differences in the rate of perforations.

Perforation of the sinus membrane is the most common surgical complication associated with maxillary sinus floor elevation. Perforations have been linked to acute or chronic sinus infection, edema, bleeding, loss of bone graft material, and failure of the implant.

In this study, researchers used 20 human cadaver specimens with 40 intact sinuses, as test subjects for three transcrestal surgical techniques. One experimental group used the DASK Sinus Lift and Elevation Kit, which features specially designed surgical drills to apply mechanical and hydraulic pressure. Another experimental group received a surgical protocol that permitted entry into the sinus through crestal bone that had been eliminated during site preparation. A control group was treated with the osteotome/crestal sinus membrane elevation, or OCSME, technique, also commonly referred to as the "Summers' technique," according to the authors.

Researchers then compared the perforation rates for each of the three techniques. Direct visual endoscopy, cone-beam computerized tomography and periapical radiographs were used.

According to the authors, the study "demonstrated that a sinus membrane perforation can occur at any time during the sinus lift procedure, independent of the surgical method used."

Full text of the article, "The Incidence of Maxillary Sinus Membrane Perforation During Endoscopically Assessed Crestal Sinus Floor Elevation: A Pilot Study," can be found in the *Journal of Oral Implantology*, Vol. 38, No. 4, 2012.

Dryz Gingival Hemostatic Retraction Paste

Dryz, a new retraction paste by Parkell Inc., stops gingival bleeding and seepage that may interfere with impression taking. The fast-acting paste is a light green color that contrasts nicely with gingiva, blood and tooth structure, making it easy to detect. Dryz is easily removed with an air/water syringe and leaves no residue to interfere with impressions or seating of restorations. Dryz is great for tissue management when seating restorations, placing rubber dams, bleaching teeth and restoring subgingival cavities. It creates a nice space between the gingival tissue and tooth surfaces while controlling any bleeding with its aluminum chloride. Visit parkell.com for details.

UPCOMING MEETINGS

2013	
Feb. 7–9	20th anniversary Conference and Exhibition, Academy of Laser Dentistry, Palm Springs, laserdentistry.org
April 7–13	U.S. Dental Tennis Association, TOPS'L Resort, Destin, Fla., 800-445-2524 or dentaltennis.org
April 11–13	*CDA Presents The Art and Science of Dentistry, Anaheim*, 800-CDA-SMILE (232-7645), cdapresents.com
Aug. 15–17	*CDA Presents The Art and Science of Dentistry*, San Francisco, 800-CDA-SMILE (232-7645), cdapresents.com
Oct. 31–Nov. 5	154th Annual Session, New Orleans, ada.org/session
Nov. 3–9	U.S. Dental Tennis Association, Big Island, Hawaii, 800-445-2524 or dentaltennis.org

To have an event included on this list of nonprofit association continuing education meetings, please email Courtney Grant at courtney.grant@cda.org.

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Anaheim California

Thursday–Saturday April 11–13 2013

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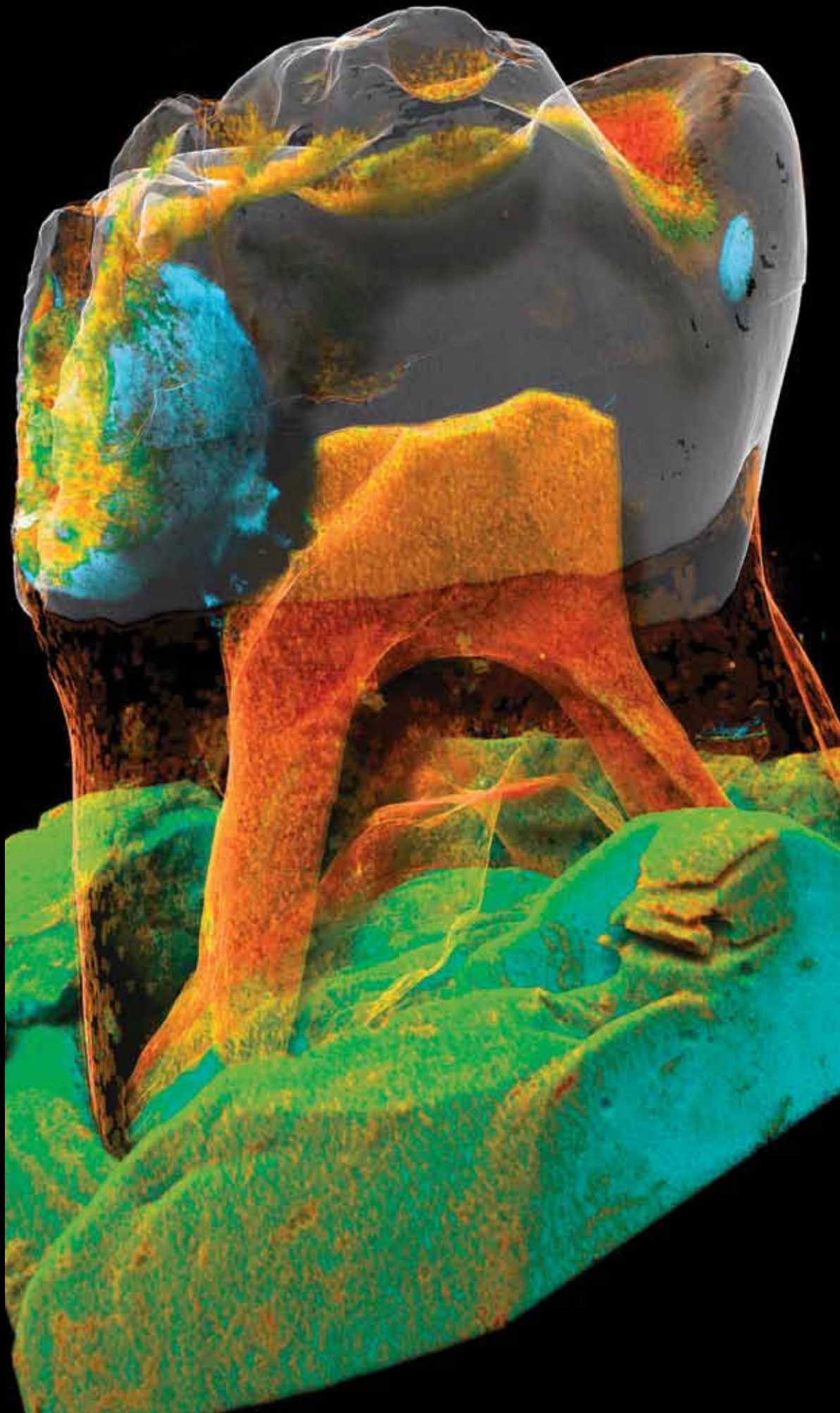

Registration Information

Register online today: **cdapresents.com**

Here is some information you will be asked for when registering:

- Name
- Address
- Phone number
- Registration type
- License number (if applicable)
- Emergency contact person
- Ticketed courses/events to purchase
- Password
- Email address (used for username and instant confirmation)

Leave your worries at home and choose to pick up your materials on site at eBadge Exchange! This option gives you the ability to make any necessary changes to your registration from your personal online dashboard at any time until March 13. Otherwise, register by February 13 to have materials mailed to you at least two weeks prior to the meeting. Remember, CDA dues must be current for 2013 to complete your registration as a member.

Please note: Registrations are not accepted over the phone.

On-site registration/bag and lanyard pickup

Anaheim Convention Center

Thursday	6:30 a.m. – 5:30 p.m.
Friday	6:30 a.m. – 5:30 p.m.
Saturday	6:30 a.m. – 4:30 p.m.

Bags and lanyards will also be available at the Hilton Anaheim Hotel

Thursday	7 a.m. – 3 p.m.
Friday	7 a.m. – 3 p.m.
Saturday	8 a.m. – noon

What is the cost for CDA dentists?

Zero. As a benefit of membership, the $890 registration fee is waived for CDA dentists.

Staff and guests

Dentists may register staff and guests, but not other dentists. All dentists, including nonmembers must register as dentists. Staff and guest fees can be found at **cdapresents.com**.

If you register an employee who is no longer attending, you can exchange the badge on site for a new one at no charge.

One-time $75 California nonmember rate*

Nonmembers can save $815 with the $75 one-time meeting registration fee.* If you were a CDA member in 2011 or 2012, you are not eligible for the one-time nonmember $75 registration fee for 2013. Materials cannot be mailed in advance, but can be picked up at a required 20-minute membership presentation held in the registration area. You will receive an email approximately one month prior to the show with presentation time options for your convenience. If you are not able to attend one of the membership presentations, your registration cost will be $890.

**Any nonmember who has taken advantage of this offer in the past is not eligible. The rate is for one-time promotional use only.*

Registration deadlines

Feb. 13, 2013: To have materials mailed prior to the show.

Feb. 14 – April 13, 2013: Online registration remains open and materials will be available at the eBadge Exchange booth at the Anaheim Convention Center.

CDA mails registration materials at least two weeks prior to the meeting. If you do not receive materials within this time frame, call CDA at 800.232.7645.

Cancellations and/or course changes can be made from your online registration dashboard or requested in writing until March 13, 2013. After this date, refunds will not be given. If badges and/or tickets have already been mailed, the appropriate materials must be returned with your refund request and postmarked by March 13 in order to be processed.

Mail refund requests to:
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1201 K Street, 16th Floor
Sacramento, CA 95814

Speakers who don't just inform, they inspire.

The opportunity to learn from the most successful names in dentistry is just one of the many highlights of *CDA Presents*. We search across the globe to bring you speakers who will help you excel in every aspect of dentistry.

Programs for Dentists





Frank T. Curry, DDS (moderator)
Stephen J. Chu, DMD, MSD, CDT
Kenneth A. Malament, DDS
Terry T. Tanaka, DDS
Dennis P. Tarnow, DDS
Decisions Panel
Friday afternoon lecture

Kenneth A. Malament, DDS
Dental Materials and Application
Saturday lecture

M. Nader Sharifi, DDS, MS
Prosthodontics/Removable
Thursday morning lecture
Thursday afternoon workshop
Friday morning lecture
Friday afternoon workshop

Dennis P. Tarnow, DDS
Implant Dentistry
Friday morning lecture,

DeWitt C. Wilkerson, DMD
Occlusion
Thursday lecture
Friday workshop

Corky Willhite, DDS, FAGD
Esthetic Dentistry
Thursday workshop
Friday lecture

David A. Garber, DMD
Crowns and Bridges
Saturday morning lecture

International Symposia

Kiyokazu Minami, DDS
Restorative Dentistry
Thursday lecture

Takashi Watanabe, DDS
Restorative Dentistry
Saturday lecture

Programs for Office Staff

Joseph A. Blaes, DDS
Dental Assistants Program
Friday lecture

Charles Blair, DDS
Finance
Saturday lecture

Lisa F. Harper-Mallonee, BSDH, MPH, RD, LD
Nutrition
Thursday lecture, Page 33
Friday lecture

Kelli S. Vrla, CSP, BBA, BA
Leadership and Staff Engagement
Thursday lecture
Friday lecture

Victoria L. Wallace, CDA, RDA, LDA
Dental Assistants Program
Thursday lecture
Friday workshop
Saturday workshop

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With more than a hundred new product launches and nearly 600 exhibitors filling the vibrant exhibit hall, *CDA Presents* is one of the most anticipated dental tradeshows in the U.S. It's the place to discover the latest innovations in dentistry.

Grand Opening

Thursday, April 11, 9:30 a.m.

Exhibit Hall Hours

Thursday, April 11, 9:30 a.m.–5:30 p.m.
Friday, April 12, 9:30 a.m.–5:30 p.m.
Saturday, April 13, 9:30 a.m.–4:30 p.m.

Family Hours

Daily: 9:30 a.m.–noon

This app makes the show a snap.

Search courses by day, topic or speaker and then link to the class location on the conference map.

Find exhibitors by name and product categories and locate them directly on the exhibit hall map.

Link straight to the C.E. website and avoid lines at the C.E. Pavilion.

Download course handouts, take notes and more.

Available for download approximately one month before the show at the App Store for iPhones or the Google Play Store for Android users. Visit **cdapresents.com** for updates.

The Spot Educational Theater Schedule

It's the spot for free Wi-Fi as well as a charging station. It's the spot for C.E. and the Smart Dentist Series of free one-hour lectures. And, it's a spot to relax and catch your breath after a hectic day on the exhibit hall floor. It's The Spot, where something's happening every day.

Thursday

10–11 a.m.	Office Policies and Procedures — Do You Have Them? (C.E.: 20% – 1.0) *Robyn Thomason*
11 a.m.–noon	Handling Refund Requests From Insurance Plans (C.E.: 20% – 1.0) *Patti Cheesebrough*
Noon–1 p.m.	Dealing With Patients Who Won't Pay Their Bill? (C.E.: 20% – 1.0) *Katie Fornelli*
1–2 p.m.	Dental Insurance Coding for Success: What Every Office Should Know About the NEW CDT Codes (C.E.: 20% – 1.0) *Gary L. Dougan, DDS, MPH*
2–3 p.m.	Characteristics of Ethical Dental Professionals (C.E.: 20% – 1.0) *Brooke Kozak*

Friday

10–11 a.m.	Dental Insurance Coding for Success: What Every Office Should Know About the NEW CDT Codes (C.E.: 20% – 1.0) *Gary L. Dougan, DDS, MPH*
11 a.m.–noon	Addressing Negative Online Reviews (C.E: non-eligible) *Carla Christensen*
Noon–1 p.m.	Managing Patient Conflicts (C.E.: 20% – 1.0) *Brooke Kozak*
1–2 p.m.	Preparing Your Office Emergency Kit (C.E.: Core – 1.0) *Steven I. Ganzberg, DMD*
4–5:30 p.m.	Wine Seminar (Ticket Required)

Saturday

10–11 a.m.	Office Policies and Procedures/Do You Have Them? (C.E.: 20% – 1.0) *Robyn Thomason*
11 a.m.–noon.	Handling Refund Requests From Insurance Plans (C.E.: 20% – 1.0) *Patti Cheesebrough*
Noon–1 p.m.	Patient Records — Access and Rules (C.E.: 20% – 1.0) *Teresa Pichay*

Reference On-Site Show Guide *for updated program information.*

Wine Seminar

Wine FUNdamentals

Join us for an interactive wine experience and learn while you taste! Do you prefer fruity and juicy wines or earthy and subtle? Wines with big tannins or tannins that are more velvety? Come join us as we taste through wines from both the Old World (more earthy) and the New (more fruity). Learn what your palate preference is by tasting wines from France, Italy, Spain, Australia, New Zealand and California!

Date/Time: Friday, April 12, 4–5:30 p.m.
Location: The Spot
Fee: $30
Event #: 046

$10 reserves your seat in these popular lectures

Have you ever shown up on time or even early to a popular lecture only to find that it was already full? To alleviate that frustration, the following courses have been selected to designate a portion of the capacity as reserved seating. This opportunity is optional and only available in advance for the following lectures at **cdapresents.com**. Beyond these reserved seating options, all lectures remain free on a first-come, first-served basis.

Details

- Seats will be held up to 15 minutes after the program begins, after which time seats will be released if the room is full.
- A separate entrance will be available for reserved seating ticket holders.
- Ticket must be presented and is nonrefundable if lost, stolen or forgotten.
- Reserved seating is grouped together in a designated section so we can provide better service.

Thursday, April 11

Lisa F. Harper-Mallonee, BSDH, MPH, RD, LD
Healthy Mouth, Healthy Body — Healthy Practice! (a.m.)
Event # 051

Lisa F. Harper-Mallonee, BSDH, MPH, RD, LD
Probiotics, Supplements and Food Fads: Considerations for the Dental Professional (p.m.)
Event # 052

DeWitt C. Wilkerson, DMD
The ABCs of Dental Occlusion and Occlusal Equilibration (full day)
Event # 053

Friday, April 12

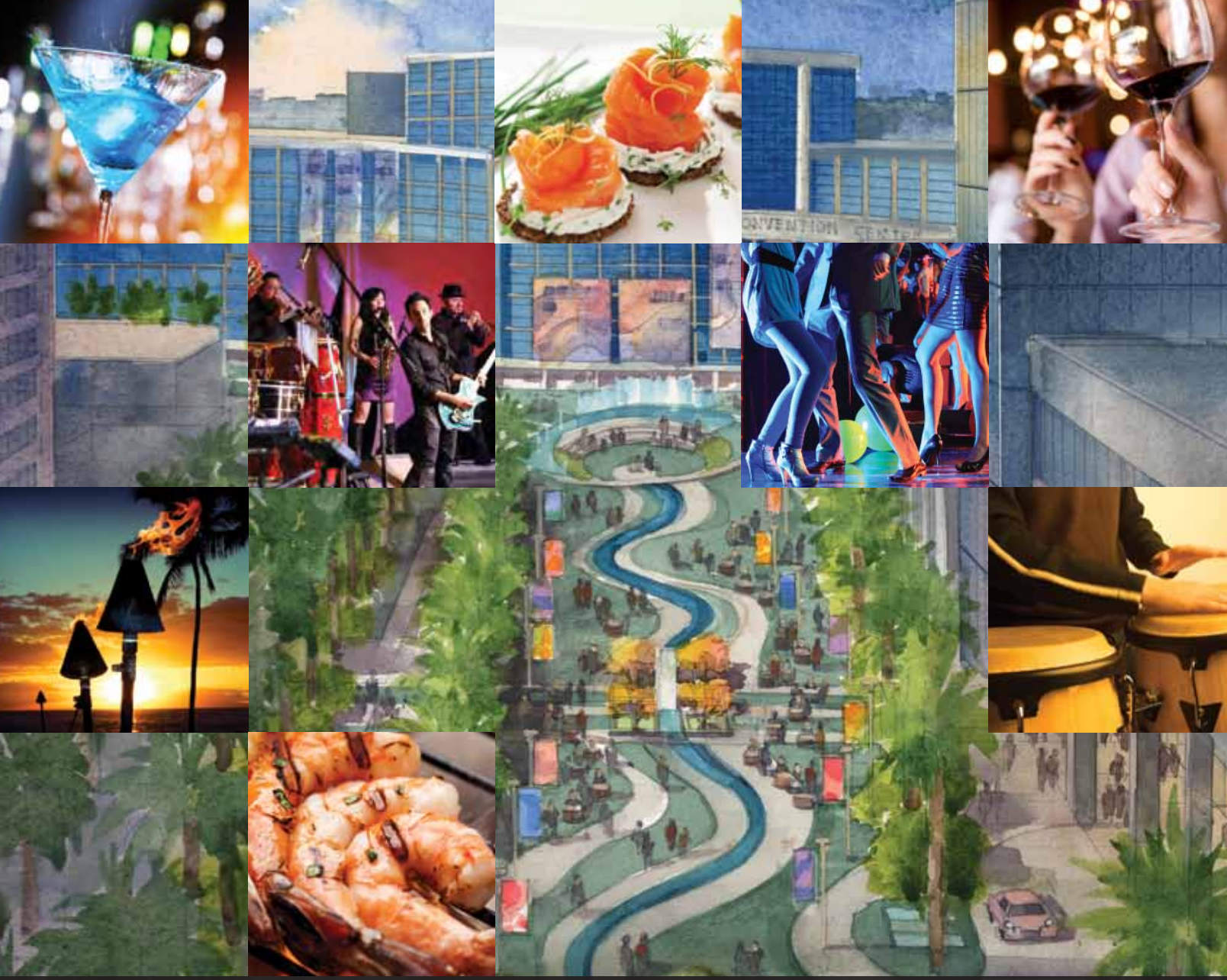
Dennis P. Tarnow, DDS
Immediate vs. Delayed Socket Placement: What We Know, What We Think We Know and What We Don't Know (a.m.)
Event # 054

Gregory L. Psaltis, DDS
Baby Steps — Infant and Preschool Dental Care for the General Practitioner (p.m.)
Event # 055

Saturday, April 13

Kenneth A. Malament, DDS
Integration of Esthetic Dentistry in Routine and Complex Prosthodontics
Event # 056 (a.m.)
or # 057 (p.m.) (Repeat lecture)

Raymond L. Bertolotti, DDS
Adhesion, Not Tooth Destruction (full day)
Event # 058



Party in the Plaza

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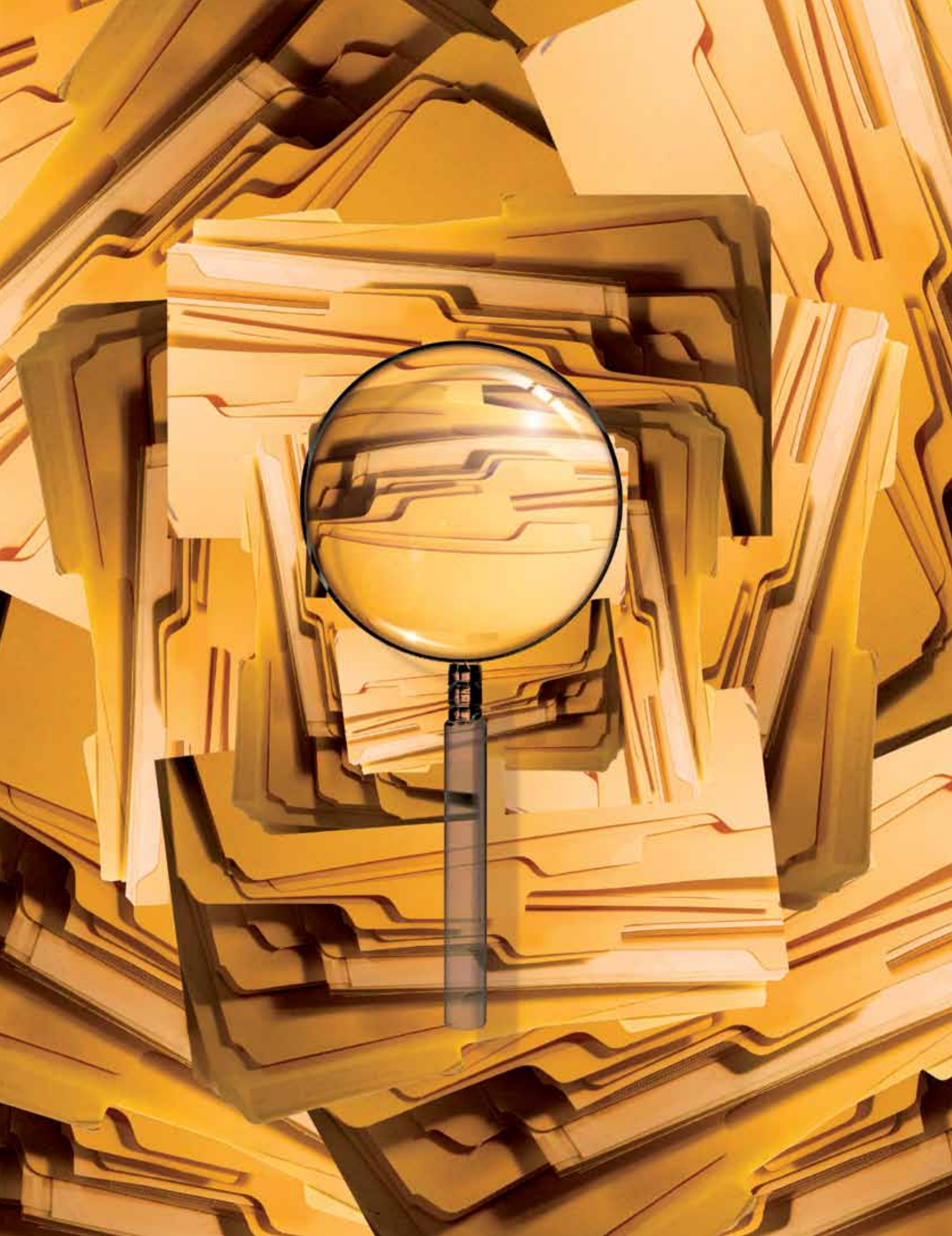

CDA JOURNAL, VOL 41, Nº1

Young Investigators and Translational Research

RICHARD T. KAO, DDS, PHD

GUEST EDITOR

Richard T. Kao, DDS, PHD, is an adjunct associate professor, Department of Periodontics, Arthur A. Dugoni School of Dentistry, San Francisco, and an associate clinical professor, Division of Periodontology, University of California, San Francisco, School of Dentistry.
Conflict of Interest Disclosure: None reported.

In the December 2012 *Journal of the California Dental Association*, we displayed the talents of our dental students and their ability to perform basic research on topics ranging from how to improve wound healing to mechanisms for tumor identification and metastasis. The work of these young investigators assures us that future basic dental research will continue to provide a better understanding of oral biology. These clues would be useless without a cadre of dental investigators who can incorporate this information into strategies that can permit us to take better care of our patients. This month, we feature new and young investigators who are interested in translational research. This is the research of turning clinical observations, basic research findings and technological innovations into clinical strategies for taking care of our patients.

This issue features the translational research efforts of the following new and young investigators:

- Stacey A. Lee is a highly motivated pre-dental student who worked in my periodontal practice. Having reviewed publications regarding gingival biotypes and listening to comments regarding variation in dental morphology, she assembled a research team of pre-dental students consisting of Alexis Kim and Louis Prusa Jr. to do a chart review study of patients in three dental practices. Through a chart review of Asian patients, she tested the clinical observations that Asian dental anatomy can be characterized as being short and with thin gingival biotypes. Their analysis of clinical data and radiographic record confirmed that Asians do have short root length and there is increased frequency of thin gingival biotypes. These findings have several clinical implications, as their paper will discuss. At the time of publication, Lee is a second-year dental student at the

University of California, San Francisco, School of Dentistry. Kim and Prusa Jr. are applying for dental school.

■ One of the difficulties with computer tomography is the scatter that occurs in the presence of metallic objects. This is true when evaluating the titanium implant-bone interface. This x-ray scattering is critically affected by metallic halation. In his student research, Jee Ha, DDS, under the mentorship of Ichiro Nishimur, DDS, DMSc, DMD, used a mathematical filtering model to remove the noise from the metallic halation. This can potentially improve the micro-computed tomography quality so that the bone-implant interface can be better assessed. Ha is a 2012 graduate of the University of California, Los Angeles, School of Dentistry.

■ In the last report, senior dental students, Brian Goodacre, Jason Mashni, and John Yankee, and their faculty supervisors at Loma Linda University School of Dentistry evaluated the use of angulation sensors to improve the accurate angulation of implant placement. With the sensors, novice dental implant operators were more accurate and reported an increase in confidence level in performance of implant placement. In this study, the angulation error while using the sensor was comparable, if not slightly superior, to the use of conventional surgical templates. Goodacre will be completing his dental studies and continuing his education at Loma Linda University's prosthodontic program. Mashni and Yankee will be returning to the Midwest to enter into private practice.

Dental research is thriving with our dental faculty members mentoring both pre-dental and dental students on the importance of dental research. By encouraging this spirit of curiosity and investigation, our profession will continue to advance as we implement new information and innovations. ■■■■

CDA JOURNAL, VOL 41, Nº1

Characterization of Dental Anatomy and Gingival Biotype in Asian Populations

STACEY A. LEE, BS; ALEXIS C. KIM, BS; LOUIS A. PRUSA JR; AND RICHARD T. KAO, DDS, PHD

ABSTRACT Gingival and dental characteristics are risk factors for periodontal problems. With short or fused roots, a decreased periodontium results in some attachment loss, compromising periodontal stability. Similarly, with an increased incidence of thin gingival biotype, inflammatory and traumatic insults may result in gingival recession. Anecdotally, Asian dentitions have been described as having short roots with "thin gingiva." This cross-sectional study will utilize clinical data and radiographic interpretation to ascertain whether this clinical impression is valid.

AUTHORS

Stacey A. Lee, BS, is a second-year dental student at the University of California, San Francisco, School of Dentistry.
Conflict of Interest Disclosure: None reported.

Alexis C. Kim, BS, is a predental student candidate at the University of California, Irvine.
Conflict of Interest Disclosure: None reported.

Louis A. Prusa Jr., is a predental student candidate at the University of the Pacific.
Conflict of Interest Disclosure: None reported.

Richard T. Kao, DDS, PHD, is a clinical professor at the University of California, San Francisco, School of Dentistry.
Conflict of Interest Disclosure: None reported.

ACKNOWLEDGMENTS

The authors wish to thank Drs. James Hayashi, David Foon, and Louis Prusa for providing access to patients' charts for review and data gathering. Without the help of these doctors and their staff, this project could not have been accomplished.

Clinically, it has been found that Asian persons are highly susceptible to periodontitis and gingivitis. Many reasons have been proposed to account for the high incidence of periodontal problems in this population, including oral hygiene practices, access to health care, plaque control and bacterial levels.[1] A study of children of Asian descent living in Sweden and their Swedish counterparts found that the Asian children had more plaque, bleeding on probing, and more bone loss, suggesting that plaque control may play a role in their disease experience.[2] Another study suggested that Asian patients have an increased risk for harboring oral pathogens such as *Actinobacillus actinomycetemcomitans* and *Porphyromonas gingivalis* in saliva and periodontal pockets.[3] The prevalence of periodontal diseases among Asian persons includes juvenile periodontitis. A comparison of the prevalence of this disease among different ethnic groups found a highly significant difference in prevalence, with an overall prevalence of 0.2 percent for the Asian group and 0.02 percent for the Caucasian group.[4] Although these studies focused on differences in the oral microflora, an alternative contributing factor may be the cultural predisposition for certain types of dental morphology and gingival biotype. A common clinical impression is that Asian persons tend to have short root morphology as well as susceptibility toward gingival recession.

Gingival characteristics of various ethnic populations such as Taiwanese and Indian patients have been documented.[5,6] The majority of Taiwanese patients studied by Chou et al. were found to have a narrow crown form in the maxillary

FIGURE 1. Panoramic image demonstrating the use of a 5-mm metal ball as a measuring device to obtain measurements for tooth and root length. This standardized metal ball was used to correct for magnification. Measurements were done utilizing a Boley gauge or the measuring tool built into the software.

anterior teeth with a thin gingival biotype. An assessment of gingival thickness at the interdental papilla and midbuccally in the maxillary and mandibular arches of Indian patients revealed that, overall, younger patients (16-24 years) had thicker gingiva than older patients did (25-38 years). In a survey of root lengths of all mandibular and maxillary teeth, researchers also found that Caucasian patients had significantly longer roots than Asian patients with an average difference of 1.2 mm.[7] In the maxillary dentition, the difference in root length between Asian and Caucasian patients was the largest at 2.5 mm for the distobuccal root of the first molar. In the mandibular dentition, the largest difference in length between the two ethnicities was 1.8 mm for the mesiobuccal root of the first molar. These variances can have a potential impact on periodontal disease susceptibility, disease progression and prognosis, and short root lengths can subsequently impact restorative treatment planning.

Gingival biotype is important to consider because it qualitatively describes the soft and bony tissue around a tooth. There are two major gingival biotypes: thick and thin. Thick gingiva is characterized by dense, fibrotic soft tissue with a large amount of attachment. Thin gingiva is characterized by delicate, friable soft tissue and a minimal amount of attachment.[8] A thick gingival biotype is generally viewed as the hallmark of periodontal health while a thin gingival biotype is susceptible to trauma and inflammation.[9] Information regarding the prevalence of thick or thin gingival biotypes in a variety of ethnic populations can be potentially beneficial for patient evaluation and risk assessment for periodontal breakdown.

In this study, the authors present a comprehensive survey of the tooth morphology and gingival biotypes of Asian patients, specifically those of Chinese, Korean, Vietnamese and Japanese descent, as possible features that may affect the management of periodontal destruction, as well as provide an anatomical reference during treatment planning.

Materials and Methods

The subject sample consisted of 49 patients of Chinese, Japanese, Korean and Vietnamese descent. All patients gave their consent for participation in the study. A survey was designed to assist three general dentists with collecting information on the patient's age, occlusion, gingival biotype around each tooth, and gingival width and recession around each tooth. In total, seven teeth — a maxillary first molar, a maxillary second premolar, a maxillary canine, a maxillary central incisor, a mandibular first molar, a mandibular canine, and a mandibular central incisor — were examined. If teeth were missing, the contralateral tooth was evaluated. Gingival biotype for each of these teeth was assessed clinically while dental morphology was evaluated based on panoramic radiographs.

Gingival biotype was determined according to De Rouck et al.[10] The gingiva was characterized as thin if the outline of a periodontal probe could be seen through the gingival margin while probing the gingival sulcus. Gingiva that did not fulfill this requirement was classified as thick gingiva.

For evaluation of the dental morphology in terms of root and tooth length, measurements were performed utilizing panoramic radiographs taken as part of each patient's routine dental examination. A 5-mm metal ball that did not interfere with radiographic analysis was placed in the patient's mouth around teeth Nos. 22 and 19 as an additional reference marker. The purpose of the 5-mm ball was to correct for radiographic distortion due to the position of the dental arch in the focal trough (**FIGURE 1**). The panoramic radiographs were analyzed and the tooth length from the crown to the root apex and the root length from the cementoenamel junction (CEJ) to the root apex were measured using a Boley gauge. Since it is known that the actual diameter of the metal ball is 5 mm, the measurements obtained from the radiographs were adjusted using a ratio of measured ball diameter to actual diameter. This ratio was then used to adjust the measurements of the teeth and roots.

Results

The study population consisted of 49 patients of Chinese, Japanese, Korean and Vietnamese descent. Twenty-nine female and 20 male patients were examined, with a mean age of 39 years. When compared to the data documented in Nelson and Ash, the means of both the total length of each tooth and the length of the roots were found to be shorter for the Asian patients who participated in this clinical survey[11] (**FIGURES 2 AND 3**). The mean tooth length for the patients in the authors' study was 19.6 mm, with a mean root length of 12.6 mm. The average difference in total tooth lengths was 3.8 mm between

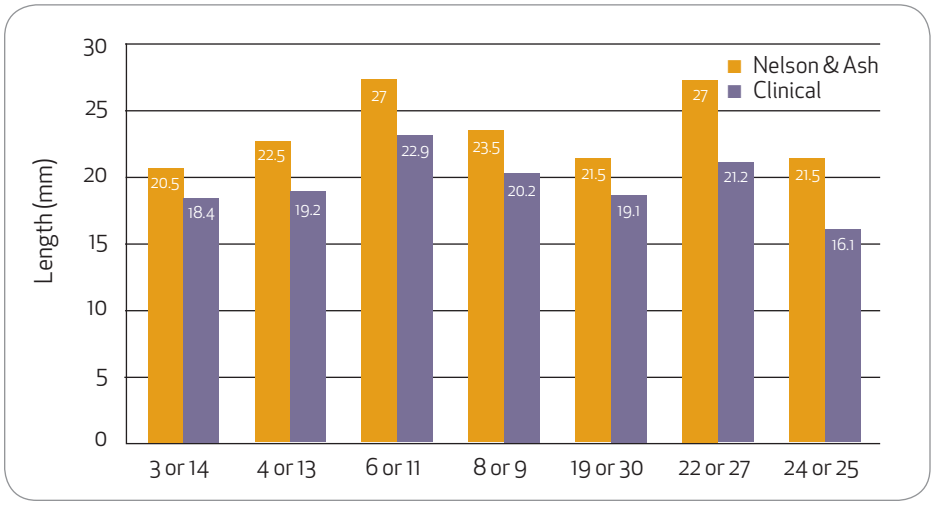

FIGURE 2. Mean total lengths of each tooth as documented by Nelson and Ash[11] compared to mean clinical values collected. Teeth were measured from cusp tips to root apices.

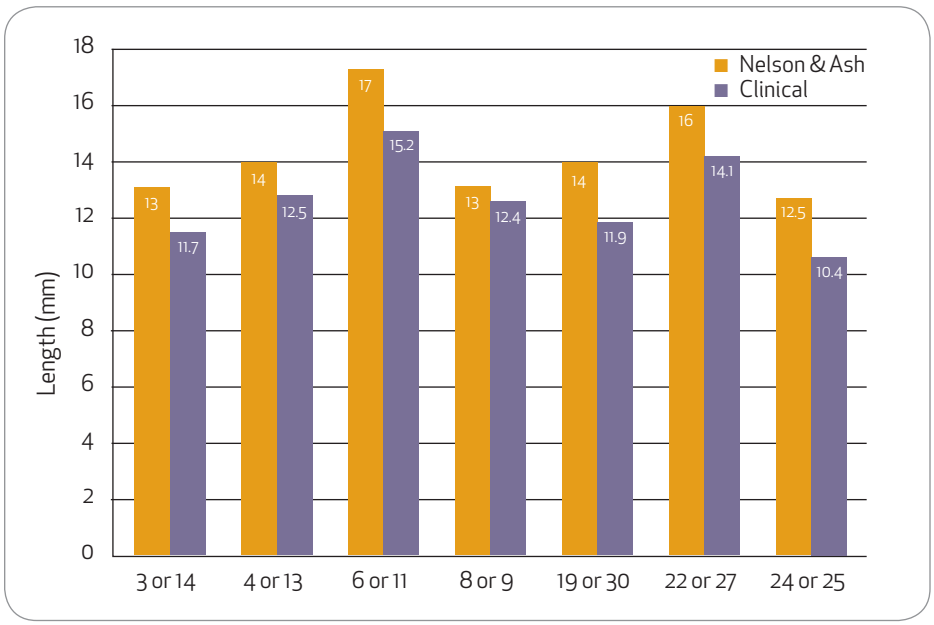

FIGURE 3. Mean root lengths documented by Nelson and Ash[11] compared to mean clinical values. Lengths are measured from the CEJ to the root apex.

the patients in the authors' study and those documented by Nelson and Ash; the average difference in length for the root lengths was about 1.6 mm (**TABLE 1**). The crown-root ratios for the Asian population and those documented by Nelson and Ash were similar (data not shown).[11] There was no significant pattern deviation between the various ethnic Asian groups (i.e., Chinese versus Japanese, etc.).

Measurements of the root trunks from the CEJ to the furcation of each molar with furcation involvement revealed a mean length of 4.51 mm for the maxillary first molars and 3.75 mm for the mandibular first molars.

Examination of the clinical characteristics of gingival morphology of the Asian patients found high positive frequencies of thin biotype and moderate recession. The frequency of thin gingiva biotype was the highest for the second premolars (52 percent), maxillary (60 percent) and mandibular canines (65 percent), and maxillary (60 percent) and mandibular central incisors (69 percent); far less was observed for the maxillary first molars (31 percent) and mandibular first molars (31 percent) (**TABLE 2**).

Mean recession was greatest around the maxillary first molars (0.82 mm). The maxillary second premolars and mandibular first molars both had 0.63 mm of recession and the canines of both arches and the mandibular central incisors had approximately 0.3 mm of recession (**TABLE 2**). The least amount of recession exhibited was 0.10 mm around the maxillary central incisors.

The mean gingival width was greatest for the maxillary central incisors at 4.83 mm and the lowest mean gingival width was at the mandibular canines. (**TABLE 2**).

Discussion

Though there is considerable variation in the dental anatomy between patients, there is ethnic consistency. In this study, a survey of the gingival and tooth morphology of patients of Chinese, Japanese, Korean and Vietnamese origin was compared with those reported by Nelson and Ash.[11] Asian patients exhibited shorter teeth and root form overall. Additionally, Asian patients exhibited high frequencies of thin gingival biotype. These ethnic characteristics have implications regarding susceptibility to periodontal problems, disease prognosis and early disease recognition and management.

The dimensions of each tooth examined in this study were measured using radiographs of a metal ball indicator positioned in both the right canine and left molar regions. The purpose of this

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TABLE 1

Tooth Length and Root Length as Measured from Panoramic Radiographs of 49 Asian Patients [Mean (SD)]

Tooth #	Tooth Length mm (sd)	Root Length mm (sd)
3 or 14	18.4 (1.99)	11.7 (1.91)
4 or 13	19.2 (2.26)	12.5 (1.89)
6 or 11	22.9 (2.99)	15.2 (2.44)
8 or 9	20.2 (2.63)	12.4 (1.87)
19 or 30	19.1 (2.54)	11.9 (1.98)
22 or 27	21.2 (3.03)	14.1 (2.66)
24 or 25	16.1 (2.03)	10.4 (1.67)

TABLE 2

Clinical Characteristics of Gingival Morphology in 49 Asian Patients [Mean (SD)]

Tooth #	Mean Gingival Width mm (sd)	Mean Recession mm (sd)	Frequency Positive for Thin Gingival Biotype
3 or 14	3.96 (1.29)	0.82 (1.16)	31 %
4 or 13	4.07 (1.44)	0.63 (0.91)	52 %
6 or 11	4.06 (1.59)	0.45 (0.87)	60 %
8 or 9	4.83 (1.31)	0.10 (0.37)	60 %
19 or 30	3.54 (0.85)	0.63 (0.91)	31 %
22 or 27	3.21 (1.11)	0.31 (0.75)	65 %
24 or 25	3.34 (1.28)	0.34 (0.72)	69 %

metal marker was to reduce the effect of radiographic distortion on the results of the study. However, the accuracy of measurement is also affected by magnification. Yassaei et al.[12] conducted a study on the radiographic magnification of teeth in the premolar region using a similar method with a metal ball and found that the overall vertical magnification of teeth in the premolar region was about 27 percent. Additionally, it was found that there is no statistically significant difference between the magnification of the left and right jaws. The physical shape of the marker used also has an effect on the amount of magnification and distortion exhibited in the radiograph. Schulze et al.[13] found that when an object is more spherical, like the metal ball used in this study, more accurate measurements with less distortion were obtained. Although the present study provides measurements of the tooth and root lengths of Asian patients using panoramic radiography, clinicians should be aware that these measurements are only estimates of the actual lengths and clinical measurements may be different from those presented in this study.

The mean tooth length exhibited in the Asian patients who participated in this clinical survey was 19.6 mm. Measurements conducted on extracted teeth from Caucasian males aged 17-21 years revealed a mean tooth length of 23.1 mm.[14] Nelson and Ash standardized values calculated by G.V. Black and found the average tooth length to be 23.4 mm, about the same as that calculated by Bjorndal et al.[15] The authors' study found the average tooth length of Asian patients to be 19.5 mm or about 16 percent shorter than those measured by the studies above. It should be noted that neither Black nor Nelson and Ash mentioned the demographics of the sample, making studies specific to certain ethnic groups more necessary and helpful to determine root canal success or failure. Root lengths in Asians were similarly shorter. The implication of this is that with periodontal disease, a small amount of attachment loss, which represents the percentage of loss of periodontal support, is magnified. A clinician's standard accepted levels of attachment loss for various stages of periodontal disease may need to be adjusted for the shorter root length of Asian patients.

Root trunk dimensions are important for the diagnosis, prognosis and treatment of periodontal diseases. Generally, furcation areas are favorable environments for plaque and bacteria retention. If the root trunk is short, furcal involvement occurs earlier, leading to earlier onset of periodontal destruction.[16] In this study, the authors found the average root trunk dimension of the maxillary first molars to be 4.51 mm and for the mandibular first molars to be 3.75 mm. These findings are similar to those measured by Kerns et al. on randomly selected extracted molars.[17] According to the categories suggested by Kerns et al., the root trunk dimensions obtained in the present study are in the medium-length root trunk category (3.00-5.24 mm). Since the root trunk dimensions reported in the present study were measured from radiographs, it could

not definitively be concluded whether or not cervical enamel projections were present. However, Hou et al. examined extracted molars from Asian patients and concluded that 63.2 percent had cervical enamel projections with the majority in mandibular first molars.[18] This conclusion is clinically relevant because the lack of periodontium on these enamel surfaces permits furcal accumulation of bacteria and plaque and increased risk for furcation breakdown. Whereas the root trunk is average, the presence of enamel projection may present a greater risk for periodontal breakdown in the furcation areas.

Gingival characteristics have been explored extensively in Caucasian patients. Muller et al. measured the gingival thickness of the premolars, canines and incisors of the mandibular and maxillary arches in young Caucasian males with an ultrasonic device and found that 88 percent had thick gingiva and 12 percent had thin gingiva.[19] Furthermore, De Rouck et al corroborated the low incidence of thin gingiva at the central incisors by determining gingival thickness using a periodontal probe and concluded that 28 percent of the Belgian participants exhibited thin gingiva.[10] This is in contrast to the results of the present study which found a high incidence (>60 percent) of thin gingival biotype in the anterior teeth of Asian patients. In addition, the previously mentioned papers did not conduct a full survey of gingival biotype of each type of tooth in the dentition. The present paper demonstrates there are certain regional areas with higher prevalence for thin gingival biotype than the conventionally analyzed maxillary central incisors. In this study, the authors demonstrated that other areas of the dentition may exhibit a higher frequency for thin gingival biotype than the maxillary central incisors.

Due to the increased prevalence of thin gingival biotypes in Asian patients,

there are several periodontal, restorative and dental implant implications. Areas of thin gingival biotypes will respond to inflammatory or traumatic insult by exhibiting localized gingival recession. As such, the Asian population may have a high incidence of dentinal hypersensitivity and a greater need for gingival augmentation. This group warrants extra restorative attention in areas of thin gingival biotype. Gingival retraction, positioning of the restorative margins and plaque retentiveness of the dental restoration may result in gingival recession.

With exodontia, there is a tendency for greater remodeling associated with the alveolar housing and there may be an increased need for ridge preservation to minimize ridge resorption. Additionally, since the remodeling is unpredictable, this poses a risk and a contraindication for doing immediate implant placement.[20] Lastly, this thin gingival biotype is the most difficult area in which to monitor periodontal health. The tendency is to monitor pocket depth. However, in the thin biotype, attachment loss progresses with increased gingival recession, but rarely with increased pocket depth so these teeth are potential risks for "watchful negligence."

In summary, a survey of the gingival and tooth morphology of Asian patients has been presented. Overall, these patients have a high prevalence of thin gingival biotype in the anterior region, more recession in the posterior region than in the anterior, and shorter teeth than previously documented for other ethnic groups. As a whole, these factors are important for the practitioner to consider in the periodontal management, monitoring and treatment of Asian patients since the combination of short root morphology and thin gingival biotypes can place these patients at risk for periodontal breakdown and increased complications associated with restorative and implant procedures. ■■■■

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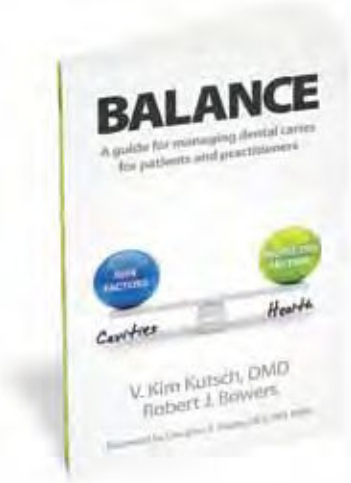

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Mathematical Filtering Minimizes Metallic Halation of Titanium Implants in MicroCT Images

JEE HA, DDS; STANLEY J. OSHER, PHD; AND ICHIRO NISHIMURA, DDS, DMSC, DMD

ABSTRACT Microcomputed tomography (MicroCT) images containing titanium implant suffer from x-rays scattering artifact and the implant surface is critically affected by metallic halation. To improve the metallic halation artifact, a nonlinear Total Variation denoising algorithm such as Split Bregman algorithm was applied to the digital data set of MicroCT images. This study demonstrated that the use of a mathematical filter could successfully reduce metallic halation, facilitating the osseointegration evaluation at the bone implant interface in the reconstructed images.

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Microcomputed tomography (MicroCT) can be used as a noninvasive solution to evaluate the bone-implant surface of explanted biopsy samples as well as experimental specimens.[1,2] Three-dimensional image reconstruction should provide the comprehensive observation on the bone to implant contact accurately assessing the degree of osseointegration. However, MicroCT images containing titanium implant inherently suffer from the X-rays scattering, and, in particular, the implant surface is critically affected by metallic halation[3,4] (**FIGURE 1**). Although significant efforts have been directed to reduce metal artifact and have shown improvements in CT images, the problem arising in the direct vicinity of the metallic object still presents significant challenges.[5] Therefore, the use of CT for trabecular bone imaging around metallic implants is not considered feasible and should be restricted to track tendencies in follow-up studies.[6]

Mathematical filtering has been used for quite sometime to remove random noise from various forms of digital images. For example, nonlinear total variation based noise removal algorithms have proven useful in many applications for edge preserving denoising.[7,8] Considering the metallic halation from the surface of the implant to be an unwanted random noise, the authors have postulated that the application of a mathematical filter may improve the images generated with MicroCT. In this application, it was thought important to preserve the edge, i.e., the

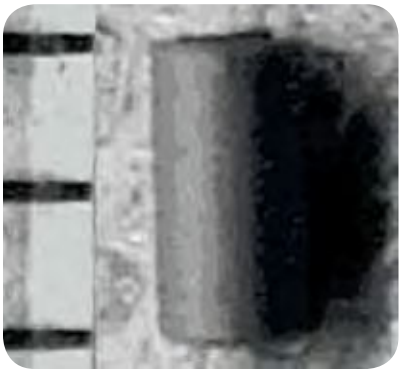

FIGURE 1A. Experimental titanium implant, 2 mm in length and 1 mm in diameter.

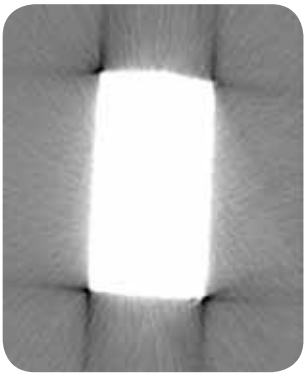

FIGURE 1B. One of 200 MicroCT slices depicting the metallic halation artifact.

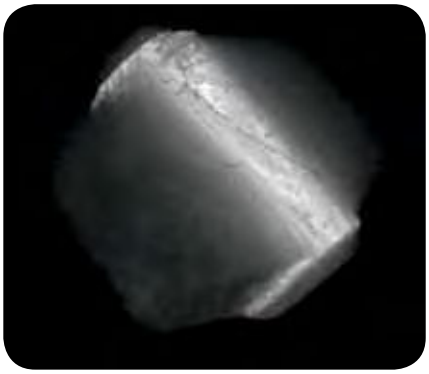

FIGURE 1C. The 3-D reconstructed MicroCT image with significant metallic artifact.

implant surface, while eliminating the noise, i.e., metallic halation). Here the authors show the application of the mathematical filter constructed from the Split Bregman algorithm resulted in a fast and reasonably accurate solution for reducing the metallic halation derived from titanium implant.[9]

Materials and Methods

Experimental Implant

A cylinder-shaped titanium implant 2 mm in length and 1 mm in diameter was used (**FIGURE 1A**). The surface of the experimental implant was dual-acid etched followed by discrete apposition of hydroxyapatite nanoparticles (NanoTite, Biomet3i, Palm Beach Gardens, Fla.). The experimental implant was partially embedded in plaster to mimic a clinical case when the implant was placed in bone. The radiodensity of plaster has been shown similar to that of bone.

MicroCT

The bare experimental implant and the plaster-embedded implant were separately subjected to MicroCT scanning (μCT40, Scanco Medical AG, Wayne, Pa.). With the isotropic resolution of 9 μm, 200 MicroCT slices were imaged at an X-ray energy level of 70 kVp with a current of 114 μA. The integration time was 300 ms, the stepping rotational angle was 0.18 degrees. The 3-D image reconstruction was generated using the provided computational program.

Mathematical Filter

Each 2-D image slice was individually put through the mathematical filter. The mathematical filter was based on the nonlinear total variation noise removing method, which was implemented with the Split Bregman algorithm. For a nonlinear Total Variation denoising algorithm, the authors want to solve the equation:

TV Denoising:

$$\min_u ||u||_{BV} + \frac{\mu}{2}||u-f||_2^2$$

Where "u" is the denoised image and "f" is the noisy image, "μ" is a positive parameter. The choice of the parameter μ affects how much the image is regularized, balancing between removing the noise and preserving the signal content. Parameter tuning can be used to optimize the denoising result. To solve this equation a Split Bregman approach is used. Split Bregman is a flexible algorithm for solving nondifferentiable convex minimization problems. The Split Bregman idea is to apply operator splitting and then use Bregman iteration to solve the resulting constrained minimization problem:

While $||u^k - u^{k-1}||_2 > tol$

  for n = 1 to N

    $u^{k+1} = \min_u H(u) + \frac{\lambda}{2}||d^k - \Phi(u) - b^k||_2^2$

    $d^{k+1} = \min_d |d| + \frac{\lambda}{2}||d - \Phi(u^{k+1}) - b^k||_2^2$

  end

  $b^{k+1} = b^k + (\Phi(u^{k+1}) - d^{k+1})$

end

The first line is the algorithm stops when the sum of squared errors from this iteration and the previous iteration is less than tol, which is a parameter that is decided in order to stop the algorithm when the result is close enough to the optimized result. The function "d" is introduced to split the steps to subproblem d and u, d is the gradient of u. Subproblem u is solved while fixing u and subproblem d is solved while fixing u. Parameter λ is chosen so that both d and u subproblems converge quickly. Auxiliary variable "b" is initialized to zero and updated after each Bregman iteration.

The mathematical filter was applied using a numerical computing environment (Matlab, MathWorks Inc., Natick, Mass.). The filtered images were evaluated for clarity and contrast.

The optimal images were then combined to construct 3-D images using an available program (Fiji, a distribution package of ImageJ, NIH, Bethesda, Md.).

Results

Unprocessed MicroCT images showed radio-opaque lines projected from the implant body (**FIGURE 1B**). The radiodensity of these projected lines appeared to be less than the implant itself. After 3-D reconstruction, the metallic halation artifact was shown covering the implant surface, making the actual implant shape unrecognizable (**FIGURE 1C**).

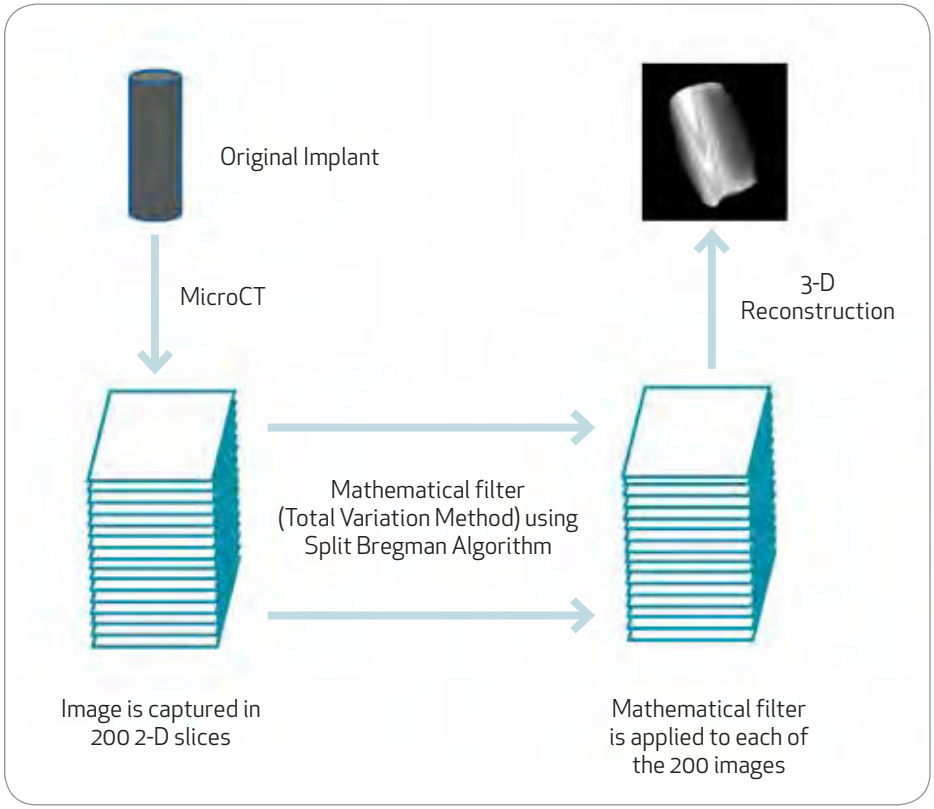

FIGURE 2. Flowchart of the experiment. The original implant was scanned with MicroCT. The resulting 200 2-D images were individually processed with the mathematical filter that was constructed with Total Variation method using the Split Bregman algorithm. The processed images were put together and reconstructed into a 3-D image. The metallic halation was largely removed and the implant surface became exposed.

After the 2-D MicroCT images were subjected to the mathematical filter, the 3-D implant image was reconstructed (FIGURE 2). The metallic halation artifact was significantly reduced, although it was not completely removed. As a result, the implant surface was exposed. In a separate experiment, the MicroCT image of the same implant was manipulated by a simple thresholding, which gave rise to the complete removal of the metallic artifact (data not shown). However, the threshold used was within the bone radiodensity and thus, this simple thresholding method could eliminate the surrounding bone structure. The major challenge was to selectively eliminate the metallic halation artifact while maintaining the bone structure.

To test if the mathematic filter could perform this task, the implant was embedded in plaster (FIGURE 3A). The unfiltered MicroCT image in 2-D (FIGURE 3B) and 3-D (FIGURE 3C) showed the metallic halation artifact projected from the implant body. The radiodensity of the metallic artifact was not indistinguishable with that of plaster. Thus, the plaster structure was also significantly affected. It was difficult to distinguish plaster and metal halation. After the mathematic filter adjustment, the metallic artifact was significantly reduced while the plaster structure remained visible (FIGURES 3D AND 3E). In fact, the reduction of metallic artifact resulted in the clear distinction of implant and plaster.

The detailed evaluation at the interface between the implant and plaster (FIGURE 4A) demonstrated that the selective reduction of metallic artifact (FIGURE 4B), which was indistinguishable with plaster structure prior to the mathematic filter application (FIGURE 4C).

Discussion

Osseointegrated implants are widely used today. In 1981, Albrektsson et al. defined six different parameters that needed to be controlled for proper implant osseointegration: biocompatibility, design and surface conditions of the implant, the state of the host bed, the surgical technique, the undisturbed healing phase and the loading conditions.[10] In order to accurately evaluate osseointegration, it is essential to obtain the evidence of new bone formation on the surface of the implant.[11] Conventionally, histological slides of bone samples containing implant are prepared for the evaluation of osseointegration. However, several critical drawbacks have been identified. This method is inherently invasive and the sample has to be cut and destroyed. Second, the results depend heavily on the position and orientation of the histological section. Third, the nondecalcified and resin-embedded histological preparation process appeared to suffer from artifacts at the critical bone and implant interface.

Introduction of high-resolution 3-D bone evaluation by MicroCT was initially thought to solve the shortcomings of histological assessment for osseointegration. However, the metallic halation associated with titanium implant significantly limits the application particularly at the bone and implant interface. In the current study, the authors constructed a mathematical filter in order to remove the metal halation using total variation algorithm. The total variation minimization

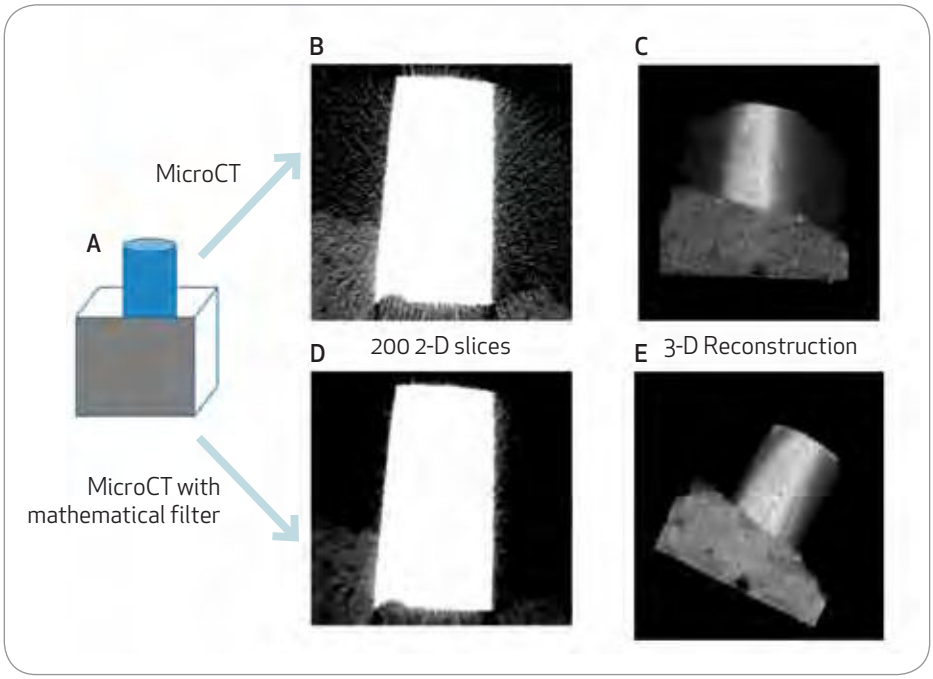

FIGURE 3. 3A Diagram of the experimental implant embedded partially in plaster. **3B** A scanned image of the implant and plaster with MicroCT. The metal halation was shown from the implant surface and overlapped on the plaster. **3C**. The 3-D reconstruction without applying the mathematical filter. **3D.** A 2-D image of MicroCT that was denoised by the mathematical filter. **3E.** The 3-D reconstruction after applying the mathematical filter. The implant surface and the surrounding plaster were much more distinguishable compared to the image C.

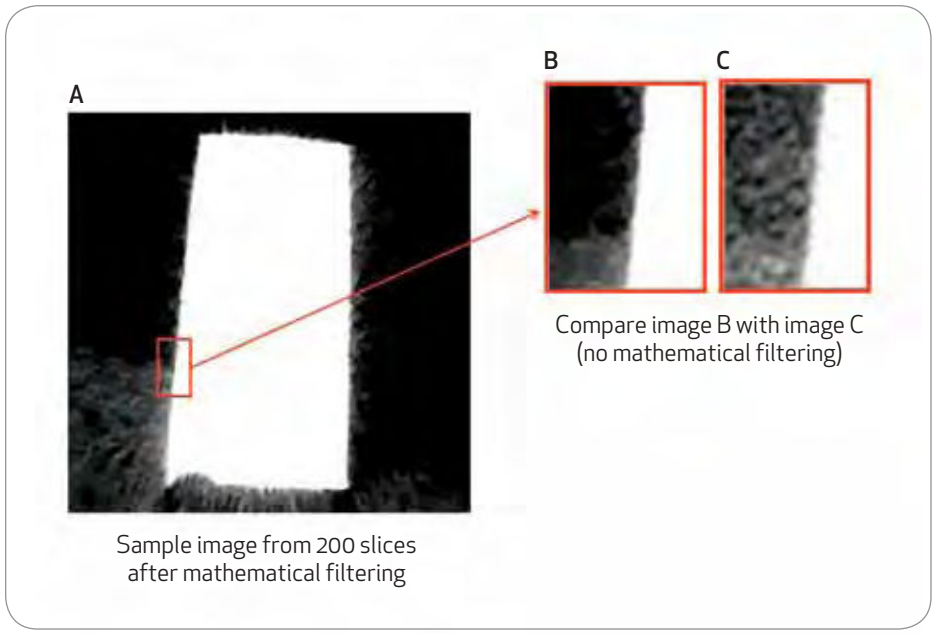

FIGURE 4. 4A. A MicroCT image of the implant partially embedded after applying the mathematical filter. **4B**. A close-up near the interface surface of the implant and plaster. The image quality was enhanced by decreased metallic halation artifact while preserving the true signal of the plaster structure. **4C**. Without the mathematic filter, the metallic halation artifact significantly overlapped the plaster structure.

algorithm is a well-established and relatively simple computational method to estimate a true signal in noise.[7] This was introduced to image processing by Rudin, Osher and Fatemi in 1992; however, it was thought to be slow for a practical implementation.[8] The Split Bregman algorithm was developed as an efficient and fast solution to tackle the 2-D image noise reduction. This method constrains and splits the parameters and solves the problem separately. Then it combines the parameters to get the unconstrained solution.[8] The current study demonstrated that the Split Bregman algorism significantly improved the metallic halation artifact from MicroCT images (**FIGURES 2 AND 3**). Most importantly, the plaster structure mimicking bone was not only untouched but also clarified by removing the overlapping metallic artifact (**FIGURES 3 AND 4**).

Future work should involve real clinical samples and evaluate the bone-to-implant contact with this mathematical filter. The authors are fully aware that the current study is a preliminary evaluation and additional improvements must be made. The authors envision devising new mathematical filters that are capable of direct estimation of true signals in the 3-D image without the step of 2-D image manipulation and 3-D image reconstruction. The outcome of these studies should improve the diagnostic capability of MicroCT as well as clinically relevant dental CT scanning. ■■■■

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Timothy G. Giroux
DDS/Broker

ASK THE BROKER

I just bought a practice and don't want to pay for the phone book advertisement as it states in the sales contract. Why should I?

This comment comes up about once every year or two and inevitably a new buyer feels very strongly about the subject. Upon reviewing all the issues and looking at the "big picture", I hope that buyers understand why all transition specialists handle it this way and why it absolutely needs to remain this way.

Every dental transition attorney agrees buyer assumes the advertising contracts in place at close of sale. In fact buyer's attorneys usually use language in the contract which states the seller did not change any normal business operations prior to the sale. A change in marketing efforts would be considered a material change in the practice.

The financial strength of the practice is properly presented by the tax returns and financial statements that show what the expenditures are for the promotions currently in place. The practice is presented with a history of revenue and expenses that discloses the expenses associated with any marketing expenses. An assumption is made that the buyer understands the financials prior to close.

Every dentist could argue which form of marketing is best between yellow pages, newspaper ads, Google exposure, postcards, Demand force software etc, as the list goes on and on. Some buyers feel that one or all of the above marketing techniques is a waste of money. If we were to try to accommodate all buyers that didn't want to pay for extended contracts, we would have to advise sellers to cancel their phone book ads (they are already in print) or any other longer term contracts prior to the sale. If a buyer bought that practice and experienced a drop in production for ANY reason, they could legally blame the seller for the material change and reduced patient flow due to the cancellation of the marketing efforts. Obviously the seller believes they are getting a return on their investment and these contracts typically run out within a few months of the sale. Usually all buyers use the seller's name after the purchase for up to one year.

Bottom line: The seller believes there is a benefit to the marketing. The cost is disclosed in the financial statements. The continued benefit is to the buyer. It is totally impractical to have sellers make a material change in marketing prior to a sale.

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CDA JOURNAL, VOL 41, Nº1

The Effect of Angulation Sensors on Implant Placement

BRIAN GOODACRE, BS; JASON MASHNI, BS; JOHN YANKEE, BS;
CHARLES GOODACRE, DDS, MSD; JAIME LOZADA, DDS; AND JOHN WON, DDS

ABSTRACT It is hypothesized that use of an angulation sensor could increase the alignment accuracy of multiple implant osteotomies without requiring the use of guided-surgical templates. Therefore, the purpose of this study was to determine if use of such a sensor mounted on a surgical handpiece could improve implant placement.

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Conflict of Interest Disclosure: None reported.

Accurate angulation is important in many aspects of dentistry and crucial for the biomechanical and esthetic success of dental implants. Optimal implant alignment is particularly important for proper functioning when occlusal forces are applied.[1] Additionally, implant angulation with overdentures plays a key role in prosthesis retention.[2] Even the accuracy of impressions can be adversely affected when improperly aligned implants are present.[3]

Difficulty in aligning implants can be caused by anatomical and/or esthetic factors that lead to nonoptimal placement and compromised outcomes.[4] Computer systems have been used to produce surgical templates that guide implant placement so as to avoid vital structures, enhance esthetic positioning, direct placement into areas of limited bone, and permit the use of a flapless technique.[5,6,7] These systems have been shown to improve the accuracy of implant placement and most use computed tomography (CT) images during both the preoperative planning and surgery.[6,8,9] However, the templates used to guide the surgical placement require substantial planning and training and add to the cost of care.

It is hypothesized that use of an angulation sensor could increase the alignment accuracy of multiple implant osteotomies without requiring the use of guided-surgical templates. Therefore, the purpose of this study was to determine if use of such a sensor mounted on a surgical handpiece could improve implant placement.

Material and Methods

Twenty third-year dental students and five experienced clinicians volunteered for this study. Experienced clinicians were those who had placed more than 100 implants. Participants were numbered

FIGURE 1. Sawdust mandible mounted in manikin with sensor in use.

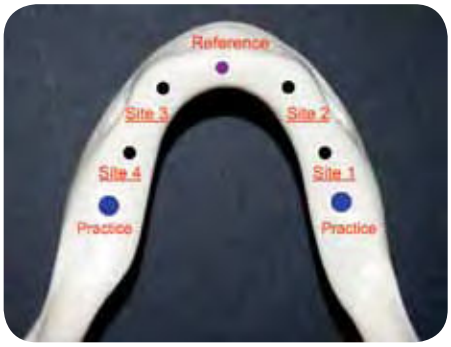

FIGURE 2. Location of reference and osteotomy sites.

FIGURE 3. Sensor mounted on surgical handpiece.

using a random numbering system. Students' Perceptual Ability Test (PAT) scores on the Dental Admissions Test were obtained from administration to determine if correlations might exist between scores and the results of this study.

Fifty mandibles (Paradigm Dental Models, San Diego, Calif.) were mounted in dental simulators (A-dec, Newberg, Ore.) (**FIGURE 1**). Seven marks were drawn on the mandibles: one for placement of a central reference pin, two on each side as locations for osteotomy placement, and one on each side for practice (**FIGURE 2**). To provide a standard reference osteotomy, the central osteotomy was drilled using a jig.

Each participant watched an instructional video showing the procedural steps and then filled out a survey assessing his/her confidence before the procedure. After performing the osteotomies, participants were again surveyed regarding their postperformance confidence with and without use of the sensor and their opinion about the ease of sensor use.

For the study, each participant was evaluated on the placement of four osteotomies without using a sensor-guided handpiece by using visual alignment with a reference pin placed in the central osteotomy. They next placed four osteotomies using a sensor-guided handpiece (**FIGURE 3**). For the sensor-guided osteotomy placement, no central reference pin was used and the reference osteotomy was left open.

Each operator placed six osteotomies using a 2 mm twist drill. The first two osteotomies were drilled for practice to become accustomed to the simulated mandible and the surgical handpiece. Participants then drilled the remaining four osteotomies in a predetermined order: site 3, site 2, site 1, and site 4. The goal was to drill the four study osteotomies parallel to the central reference pin.

With the sensor, the participants placed the 2 mm twist drill in the reference osteotomy and set the sensor. After the sensor was set, the participants moved the drill to the osteotomy sites. Once the sensor was set, any time the handpiece was returned to that set orientation, a light-emitting diode (LED) light and an audible sound alerted the user that the handpiece was aligned with the previously set angulation. Therefore, as long as the light was on and the sound present, the drill was aligned with the reference osteotomy. The procedures were performed with the manikin in a semisupine position; similar to the way a patient would be positioned in a dental chair.

To measure alignment accuracy, carbon fiber guide pins were placed into each osteotomy and the mandibles scanned using an iCAT Cone Beam Computed Tomography machine (Imaging Science International, Hatfield, Pa.). Files were exported and loaded into NobelClinician Software (Nobel Biocare, Zurich, Switzerland) for angulation analysis. The angle variation was analyzed using screen shots uploaded into Google SketchUp (Google, Mountain View, Calif.) and the results verified by placing virtual implants using NobelClinician Software to record the difference between the angulation of the reference osteotomy and each of the other osteotomies (**FIGURE 4**). The data was analyzed using a Related Samples Wilcoxon Signed Rank test with the significance level being 0.05.

Results

Without the sensor, five students drilled at least one osteotomy that varied from the guide pin by more than 10 degrees with a maximum deviation from the guide pin of 13.5 degrees. With the sensor, only one student produced an osteotomy that varied from the guide pin by more than 10 degrees. The average error with the sensor was 4.1 degrees compared to 5.2 degrees without the sensor. Most students, 62.5 percent, showed improved accuracy when using the sensor-guided handpiece. Experienced clinicians did not show a significant difference in angulation with or without the use of the sensor; 4.3 degrees average error with the sensor compared to 5.0 degrees average error without the sensor. No statistical correlations were found between angulation accuracy and PAT scores. According to the survey, students reported improved confidence, while experienced faculty reported decreased confidence levels with the use of the sensor.

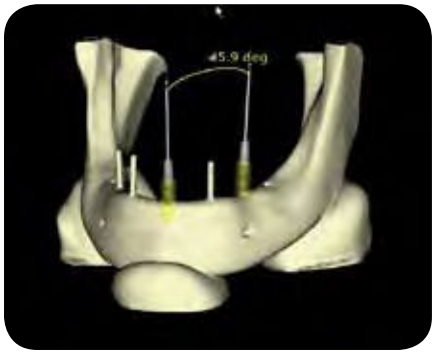

FIGURE 4. NobelClinician angulation measurement to determine error.

Discussion

The science of implant design and placement is constantly evolving as new research and technology arises. Implant placement requires meticulous treatment planning presurgically and precise placement during surgery. Guidance systems for implant placement traditionally include laboratory-fabricated surgical templates, but have evolved to include computer-aided design/computer-aided manufacturing (CAD-CAM) fabricated models and computer-assisted technology. The current implant guidance systems have an average error of 4.1 degrees from the reference.[8] The average error produced by participants using the angulation sensor in this study was 4.1 degrees, comparable to existing systems. Previous research showed that placement of implants using surgical templates produced error from 0.5 to 14.5 degrees from the ideal planned placement.[10] In this study, the angulation error while using the sensor ranged from 0.2 to 10.9 degrees. These studies support comparable accuracy between the tested sensor and the guidance systems currently being used clinically.

This study also examined other parameters to determine the effect of using a sensor-guided handpiece. Four osteotomies were performed at different positions and distances from the reference osteotomy. It was determined that the sites on the right side (site 1 and site 2) showed significantly better alignment

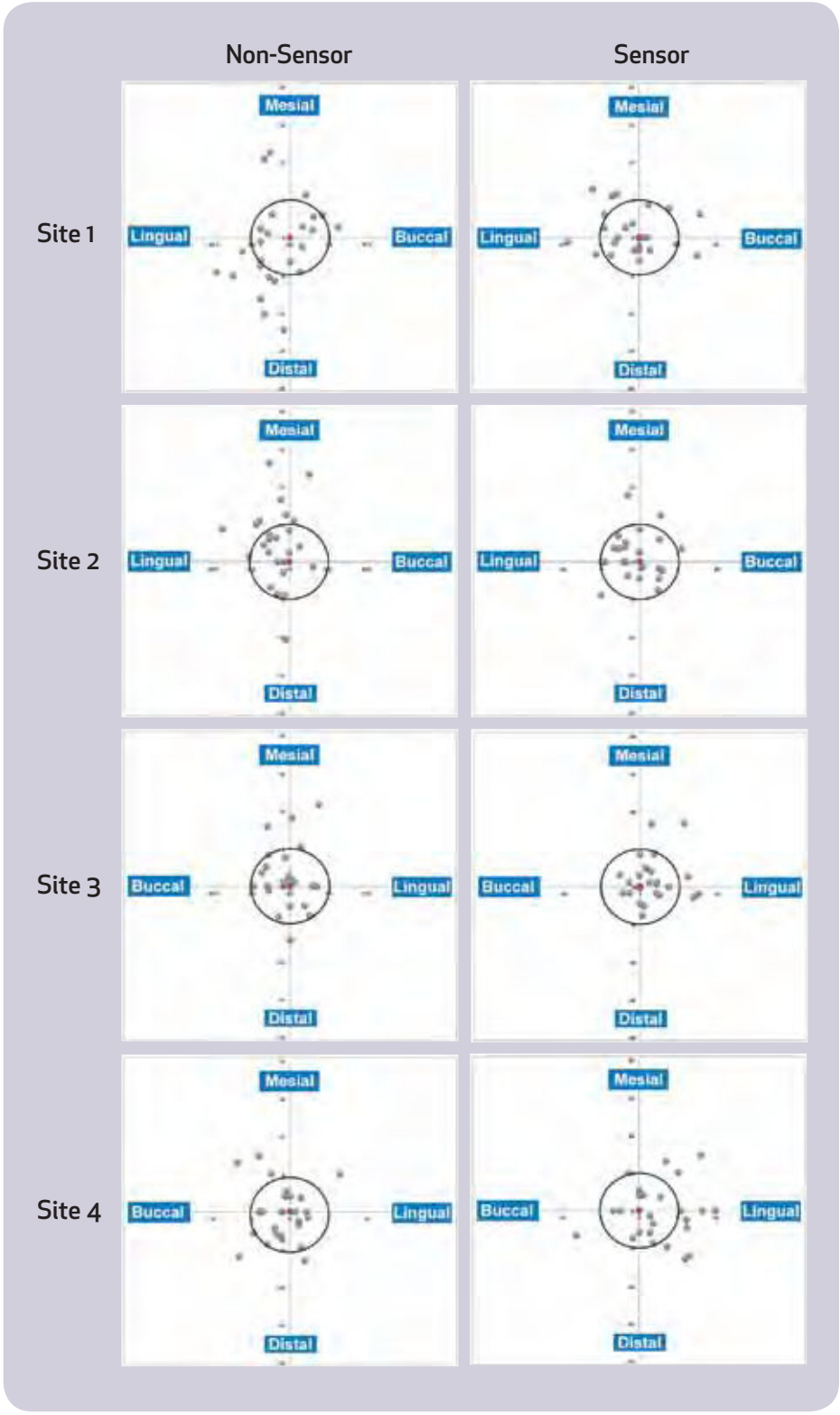

FIGURE 5. Overhead view of osteotomy placement.

when the sensor was used, whereas the sites on the left side showed no significant improvement (**FIGURE 5**). These results could be attributed to participant handedness. It was also determined that the osteotomy on the patient's left, and farthest away from the reference site (site 4), was the only site that showed decreased accuracy with the sensor. Site 4 was the last osteotomy performed and these results could be attributed to participant fatigue, along with handedness and distance.

Both experienced clinicians and dental students were used in this study to determine if experience affected the performance of using the sensor. With the sensor, the experienced clinicians did not show any significant improvement in any site, while their average error decreased by only 0.7 degrees. These results suggest that experienced clinicians will not benefit from using the angulation sensor. However, these results could be attributed to the low number of experienced clinicians tested.

Participants filled out a survey to assess their confidence levels before and after the study. Participants were also asked to rate the ease of sensor use. It was found that self-reported confidence levels and ease of use with the sensor had no correlation to improvement with the sensor and angulation error. A coincidental finding was that all student participants had increased confidence with the use of the sensor and all experienced clinicians had decreased confidence when using the sensor.

Student PAT scores were obtained to determine if these scores correlated to implant placement and accuracy with the angulation sensor. There was no improved accuracy in overall placement for those with higher PAT scores and no significant correlation was found between PAT scores and improvement with the angulation sensor. Other research has shown that PAT scores do not correlate with clinical performance.[11] One coincidental finding was that those with higher PAT scores found the angulation sensor harder to use.

There were certain limitations to this study, some of which could be improved in further studies. One limitation already addressed was the low number of experienced clinicians. There were also limitations with the sensor because a 2.5-degree range of movement was programmed into the sensor to enhance its ease of use. Even with this programmed range of error, it was observed that participants had difficulty keeping the sensor aligned during the entirety of osteotomy placement. This limitation was a very significant observation in this study, as some participants drilled their osteotomies without keeping the sensor's light and audible sound activated the entire time. This could be attributed to the participant's learning curve and participant fatigue.

Although two practice osteotomies were performed, observation indicated that more practice with the sensor would be beneficial in further studies. Lastly, this study was performed on manikins. To fully determine the clinical efficacy, further research would need to be conducted with live patients.

While this study focused on the use of this angulation sensor's efficacy in placing implants, future studies could look at its use in the preparation of guiding planes for removable partial dentures or crown and fixed partial denture tooth preparations. Additionally, the use of these sensors in an educational setting could be useful, as students are more likely to benefit from this technology in both the accuracy of their preparations along with the confidence gained while using the sensor. More research is needed to determine the specific types of participants who will benefit most from the use of this device. ■■■■

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TUSTIN - Leasehold & Equip Only! Great office located in a busy shopping center with heavy traffic flow. 3 eq ops. ID # 4273.

RIVERSIDE / SAN BERNARDINO COUNTIES

LA QUINTA - Price Reduced. Leasehold & Equip Only! Located in strip shopping center W/ 3 eq. ops, 1,000 sq. ft. ste.ID#4063
MURRIETA (GP) - Beautiful office w/ 3 eq ops surrounded by major anchor tenants. Some Capitation. 4 day/wk office. ID #4247
RIVERSIDE (GP) - Established in January 2012 in busy shopping center. 4 fully eq ops. In residential area. Heavy traffic flow. ID #4269.
WRIGHTWOOD (GP) - 21 years of goodwill. Only dentist in town. Fee for service. Consists of 4 eq ops in 1,265 sq. ft. ste. ID #4243.

SAN DIEGO C OUNTY

SAN MARCOS - Leasehold & Equip Only! Modern designed offic. Established in 2007. Consists of 2 eq ops in 800sqft ste. ID #4217.
SAN DIEGO (GP) - In free standing bldg w/ private prkng. Consists of 5 ops w/ Dentrix software. Monthly revenues of ~$40K. ID #4279.

VENTURA & KERN COUNTY

CENTRAL COAST - Located in a Historic Colony District on a 1 story bldg . Fee for Service. 3 eq.. ops. Proj. $1M for 2012. ID # 4201.
PORT HUENEME (GP) - Absentee Owner Practice. Established in 1980. Consists of 3 eq. ops, in a 920 sq. ft. suite. ID #4167.
THOUSAND OAKS (GP) - Modern designed off. w/ 6 eq ops. Seller owns bldg/ not for sale. 50 yrs of goodwill. Absentee owner. #4257.

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How to Place a Free Classified Ad

The *Journal* has changed its classified advertising policy for CDA members to place free classified ads online and publish in the *Journal*. Only CDA members can place classified ads. Non-CDA members can place display ads.

All classified ads must submitted through cda.org/classifieds. Fill out the blank fields provided, including whether the ad is to appear online only or online and in the Journal. Click "post" to submit your ad in its final form. The ad will post immediately on cda.org and will remain for 90 days. Space permitting, your ad will run one time in the next issue of the Journal following the posting of your online ad. After 90 days, you will need to repost your ad if you wish to continue running it online.

Classified ads for publication in the Journal must be submitted by the fifth of every month, prior to the month of publication. Example: Jan. 5 at 5 p.m. is the deadline for the February issue of the *Journal*. If the fifth falls on a weekend or holiday, then the deadline will be 5 p.m. the following workday. After the deadline closes, classified ads for the *Journal* will not be accepted, altered or canceled. Deadlines are firm.

Classified advertisements categories are: Equipment for Sale, Offices for Sale, Offices for Rent or Lease, Available Positions, Opportunities Wanted, and Practices for Sale.

How to Place a Display Ad

Non-members are welcome to place display ads. For information on display advertising, please contact Corey Gerhard at 916-554-5304 or corey.gerhard@cda.org.

CDA reserves the right to edit copy and does not assume liability for contents of classified advertising.

AVAILABLE POSITIONS

GP ASSOCIATE DENTIST, ENDODONTIST AND ORAL SURGEON — We are looking to hire the following: part-time General Dentist Associate who is available to work some late evenings and Saturday; part-time Endodontist; part-time Oral Surgeon or GP who can perform wisdom teeth extractions and surgical placement of implants. Flexible schedule available. Please send your resume to perfectsmile500@gmail.com or call us at 925-600-0065.

RECEPTIONIST/BILLER — High-tech, state-of-the-art office seeking energetic, compassionate and experienced employee in Torrance area. Preferably DENTRIX proficient. Full time, immediate hiring. Fax resume to 310-257-1112 or email dw@yagasakidentalcenter.com.

ORTHODONTIC RDA — Progressive orthodontic practice is seeking a skilled, friendly, professional Orthodontic RDA with a great attitude and dedication to quality care. Part time, 30 hour/week position open to candidates with a minimum of one year experience in orthodontics; current licenses required. Please email resume, references and salary requirements to csrofc@aol.com.

CONTINUES ON 54

CLASSIFIEDS, CONTINUED FROM 53

DENTIST — Great opportunity ... General Practice established 15 years ago looking for Dentist to work 1 to 2 days a week to start with; possible Associate/Buy-In option for the right doctor. Practice focus is Cosmetic and Restorative Dentistry for young adults and adults. Beautiful office in great area with amazing team. Qualified applicants email resumes to drjphansen@yahoo.com.

DENTIST—Established practice. Associateship. Email resumes to khazaee@yahoo.com.

PERIODONTIST — Upscale General Practice looking for experienced periodontist to place implants on weekly basis. Minimum 3 years experience placing implants required. Must be friendly, outgoing and energetic. Our office is equipped with latest technological advances and we have support staff knowledgeable in the field. Please email your resume to dentexdental@yahoo.com or call 818-800-9494.

ORTHODONTIST — Established multi-specialty group practice is seeking an Orthodontist to work at our location 1 to 2 days/week and split monthly collections. We have an active patient base of more than 15,000 patients, built-in referrals from other GP offices, an aggressive marketing team, treatment coordinator, pan/ceph, plenty of space and parking as well as a friendly staff. Orthondontist must be a provider for HMO and PPO insurances, Denti-Cal, and bring own supplies and RDAs. Please email us at jba_1@sbcglobal.net for more information.

OFFICE STAFF — Modern, high-class private practice in Santa Monica seeking office manager/receptionist with dental experience. Excellent computer skills and communication skills necessary. Email resume to bmorshed@verizon.net or call 310-393-9664.

PEDIATRIC DENTIST — Temporary position available for pediatric dentist to provide oral sedation 1 to 2 days per month. Must be compassionate and enjoy working with children. Preferably bilingual. Email resumes to toothfairiesdental@gmail.com

DENTAL ASSISTANT — Leading cosmetic Beverly Hills Dental Practice is looking for an experienced DA (5 years minimum experience) with a valid Calif.

CONTINUES ON 56

WESTERN PRACTICE SALES

John M. Cahill Associates

BAY AREA

AC-085 SAN FRANCISCO- **L**ong established. 2nd floor. 1,433 sf overlooking Park Presidio. 4 large ops. Skylights/large windows **$189k**

AC-119 MILL VALLEY - Several blocks from downtown . Recently remodeled! State-of-the-art equipment including: digital charting and x-ray. 1,100 sf w/ 3 ops. Plumbed for 4th **$450k**

AC-123 SAN FRANCISCO- Located on corner store front. Busy, major thoroughfare in well-established area. 1,032 sf w/ 3 ops **$450k**

AG-125 SAN FRANCISCO - Relaxed schedule (Saturdays/Sundays by appt only. Professional building, major thoroughfare, highly desirable area. 1,000 sf w/2 ops. Plumbed for 1 add'l **$125k**

B-9851 SAN RAMON Facility—This opportunity will not wait! Office ~ 1,700sf w/ 3+ ops **$219k**

BG-106 Facility UNION CITY -Intersection w/ monumental signage & excellent visibility. Open floor plan. 1,800sf w/ 6 fully equipped ops. New Computers and New Telephone Systems. $**150k**

BN-051 HAYWARD Facility - Seller Motivated! Office is ~1000sf w/ 3 fully equipped ops. **$150k**

BN-130 OAKLAND—Large successful FFS practice, in a multi-story Prof. Building. ~ 2,211sf w/ 4 ops. **$1.4m**

CC-056 MARIN CO- With beautiful garden setting, this well maintained office is centrally located near popular shopping center. Easy access to Hwy 101. 1200sf w/ 3 ops. Room for 2 add'l ops **$350k**

CC-077 BENICIA- Highly visible. Within walking distance of downtown. 820 sf w/2 ops **$125k**

CC-109 PETALUMA - Priced for a quick sale! Reasonable overhead & below market rent. Don't miss this excellent opportunity! 2 ops. Plumbed for 3 add'l. **$170k**

CC-118 Vacaville - Turnkey Facility - Midway between SF & Sacramento. Highly visible, easily accessible, attractive building w/ ample parking in growing city. 859 sf w/3 ops. Option to lease/purchase suite. **$245k**

D-9091 ATHERTON -Turnkey operation 969 sf & 3 ops ***Call for Details!***

DC-113 MILPITAS - Seller retiring! Great location 1,009 sf w/ 3 ops. Plumbed for 1 add'l **$140k**

DN-112 SAN JOSE— Established Fee-for-service practice, ~1008sf w/ 2op and plumbed for 2 add'l. **$100k**

DN-063 SAN JOSE - Long-established, Popular Retail Shopping Center. 780 sf w/ 2 ops **$70k**

BAY AREA CONTINUED

CC-133 SANTA ROSA - Stable patient base. Well-respected. Location = new patient traffic. Excellent signage/major thoroughfare. 1,291 sf w/3 ops + 1 add'l **$480k**

DG-107 Facility MOUNTAIN VIEW - Located w/ in 3 mi. from Google Headquarters. $400k + in build-outs. Top-of-the-line, state-of-the-art, Sirona Eq w/ built-in intra-oral cameras & curing light units. 1,800 sf w/3 fully equipped ops. Plumbed for 1 add'l **REDUCED! Now only $245k & seller will pay TWO MONTHS RENT!**

DG-124 MILPITAS- Highly visible 2-story building. Desirable area. 960 sf w/ 2 ops + 1 add'l **$130k**

DN-099 Facility SAN JOSE- Ultra-modern facility. Well-established, Dental Professional building complex. 1,450 sf w/5 fully equipped ops **$125k**

DN-084 PALO ALTO - Drawing from an educated, upper middle class community, this facility is "move-in" ready! 700 sf w/3 ops **$125k**

DG-116 SALINAS AREA-Highly respected & well-loved. Large, loyal, stable diverse patient base. Popular Retail Shp Ctr. 1,400 sf w/5ops. State-of-the-art Eq **$245k**

NORTHERN CALIFORNIA

E-8641 SACRAMENTO-FACILITY - 2,100+ sf w/ 3 ops & plumbed for 1 add'l **$50k**

EN-026 ROSEVILLE—Warm Caring Environment, ~1000sf, w/ 3 ops . **$380k**

EN-114 ANTELOPE FACILITY - Location, Location, Location! This "move-in-ready" practice has 4 ops + 1 add'l. **$120k**

F-1013 FORTUNA-Well respected FFS GP. Loyal stable patient base. 1,000 sf w/ 3 ops **$195k**

FN-087 LAKE COUNTY—Quality practice w/ friendly staff! ~2400sf w/3+ops. **$775k**

G-883 CHICO VICINITY – Quality FFS GP. Attractive Prof Plaza. 1,990 sf w/ 5 ops **$495k**

G-998 CHICO/PARADISE—Breathtaking natural beauty! ~898sf, 3 ops. **Now $240k**

GN-058 YUBA CITY— Emphasis on quality dental care / patient comfort, 1,704sf w/ 4 ops **$450K**

GN-075 YUBA CITY—Well estab. practice w/ loyal patient base! ~3000 sf w/ 8 ops**. $250K**

GN-103 CHICO—Successful, highly esteemed practice! ~3500sf, 8 ops + 2 addtl. **$850k**

HN-059 LASSEN CO-Quality, well-established, family-oriented practice. 1600sf w/3 ops **$120k**

FN-088 SISKIYOU CO— Family Friendly Location! ~1300sf w/ 2 ops. **$85k /Real Estate: TBD**

CENTRAL VALLEY

I-9721 STOCKTON –Prof. complex 1,450 sf w/3 ops & plumbed for 1 add'l op. **$75k.**

I-1005 SAN JOAQUIN VLY- Long-established High-End . 2,500+ sf w/ 6 ops **$650k**

IC-066 TRACY - Modern, paperless, FFS practice. Excellent visibility! 1,600 sf w/ 4 spacious, fully-equipped ops; plumbed for 2more **$495k**

IG-067 STOCKTON- Fully computerized, paperless, digitalized. 5,000 sf w/10ops **$475k**

IN-102 STOCKTON- Seasoned staff. Unlimited potential w/increased marketing & work schedule! 1,100 sf 2 ops **REDUCED! $80k**

IG-129 MERCED— Attractive, modernly appointed. Great location! Grossed more than $630k in 2011. ~1550 sf /3 Ops +2 add'l **$289k**

J-1000 TULARE– Highly visible location! ~1650sf w/ 4ops **Practice: $465k /Real Estate: $249k**

J-1001 LINDSEY— All American City! Conveniently located ~3,380sf w/5ops. **$220k**

JN-086 FRESNO FAC—Low Rent/Overhead! <1yr old, ~1200sf, 3 ops + poss. 4th! $**139K**

SPECIALTY PRACTICES

I-7861 CTRL VLY ORTHO- 2,000sf, open bay w/8 chairs. FFS. 60-70 patients/day. Prof Plaza. **$370k**

I-9461 CENTRAL VALLEY/ORTHO - .~ 1,650 sf w/5 chairs/bays + (2) add'l plumbed. **$180k**

G-975 CHICO ORTHO—Denti-Cal patient base. ~ 900 sf w/ 2 + ops . **$90k**

EN-089 ORTHO- ROCKLIN AREA - Contracted as a Preferred Provider w/one of the largest Medical Systems in area. Large, stable referral base. 1,500 sf w/3 chairs/bays. **$350k**

AG-096 ORTHO- PACIFICA - Exc location, easy accessibility, solid referral base. Excellent opportunity for a practice merger or secondary office. 1,400 sf w/5 chairs. **REDUCED! $178k**

CG-105 ORTHO VACAVILLE - Strong, loyal, widespread referral base. 30+ pats/day w/ 5-6 new starts/mo. Great location! 2,000 sf w/ 4 chairs/ bays **$280k**

GN-117 ENDO SACRAMENTO/NORTH VALLEY - Highly esteemed, FFS, ***Endo*** practice sets the bar for other practices! Office consist of ~2000sf w/3ops. **$310k**

800.641.4179

westernpracticesales.com

CLASSIFIEDS, CONTINUED FROM 54

X-ray license. Applicants should be capable and comfortable assisting with front office duties when needed. Applications should be made via email and include the following items: 1. Put "Dental Assistant" in the email subject line; 2. In the email state whether you are you looking for full or part-time work; and 3. Include a brief statement describing why would you be the best candidate for the job indicating your short and long-term goals. Send resume and required information to halimdental@gmail.com.

DENTAL HYGIENIST — Fee for service: Leading cosmetic Beverly Hills Dental Practice is in need of an experienced Dental Hygienist. Initial employment will consist of part time. The opportunity for full-time employment will present itself in the near future. Ideal candidate will have a bachelor's degree, strong communication skills, strong work ethic, and considers him or herself a team player. Must understand how to support the practice and its treatment plans and philosophy. Please reply via email. Only emails with the following will be reviewed: 1. Put Dental Hygienist Position in the email subject line; 2. In your email, include time, days and dates you would be available; 3. Write a personal statement that demonstrates your previous experience as well as your short and long-term goals; 4. Include a brief statement describing why would you be the best candidate for the job; and 5. Attach a current CV or resume. Send resume and required information to halimdental@gmail.com.

PERIODONTIST — Treat periodontal and dental implant patients in your own office. More than a decade experience working in GP offices, reliable, easy to work with. Send resume to implantological@yahoo.com or call 408-905-0033 for more information.

CONTINUES ON 58

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- **AMADOR COUNTY:** *For Sale*-General Dentistry Practice. Owner retiring. 2011 gross receipts of $710K+. There are 4 1/2 to 5 1/2 days of hygiene on a four day week. This well designed and spacious 2,400 sq. ft. office includes 5 ops, Laser, Intra-oral camera, Dexis Digital X-ray, and Pano. Almost paperless. Av. age of dental equipment is less than 5 years. Abundant recreational opportunities are available close by. #CA510 SOLD
- **ANAHEIM:** *For Sale*-General Dentistry Practice. This 3 op had $253,000 in collections in 2011. There are 3 ops in this 864 sq. ft. office with 1.5 days of hygiene. Owner works 3 days per week. No welfare or HMO's. Laser, Dentrix Software and Intra-Oral Camera. SOLD
- **BISHOP:** *For Sale*-General Dentistry Practice & Building. After 29 years in the same location this retiring dentist is selling both his practice and building. Collections were $1,000,243 in 2011 with $387,000 adjusted net income. There are 6 days of hygiene in this 5 op., 1,800 sq. ft. building. 100% financing available for both building and practice. Owner has reduced price below valuation price. #14390
- **CHICO:** *For Sale*-General Dentistry Practice. The collections in 2011 were $1,209,207. There are 7 days of hygiene in this 5 op., 2,400 sq. ft. office. Equipment includes Laser, Intra-Oral Camera, new Cone Beam X-ray and Dentrix software. This excellent practice has 1,824 active patients with 12 new patients a month. Owner will consider an Associate to Buy-In position leading to the purchase of this practice. #14392
- **EAST BAY:** For Sale-ENDODONTIC PRACTICE. The adjusted net income was $186,000 in 2011 in this 3 operatory, 1000 sq. ft. office. Includes Microscope, X-ray Scanner and PBS software. Transfer of referral base should be excellent. Ideal office for new endodontist or as a satellite practice for established practitioner. Dr. is retiring. SOLD
- **FRESNO:** *For Sale*-General Dentistry Practice: $935K in collections in 2011, w/adjusted net income of $337K. Office is 2,300 sq. ft. and is located in north Fresno in a highly visible professional office complex on a main thoroughfare. There are 6 equipped operatories, owner reports average age of equipment is 4 years. Practice has been operating in present location for over 20 years. Eaglesoft software, owner is retiring. #CA502
- **FRESNO:** *For Sale*-General Dentistry Facility. One of the best opportunities this year. This 3 op dental office comes equipped. It is in a great location and has about 200 active patients. Owner is in the process of completing Orthodontic training and only works in the office 5 days a month. Complete pictures of the office and an inventory list of included furniture and fixtures are available. Everything included for only $85,000 You can't afford to pass this up. #14383 SOLD
- **GRASS VALLEY:** *For Sale*-General Dentistry Practice. Gross Receipts of $491K with an adjusted net income of $130K. Overhead 73%. Office leased 1,555 sq. ft., 4 equipped operatories, 5 available. Laser, Intra-oral Camera, Cerac, & Eaglesoft Software. Owner would like to retire. #14379
- **GRASS VALLEY:** *For Sale*-General Dentistry Practice. GR 545K 3 days/wk (4 avail). 3 hygiene days/week. 5 Ops (6 Avail) 1,950 sq ft. Refers out most/all Ortho, Perio, Endo, Surgery. Office has Laser, Intraoral Camera, Pano, & Dentrix Software. Owner retiring. #14372.
- **GRASS VALLEY:** *For Sale*-General Dentistry Practice. Owner relocating. 2011 gross receipts $505K on 4 days per week with 5 days of hygiene. This well-established practice with approximatley 1,300 active patients is located in an 1,100 sq. ft. office with 4 ops, Dentrix software, Panoramic X-ray, Cerec, Intra-oral Camera, and X-rays in all ops. #CA509
- **GRASS VALLEY:** *For Sale*-General Dentistry Practice. Owner retiring. Well-designed 1,550 sq. ft. office with 4 ops plumbed, 3 ops furnished. Gross Receipts for 2011 were $309K on easy 3 days/wk with low (47+%) overhead. Practice refers out Endo, Perio, Surgery & Ortho. Pano, PBS software. May be able to merge with another existing practice that will also be for sale in the near future, This merger would result in $800,000 gross annually. #CA503
- **GREATER CHICO/YUBA CITY:** *For Sale*-General Dentistry Practice. 2011 GR $592,520 on 4 days. 1,200 sq. ft. office with 4 equipped ops. Intra-Oral Camera, Pano, 1,100+ patients. Owner retiring after 33+ years in this picturesque and prosperous community with abundant recreation, close to the mountains and near one of the largest lakes in N. CA. #14359
- **GREATER SACRAMENTO:** *For Sale*-Periodontal Practice: Retiring owner is the only Periodontist in a comunity of 50+K with a draw area of 100K. Implant experience a must. Great opportunity to work closley with a Prosthodontist and an Endodontist. Nicely appointed 1,500 sq. ft. office with 5 operatories, Digital X-rays and Dentrix software. 2011 gross receipts of $719K. #CA500.
- **HAWAII (MAUI):** *For Sale*-General dentistry practice. Gross Receipts of $636K. Office has four equipped operatories in 1198 sq.ft. Pano, Laser, I.O. Camera, Fiber Optics, 2 ½ days of hygiene. Owner retiring: Don't miss this opportunity to live and work in paradise. #20101
- **HAYWARD:** *For Sale*-General Dentistry Practice. This practice consists of 1,600 sq ft with 4 treatment rooms in an excellent location. 2010 Gross was $501,000 with a $228K adjusted net income. Dental Vision software, Average age of equipment is 8 yrs. Approximately 1,200 active patients.
- **LANCASTER:** *For Sale*-General Dentistry Practice. This 4 operatory office is located in 2,360 Sq Ft on the second floor of an attractive Medical Dental office building. Gross receipts were $676,000 with a $174K adjusted net income. Dentist is retiring after 39 years. 4 days of hygiene. Additional operatories could be added to existing space. Great location. #14376.
- **LAS VEGAS:** *For Sale*-General Dentistry Practice. This 4 operatory practice is in a great location in a high-end professional building with a view of the city of Las Vegas. It is equipped with an Intra-oral camera, Pano, Laser, and Dentrix software. There are 2 days of hygiene. The staff is well trained to efficiently run this low overhead office with great potential for further growth, 2011 gross receipts were $727K with adj. net income of $331K. Doctor moving out of state. #NV500
- **LEMOORE/HANFORD AREA:** *For Sale*-General Dentistry Practice & Building. Owner has worked in this location since 1971. Gross Receipts were $378K with $139K adj. net income. There are 3 equipped operatories and 3 days of hygiene. Purchase of the building is optional to the Buyer. 100% financing is available for both building and practice. Excellent opportunity for new grad or satellite practice. #14375.
- **MERCED:** *For Sale*-General Dentistry Practice. This is a tastefully done, 4 op., 1,550 sq. ft. office with 4 and 1/2 days of hygiene/week. All equipment is less than 10 years old and includes 2 Lasers, Intra-oral Camera, Panographic X-ray, Digital X-rays, and Dentrix Software. Molar endo and involved oral surgery cases referred out. Basic general (non-amalgam) type dentistry. 2011 gross was $878,000 with 4 weeks out as a result of a medical issue. 2010 collections were $956,000. Excellent location. Seller retiring. #CA512
- **MILLBRAE:** *For Sale*-General Dentistry Practice. This beautiful, well-established office is located on the main thoroughfare of the North Penninsula, offering great exposure that generates 25-30 new patients per month. 5 treatment rooms (6th plumbed) in approx. 1,500 sq. ft. equipped with Digital Pan, Digital Imaging and Intra-Oral Camera. 2011 gross receipts of $651,000 with $230,000 adjusted net income. Owner is retiring. Don't delay, this won't last long! #14395
- **MODESTO:** *For Sale* - General Dentistry Practice. Collections have been approximately $700K per year with a 62% overhead on 3 days per week schedule. Six days of hygiene in this 4 op. office. Eaglesoft software and Panoramic X-ray. Approximately SOLD

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CLASSIFIEDS, CONTINUED FROM 56

PARTNER DENTIST/SPECIALIST — Looking for a General Dentist or a Specialist who would like to establish his/her own practice in my office. I am also open to an existing dental office moving into my large facility. The successful partner will be a starting or well-seasoned dentist who already has an established patient base. This could be a great opportunity for mentoring and comradery. My office is modern, well-equipped and has a great location in Sunnyvale. We will be sharing a five operatory, 3,000 sq/ft facility. I am not looking for an employee dentist. I am looking for a long-term dentist partner who also might have the option to take over the office after I retire. I practice dentistry Monday-Thursday. The facility is available for the partner dentist seven days a week. Please email me at: sunnyvaledental@sbcglobal.net.

REGISTERED DENTAL ASSISTANT —Riverside Dental Group and Dental Associate Offices have 7 locations across the Inland Empire. Our practices provide comprehensive general and specialty dental care for all ages in multiple offices that are convenient to many residents. We currently have a job opportunity for a full-time Registered Dental Assistant. Must be a REGISTERED Dental Assistant with a minimum of 3 years of experience as an RDA. The ideal candidate must be energetic, passionate about his/her career, have excellent communications skills, dedicated to patient satisfaction and committed to ongoing growth and development. If you are ready for a challenge in a fun, exciting, professional environment and you have a positive attitude, we want you! We offer a competitive wage and benefits. Submit your resume by emailing Donna Dahlen at ddahlen@amdpi.com.

ASSOCIATE DENTIST — Western Dental Services, Inc. seeks Dentists for full-time work in various offices in Central and Northern California. Must have DDS or foreign equivalency and valid Calif. dental license. Western Dental offers excellent career opportunities with outstanding incentives and rewarding compensation packages that include: Highly competitive salaries; comprehensive benefits packages; clear career paths with advancement opportunities; extensive training and continuing education; professional, state-of-the-art facilities; solid job security; company paid professional liability insurance; H-1B and Green Card Sponsorship available. Our doctors join us from a wide array of career paths — straight out of school, a residency or a specialty program, moving from another town or state, filling in extra days while building a private practice, leaving private practice or moving from other dental companies. Email resumes to recruiting@westerndental.com.

OFFICES FOR RENT/LEASE

OFFICE FOR RENT OR LEASE — Newly constructed GP office in Encino with three operatories fully equipped. Subleased two to three days a week. Ideal for Endo, Perio or Oral Surgeon. Please email: bdedental@gmail.com if interested or for more information.

OFFICE FOR RENT OR LEASE — Share dental office in a beautiful, bright location of North County San Diego. Right next to school (K-8). 1,000 sq. ft., 3 chairs, fully equipped, X-ray, sterilization, lab and private office. Available 2-3 days per week. Terms are negotiable. Please contact dentalofficespace1@gmail.com to learn more.

OFFICE FOR RENT OR LEASE — We're offering a great opportunity to sublease 2 operatories in our 5 opperatories office with a great location just off the 5 Freeway in Irvine. The office suite is in a 3-story medical building. The operatories are plumbed and ready to add your chairs, units, and X-ray heads. There is plenty of room for your supplies and a front desk area for your use. Ideal for someone looking to cut overhead. Email us at: russellcannondds@earthlink.net. Check out our website at: www.DrRussellCannon.com. Please call us at 949-552-7874.

OPPORTUNITIES WANTED

OPPORTUNITIES WANTED — Implant Surgeon/Periodontist For Your Office — Implant Surgery/Bone Grafting/Perio Surgery/3rd Molar Extractions/Surgical Extractions/Gingival Grafting all done in your office. Email: bayareaperio@gmail.com or call 617-869-1442.

OPPORTUNITIES WANTED — General dentist seeking part-time/full time position. Please email denisovdds@gmail.com or visit website www.SmileForSanDiego.com for resume and qualifications.

OPPORTUNITIES WANTED — Specialist interested in renting one or two operatories in Cupertino or surrounding areas, one or two days per month. Contact implantological@yahoo.com or 408-905-0033.

OPPORTUNITIES WANTED — Hispanic dentist licensed in California, want partner to establish dental office, preferred managing dental or professional marketing. Send information to luismiguelcollazos@yahoo.com, or 818-605-1584.

CONTINUES ON 60

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3085 STANISLAUS COUNTY GP
General, family practitioner now retiring. Offering well-est. successful, state-of-the-art practice in approx. 2,800 sq. ft. facility w/7 fully-equipped ops. Great location & exceptional long term staff. Owner willing to help in transition. Estimated 2,500+ active pts. 5 year avg. GR $1.4M w/net of approx. $500K & just 3.5 doctor days & 10 hyg. days/wk. This practice is for an established dentist or 2 dentists w/experience & who will appreciate a high quality practice. Asking $895K.

3059 SANTA CRUZ COUNTY GP & BDG
Charming practice tucked among soaring redwoods in Santa Cruz County. Well established and part of the small community landscape. 2011 GR $626K+ w/3 doctor days. All fee-for-service. This is a great turn key practice and opportunity to own a hidden gem. Practice asking price $373K, building is also available.

SOLD

3080 SAN BENITO COUNTY GP
State-of-the-art family practice. 1,558 sq. ft. facility. Approx. 1,100 active pts. 3 Dr. days. 2011 GR $449K+. Asking $305K.

SOLD

3078 GILROY DENTAL FACILITY
1,280 sq. ft. turn-key dental facility w/5 ops in medical/professional office complex adjacent retirement community near Westwood Shopping Center. Great opportunity to establish a practice with little start-up cost or open a satellite office. Asking $75K.

3089 GILROY GP
Seller retiring from well-est. high quality practice w/approx. 1,200 active pts. 2011 GR $513K+ w/3 doctor days/wk. 5 fully-equipped ops in 1,440 sq. ft. modern facility. Seasoned and dedicated staff providing a relaxed atmosphere to loyal pt. base. Asking $350K.

PENDING

3082 SONOMA COUNTY GP
Well-established, family-oriented practice in charming community located in the hub of Sonoma County. Stable patient base. 4 doctor days, 3 hygiene days/week. Approx. 14 new pts./month. Approx. 1,500 active pts. 3 fully-equipped ops., recently upgraded equipment, in 900 sq. ft. state-of-the-art office. 2011 GR $552K+. Asking $384K.

PENDING

3083 SONOMA COUNTY GP & BLDG
Well established & respected GP known for personalized, quality dental care in a family oriented community. Seasoned staff, stable patient base, approx. 1,500 active pts. Located in the heart of Sonoma County in ample 2,088 sq. ft. facility w/6 ops. 2011 GR $767K+ w/4 doctor days. Seller retiring & willing to help for smooth transition. Asking for practice $560K. Building is also available for purchase.

PENDING

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CLASSIFIEDS, CONTINUED FROM 58

OPPORTUNITIES WANTED — I am a 2011 USC graduate looking for an associate dentist position in the Orange County area. I am a friendly outgoing personable dentist with over a year of professional experience that has given me a broad range of clinical experiences as well as front office knowledge (insurance). I am comfortable working in any type of practice from a small private practice to a large multi-specialty practice. Please contact me if you would like to discuss associateship opportunities and my qualifications. Contact associatedentist2011@hotmail.com or 714-878-0405.

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DENTAL EQUIPMENT FOR SALE — Equipment for sale: New handheld portable X-ray unit($3500). New intraoral wall X-ray unit ($1650). New mobile X-ray on wheels ($1695). New chairs/units operatory packages ($3695). New implant motors ($1850). Everything is brand new, with warranty. Contact nycfreed@aol.com or 561-703-1961.

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6032 **MODESTO** Currently collecting $520,000+ with Available Profits of $210,000. 3-days of Hygiene.

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3297 **PALM DESERT** High visibility Shopping Center Practice across freeway from 5,000 senior citizens. 4-ops. Within 18 months can be built to Million Dollar status. FP $660,000.

3298 **BALDWIN PARK** Conservative Lady Dentist grossing $250,000. 3-ops in 1,000 sq.ft. suite. Great visibility. FP for Practice and Building $750,000.

3299 **NORTH SAN DIEGO COUNTY BEACH CITY** Owner does no-hands on dentistry. Topped $1+ Million in past. Now apprx $800,000/year. Hands-on Owner could take over $1 Million bar. Building available for $1.6 Million. FP for practice $550,000.

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3303 **REDLANDS** Apprx 1,500 sq.ft. in busy plaza near freeway off ramp. 5 Ops with state-of-art equipment. Previous gross approx $500,000. FP $250,000.

3304 **HEMET** Seller works 2-day, grosses apprx $600,000. Full time Successor can gross $1.5 Million. 8 op office in high identity "WESTERN DENTAL" type location. FP $550,000.

3305 **ONTARIO** Stater Brothers Shopping Center. Grossing $15,000-to-$20,000/mth. Recently renovated. Averages 30+ new patients/mth. Should do $500,000 with good Clinician. FP $250,000.

3306 **MISSION VIEJO - EMERGENCY SALE** Gorgeous office. Bank will assist right Buyer.

3307 **RESEDA** Averages 60 new patients/mth! High identity location with electronic billboard. Gorgeous 7-op office. Will Gross close to $1 Million. FP $885,000.

3308 **LANCASTER** Enjoys #1 position in PPO directory. Grossing $400,000+. Seller likes to golf. Seller's Manager says: "Find motivated Successor. Practice should do $1 Million." Manager has proven track record of building practices. FP $350,000.

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CLASSIFIEDS, CONTINUED FROM 60

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DENTAL PRACTICE FOR SALE — This practice boasts strong collections, an excellent location, room for expansion, a stable and growing patient pool and a paperless, state-of-the-art design and is located in Tracy, California. The office occupies 1,600 square feet and features 4, fully equipped, spacious operatories and is plumbed for 2 more. The office has a beautiful reception area, doctor's office, business office, sterilization center, staff lounge, lab, storage room and restroom. Floor-to ceiling windows give the office an open and airy feel. Appraised at $445K; asking $445K. Contact dds1033@hotmail.com or 209-834-6863.

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DR. BOB, CONTINUED FROM 66

as a model. Seems to me that the French are making a lot of unwarranted assumptions here. A wrought-iron tooth would have almost certainly been made by a Gallic blacksmith, a profession not known for its knowledge of or adherence to the precepts of dental anatomy. It is doubtful the smithy, without the advice and guidance of Pierre Fauchard, could have forged a recognizable horse's tooth, let alone a humanoid upper bicuspid or molar. If you were presented a skull bearing a "jammed-in" iron implant, would you be so rash as to venture that the patient lived for more than a year after the procedure? I submit he passed to his reward on the same day as his operation, if not the same hour.

Undeniably, French vintners have produced some satisfyingly potent anesthetics, but there is not enough vin ordinaire in all of Paris to encourage me to eschew the morphine necessary to prevent my howling like a muezzin in such a travesty. A more likely explanation of this discovery would be that the Gallic-Roman dentist submitted a preauthorization for a vitreous carbon implant, titanium being still on the alchemist's drawing board. Stainless steel would have been his second choice had the technique of making steel stainless been generally available and not lodged solely in the clutches of the Ginzu family. The patient's HMO weaseled that implants were not a covered benefit, but in the interests of fairness, it would allow a fee equal to 80 percent of a simple extraction minus his annual deduction upon proof of eligibility. The frazzled dentist, realizing that ferrous plaque buildup on the wrought-iron implant (rust) would be another one of these ongoing marriage-type cases, jammed in the replacement with antipathy toward all and sensibly referred his patient back to the blacksmith for maintenance.

There is probably a plethora of these implant cases entombed all over France. That would explain Marie Antoinette's remark years later when she suggests that the populace eat cake; anything more substantial being too difficult to masticate.

Ancient Etruscans in northern Italy were known to have made partial dentures, crowns and simple bridges as early as 2,500 years ago. That these prostheses were so crude in their fabrication that a first-semester dental student of today responsible for a similar mishmash, would be summarily stripped of his nametag and drummed out of the corps, is beside the point.

Dental historians delight in pointing out that there is nothing new under the sun. They may be right, but when future researchers dig up one of my patients who may be wearing one of my own oral masterpieces, I hope the descendants of this cadaver will be unable to trace it back to me, even with the help of French researchers. I've left instructions in my will for my own descendants, when pressed, to deny everything. Tell 'em the blacksmith did it. ■■■■

We're taking your requests

If you have a favorite Dr. Bob column you want to see again, email Publications Specialist Andrea LaMattina at andrea.lamattina @ cda.org. We will oblige by reprinting those requested favorites interspersed with any new Dr. Bob submissions.

CDA JOURNAL, VOL 41, Nº1

Dig This

It is doubtful the smithy, without the advice and guidance of Pierre Fauchard, could have forged a recognizable horse's tooth, let alone a humanoid upper bicuspid or molar.

Robert E. Horseman, DDS

ILLUSTRATION BY VAL B. MINA

According to an Associated Press release datelined New York quoting the French journal *Nature*, researchers have stumbled upon the most riveting historical dental event since Brånemark first drew breath in Sweden.

It seems these worthies, digging about in a Gallo-Roman cemetery just south of Paris, have unearthed what is apparently the earliest known dental implant: a wrought-iron tooth imbedded in the maxilla of a man who lived about 1,900 years ago in what is now France. The United States has never had such a distinction. Although we claim a Native American named "Iron Eyes Cody" and an army general was referred to out of earshot as "Iron Pants," we've never an "Iron Tooth" anybody.

In our country one cannot go poking around in old burial grounds without incurring the righteous wrath of some vocal ethnic group or other. In France, however, most of the Visigoths are permanently deceased and the Romans have gone back to Italy because they say unequivocally the French are too overbearing and irritable for cohabitation and the pasta is beneath contempt. Not above protesting something just for the general obstructionism heck of it, the present-day French ancestors of the recently exhumed, seem disinclined to raise much hoo-hah over this dental bonanza, concentrating instead on fulminating postal strikes and harassing American tourists.

Scientists have described the iron tooth, as seen in X-rays, to be a "perfect fit" in a tooth socket in the maxillary right. They claim the implant was "jammed into place" more than a year before the man died, and, further, that whoever made the tooth used his patient's original tooth

CONTINUES ON 65

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