Journal

CALIFORNIA DENTAL ASSOCIATION

July 2014

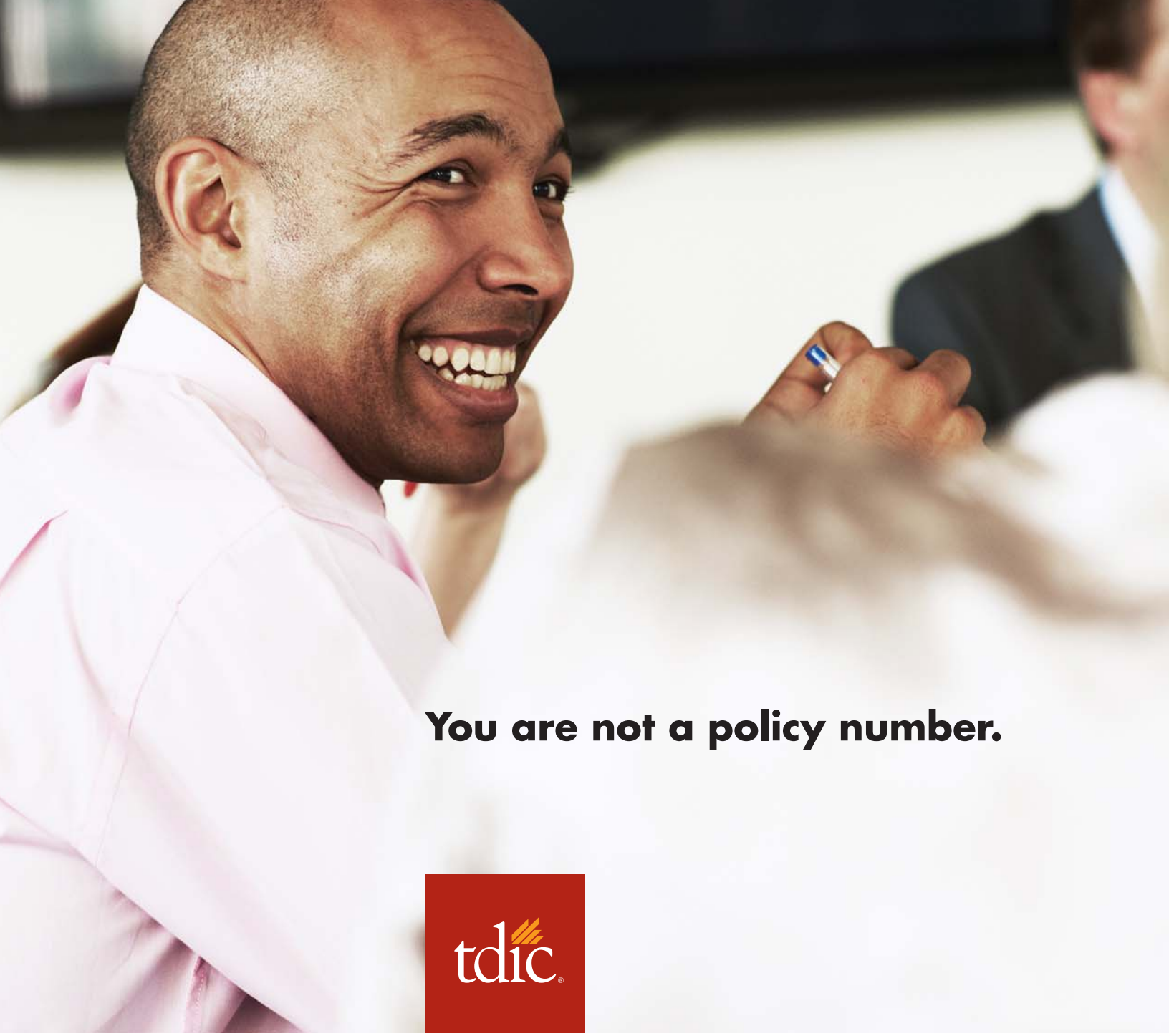
Active Caries Management

Special Needs Patients

Community Engagement

MEDICAL MANAGEMENT OF DENTAL CARIES

Joel Berg, DDS



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CDA JOURNAL, VOL 42, N°7

Why Did You Join?

Kerry K. Carney, DDS, CDE

At ADA.org, the American Dental Association gives 150 reasons for why one should join the ADA.

The 150 reasons shake down into 10 broad categories:

- Evidenced-based education/learning.
- Legislation/Advocacy/Policy development/Legal guidance.
- Public relations.
- Research and development.
- Professional development.
- Code of ethics.
- Networking opportunities.
- Practice development/management.
- Identification with the preeminent national dental organization.
- Focused charitable giving and volunteering.

They are all great reasons, but when I first joined, I do not think they would have meant much to me. Like so many things in life, you may not appreciate their true value at first glance. Simply put: you don't know what you're missing.

When I think back on why I joined CDA, I do not have a clear memory of a specific reason that made me join. There are so many things that membership in organized dentistry provides, but I was not familiar with the rich array of resources until after I joined. So it was not the prospect of significant practical benefits that lured me in.

Right out of school, working six days a week, I had no idea why it was important to have a legislative presence for dentistry. My perspective was narrowly focused on repaying loans and growing a practice. The majority of my friends from dental school were not members. I barely had free time to spend with the friends I already had. Why would I want to commit to spending time with colleagues who were strangers to me? So it was not a desire for social interaction that made me join.

Having a network of supportive colleagues was a benefit I could not have imagined before I joined.

Starting up a practice in a new community posed its own problems. As a new dentist in town, it sometimes felt as if the established dentists viewed the new dentists as interlopers or disruptive competitors. No mentor dentists urged this new dentist to join.

Before I joined, a phone call from another dentist would make me fear that my work was under a colleague's scrutiny and my professional judgment might be questioned. (That perfectionist's paranoia that was instilled in dental school was still strong.) After I became active in the local society, a phone call from a colleague was an opportunity to help or get a heads up from a friend. Having a network of supportive colleagues was a benefit I could not have imagined before I joined. So that could not have been my reason to join.

I think I joined simply because it seemed like the right thing to do.

Did everyone else calculate the benefits of membership and join because of all the resources and benefits membership could provide?

Why do dentists join? Why did you join?

I decided to conduct a completely unscientific survey of my colleagues. I asked everyone I could, "When did you join organized dentistry and what was your reason for joining?"

At least half of my survey subjects said they had joined in dental school and had maintained continuous membership ever since. They usually attributed their student membership to the influence of the faculty or just the cultural imperative at their dental school. This correlates with information about national membership figures. Some schools have very high percentages of student membership and these student members tend to convert to regular continuing memberships.

The other half of my respondents indicated the influence of a friend who was already a member and/or they felt it was the right thing to do at that point in their careers. Some said it gave legitimacy to their practice. Some said it was the association with their local component that drew them into joining.

It is important to know what drives dentists to join organized dentistry. In 2012, CDA proceeded to investigate that question on a person-to-person scale.

The Member Concierge (MC) pilot program was established in February 2012. It was created within the membership department and facilitates a unique and personal connection with each new member on behalf of the organization. The MC reaches out with a phone call to every new member within two days of membership activation.

If the MC is unable to reach new members by phone, an email is sent linking to a questionnaire for their

feedback. The results and feedback have been overwhelmingly positive.

In the first year of the MC program, 1,060 new members joined ADA, CDA and their local component. The MC was able to contact 60 percent of those new members. New graduates (in practice fewer than six years) made up 55 percent of the new members. Thirty-three percent of the new members had been members in the past but had a lapse of several years since their last membership. Forty-eight percent of the new members were insured by TDIC.

During her conversation with each new member, the MC was able to ask about each dentist's motivation for joining now. Their reasons fell into five broad categories of benefits: Protection (insurance), Education, Practice Support, Advocacy and Community. The category "Community" was the easy winner, with well over half the respondents giving a version of that desire to feel part of a group as their reason for joining now.

As the Member Concierge has said, "While statistics and data are invaluable to the organization, the true benefit of this program has been the personal interaction with our members. Hearing their stories on a daily basis, and identifying how organized dentistry can assist their efforts is energizing."

The Member Concierge's purpose is to help make the most of the dentist's first year as a CDA member. The MC can answer questions, help locate resources and plug that new member into the organization. After communicating with the new member and based on the dentist's present career situation, the MC can quickly tailor and suggest an array of relevant benefits of immediate use to that member.

After two years of the Member Concierge program, the numbers show that the new members who communicated with the MC are more likely to continue their membership the following year. Based on previous research, we may assume that members who make use of resources or benefits once are more likely to make use of other resources and benefits in the future. They become more engaged.

One of the goals of any membership program should be to create a compelling and meaningful relationship with members and potential members. The Member Concierge program is just one part of the personalized service and high standards CDA strives for in its efforts to support every member every day.

There are many, many good reasons to be a member of organized dentistry. But think back on why you joined. If it was to be a part of our professional community, think about reaching out to nonmembers. That personal connection may be just the impetus they need to join. ■

CDA JOURNAL, VOL 42, N°7

Maximize Efficiency, Reduce Stress — Hire an RDAEF2

I'm responding to the article in the March 2014 issue of the *Journal* titled "Dental Assisting Training Requirements." While the article was very well written, the author neglected to discuss one of the most exciting changes that have recently occurred in expanding the role of the assistant in today's modern dental practice. A law that became effective in 2010 allows for significantly expanded roles for assistants, enabling them to perform very time-consuming and reversible procedures that have traditionally been done by dentists. With appropriate dental board-mandated education, the registered dental assistant in extended functions 2 (RDAEF2) can perform these tasks. This allows the dentist to focus on procedures that are more complex. The RDAEF2 may perform the following procedures:

- Place retraction cord for final impressions.
- Take final impressions for permanent indirect restorations.
- Take final impressions for tooth-borne removable prostheses.
- Place, contour, finish and adjust occlusion on all direct restorations after preparation by the dentist.
- Adjust and cement all permanent indirect restorations.
- Size and fit endodontic master points and accessory points after canal preparation by the dentist.
- Cement endodontic master points and accessory points.
- Polish and contour existing amalgam restorations.
- Conduct oral health evaluations, including intraoral and extraoral evaluation of soft tissue, classifying occlusion and the myofunctional condition.
- Perform oral health assessments in school-based community project settings under direct supervision of a dentist or hygienist.
- Perform other procedures authorized by the regulations adopted by the Board of Dental Examiners in the future.

All of the above procedures are required to be performed under direct supervision and must be approved by the supervising dentist prior to the patient's dismissal from the office.

In order to enter an RDAEF2 program, an individual must be currently licensed as an RDA or RDAEF1 and be certified in pit and fissure sealants. The RDAEF2 educational program is an intense eight- to nine-month course of study which includes didactic and clinical procedures on both patients and typodont simulated patients. It is the only category of dental assisting that requires a post-secondary level of education and passing a rigorous state board exam with the same standards as students graduating from dental school. The students attend classes on weekends, which allows them to continue employment during the program.

It should be evident from evaluating the RDAEF2 scope of practice how much more efficiently time can be utilized in a typical dentist's day. This in turn can improve production. Equally as important as increased production, the dentist is relieved of many tedious and time-consuming procedures. This greatly reduces stress. Additionally, the dentist may use the extra time to complete administrative duties, call or consult with patients and specialists, etc. The dentist may also choose to shorten his or her production day to create more life balance.

I hope this additional information about utilizing an RDAEF2 has made it clear how — in a multitude of ways — adding an RDEAF2 to your practice could have a huge positive impact for your office.

William H. Swearingen, DDS, MBA, AAACD
Clinical Director, RDAEF2 program
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Sacramento, Calif.

The *Journal* welcomes letters

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CDA JOURNAL, VOL 42, N°7

Ethical Principles as Smoke Screens

David W. Chambers, EdM, MBA, PhD

The nub:

1. Do not use ethical principles as smoke screens for practice that is self-interested.
2. Clever interpretations are for sale, but caveat emptor.
3. Ethical principles do not cure patients; moral dentists do.

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

It requires only a few minutes to learn the five principles on which the ADA Code of Ethics is based. It requires a lifetime to live them.

Respect for autonomy, beneficence, nonmaleficence (not causing others needless harm) and justice (fair distribution of benefits and burdens) are the traditional backbone of bioethics. The ADA has added a fifth: veracity, or not letting others entertain misconceptions to their detriment. There are others, such as integrity, continuous learning and trustworthiness.

Perhaps a few philosophers quibble around the edges about the principles, but dentists have nothing bad to say about the principles in the abstract. The issues seem to come in at the implementation stage.

4C in the ADA Code says that dentists should, as a matter of justice, report cases of consistent and gross bad treatment to the appropriate authority. But who knows all the details on the ground? The patient might have caused the problem or misrepresented it. Fair enough. Reasonable doubt about interpretation allows practitioners to endorse the principle without having to take any action.

Principles can wear many costumes. Is the ethical distribution of benefits and burdens one that favors the dentist or the patient or the insurance company? Or perhaps, in particular cases, the interests of the dentist and the patient together outweigh the interests of the insurance company.

Clever minds can manage potential conflicts of interest. Marc Rodwin's study, *Medicine, Money, & Morals: Physicians' Conflicts of Interest*, is a 400-page catalogue of the tussles between ethicists and lawmakers on the one hand and physicians on the other, as they battle over the commercialization of medical practice. Rules and laws are put in place to define and curb abuses; nuances and new definitions are created to get around the restraints. The principles are never in question, it is just a matter, as President Clinton observed, of what one means by "it."

The real course in dental ethics consists of finding out how one's colleagues interpret "it."

We are now losing ground as dentists turn to others besides their colleagues to craft convenient definitions of what counts. Lawyers have long made a good living finding justifications for questionable actions their clients take in their self-interest. Practice management gurus can only stay in business if their clients think they are successful. The powerful new player is the PR firm that represents dentists by designing websites, sending out press releases and handling the marketing front end for practices so dentists can concentrate on providing the best quality technical care. All of these folks who are helping the "new" dentists (I mean the ones with novel interpretations, not the young ones) are ethical in principle. So are the dentists who interpret principles to suit their needs. ■

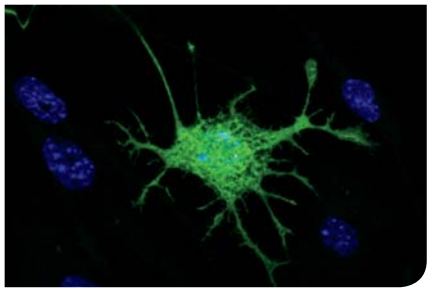


Image courtesy of Kylie Ellis, PhD, University of Adelaide.

Stem Cells From Teeth Can Make Brain-like Cells

University of Adelaide researchers have discovered that stem cells taken from teeth can grow to resemble brain cells, suggesting they could one day be used in the brain as a therapy for stroke.

In the University's Centre for Stem Cell Research, laboratory studies have shown that stem cells from teeth can develop and form complex networks of brain-like cells. Although these cells haven't developed into full-fledged neurons, researchers believe it's just a matter of time and the right conditions for that to happen.

"Stem cells from teeth have great potential to grow into new brain or nerve cells, and this could potentially assist with treatments of brain disorders such as stroke," said Kylie Ellis, PhD, commercial development manager with the university's commercial arm, Adelaide Research & Innovation.

Dr. Ellis conducted this research as part of her doctoral physiology studies before making the step into commercialization. The results of her work have been published in *Stem Cell Research & Therapy*.

"Ultimately, we want to be able to use a patient's own stem cells for tailor-made brain therapy that doesn't have the host rejection issues commonly associated with cell-based therapies. Another advantage is that dental pulp stem cell therapy may provide a treatment option available months or even years after the stroke has occurred," she said.

Dr. Ellis and her colleagues have been working on a laboratory-based model for treatment in humans.

For more, see the article "Neurogenic Potential of Dental Pulp Stem Cells Isolated From Murine Incisors" published in *Stem Cell Research & Therapy*, February 27, 2014, vol. 5:30.

New Study Reveals Rationales for Anesthesia Decisions

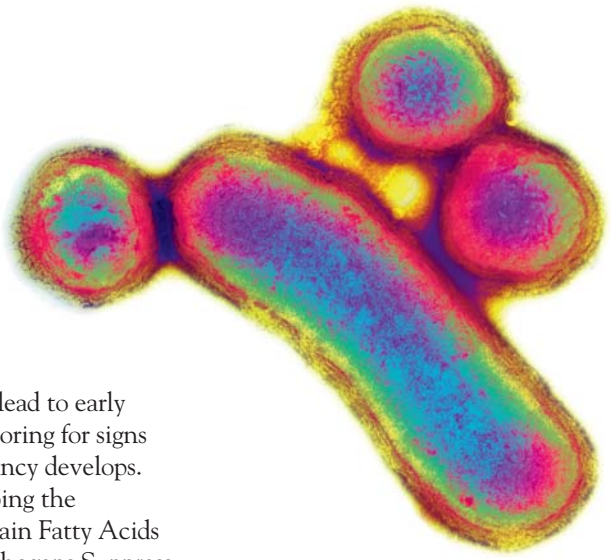
A recent survey conducted by the American Society of Dentist Anesthesiologists (ASDA) found interesting data about dentist anesthesiologists' practices and rationales for decisions about using a combination of local and general anesthesia in pediatric patients.

The survey was given to ASDA members. According to a description of the study, the survey "found a range of practices and rationales for anesthesia decisions. The email-based survey was sent to 183 members of the ASDA, and responses were received from about 42 percent of the members. The survey revealed that 90 percent of responding dentist anesthesiologists prefer the combined approach when treating some or most of their young patients. These respondents said the pairing makes it easier to stabilize the children's vital signs while decreasing the depth of general anesthesia. They also reported that the children experience less pain and recover more quickly with dual anesthetics. Half of them decide on the approach based on the patient, and 40 percent supplement general with local anesthesia in all but a few cases."

The majority of the respondents said they only administer anesthesia for children in the dental practices and allow the dentist to make the decision about whether to use local anesthesia.

According to the study's description, "Despite the preference for administering both types of anesthesia, the survey authors found that little scientific evidence is available to ASDA members in making their decision. The authors noted that no prospective double-blind studies conclusively argue for or against the combined usage."

The full article titled "Use of local anesthesia during dental rehabilitation with general anesthesia: A survey of dentist anesthesiologists," is available at anesthesiaprogress.org/doi/full/10.2344/0003-3006-61.1.11.



Perio Bacteria Spur Cancer Growth in Mouth

Two bacteria prevalent in periodontal disease form small fatty acids that incite growth of deadly Kaposi's sarcoma (KS)-related lesions and tumors in the mouth, according to Case Western Reserve University researchers who discovered the potential connection.

Their discovery could be key to the development of testing and preventive treatments. Saliva testing for the bacteria may lead to early treatment and monitoring for signs of KS before malignancy develops.

An article describing the discovery, "Short Chain Fatty Acids from Periodontal Pathogens Suppress HDACs, EZH2, and SUV39H1 to Promote Kaposi's Sarcoma-Associated Herpesvirus Replication," appeared online Feb. 5 in the *Journal of Virology*.

Porphyromonas gingivalis and *Fusobacterium nucleatum*, the bacteria associated with periodontal disease, were suspected to contribute to the replication of Kaposi's sarcoma-associated herpesvirus (KSHV) and the development of KS in the mouth.

The researchers recruited 21 subjects for this study. The first group of 11 participants had an average age of 50 and had severe chronic periodontal disease. The second group of 10 participants, whose average age was 26, had healthy gums, practiced good oral health and showed no signs of bleeding or tooth loss from periodontal disease.

The researchers studied a saliva sample from each. Part of the sample was separated into its components. The remaining saliva was used for DNA testing to track and identify which bacteria were present, and at what levels.

"The most important thing to come out of this study is that we believe periodontal disease is a risk factor for Kaposi sarcoma tumor in HIV patients," said Fengchun Ye, PhD, the study's lead investigator from Case Western Reserve School of Dental Medicine's Department of Biological Sciences. However, the study did not show that people with periodontal disease are actually at higher risk for developing KS lesions in the mouth.

Osteoporosis Drugs Linked to Jawbone Destruction

The Medical College of Georgia at Georgia Regents University has discovered that drugs used to treat osteoporosis may block a cell's ability to quickly fix a membrane. This can stop an outer membrane from deciphering what enters and exits. The finding was made by Caroline Lewis, a student at the Medical College of Georgia. Lewis said it could explain the side effect of jawbone destruction that may occur in some patients who take osteoporosis drugs.

According to Georgia Regents University News, "Lewis found that kidney epithelial cells from monkeys and muscle cells from mice both lost their ability to quickly repair their outer membrane after exposure to zoledronate, a commonly used bisphosphonate. Without drug exposure, cells quickly recovered from a microscope laser injury."

Lewis's work was on display at the college's Internal Medicine 2014 meeting. Lewis and Paul McNeil, PhD, a cell biologist at the Medical College of Georgia, are uncertain whether the same cell breakdown occurs in other areas of the body, but they believe the cell repair process is similar throughout.

Bisphosphonates are often used to treat osteoporosis by slowing bone breakdown. When the rebuilding process cannot keep up, bisphosphonates help maintain bone density, which can prevent bones from breaking too easily. Side effects can include rashes, swollen gums and loose teeth.

Bisphosphonates, according to the Mayo Clinic, can cause a portion of the jawbone to die, mainly in patients who take the drugs intravenously.

For more information, go to news.gru.edu/archives/11876.

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Custom-made Mouthguards Reduce Concussion Risk

When it comes to buying a mouthguard, parents who want to reduce their child's risk of a sports-related concussion should visit a dentist instead of a sporting goods store.

High school football players wearing store-bought, over-the-counter (OTC) mouthguards were more than twice as likely to suffer mild traumatic brain injures (MTBI)/concussions than those wearing custom-made, properly fitted mouthguards, reports a new study in the May/June 2014 issue of *General Dentistry*.

"Researchers and, most importantly, parents, are looking for ways to better protect children against concussions," said lead author Jackson Winters, DDS, a pediatric dentist who also served as a high school and collegiate football official for 28 years. "Consumers may believe that today's advanced helmet design provides sufficient protection, but our research indicates that, when compared to over-the-counter versions, a custom-made, properly fitted mouthguard also is essential to player safety."

The study followed 412 players from six high school football teams. Two hundred and twenty athletes were randomly assigned to wear custom-made mouthguards, and 192 athletes wore standard OTC mouthguards of their own choosing. All players wore the same style of football helmet.

According to the study, 8.3 percent of athletes in the OTC mouthguard group suffered MTBI/concussion injuries. For those with custom-made mouthguards, however, the rate was only 3.6 percent.

Previous studies have theorized that mouthguards can reduce concussion risk because they help absorb shock, stabilize the head and neck and limit movement caused by a direct hit to the jaw.

"Although more research on this topic is needed, our study shows the value of a custom-made mouthguard," Dr. Winters said. "The benefits of protecting your child far outweigh the costs associated with a dental or medical injury, which is likelier to occur with a store-bought model."

For more information, read the article "Role of mouthguards in reducing mild traumatic brain injury/concussion incidence in high school football athletes," in the May/June 2014 issue of *General Dentistry*.

Mutation Found in Jaw Tumor: World's First

A Finnish team of researchers was the first in the world to discover a gene mutation in ameloblastoma, a tumor of the jaw.

Ameloblastoma, an odontogenic tumor with a high tendency to recur, is most often found in the posterior of the lower jaw. Ameloblastomas are treated surgically, often resulting in tissue deficiencies in the jaws as well as loss of several teeth. A suitable drug therapy could reduce the need for surgery and the recurrence of ameloblastoma, but finding such a treatment requires a better understanding of the pathogenesis of the tumor.

Researchers have been searching for the mutation that causes ameloblastoma for decades and have recently found it in a patient living in the eastern part of Finland. The core of the team making the discovery comprises researchers from the University of Turku and the University of Eastern Finland. According to the leaders of the team, Klaus Elenius, MD, PhD, professor of Medical Biochemistry at the University of Turku and Kristiina Heikinheimo, DDS, MS, PhD, professor of Oral Diagnostic Sciences at the University of Eastern Finland, the finding is a scientific breakthrough. The significance is further emphasized by the fact that it has direct implications for treatment, because a targeted drug for the mutation in question already exists.

The findings were published in the March 2014 issue of the *Journal of Pathology*.

Cultural and Linguistic Competency E-Learning Program for Oral Health Professionals

The U.S. Department of Health and Human Services' Office of Minority Health has released an e-learning program designed to provide health professionals with the knowledge and skills to better serve diverse patient populations. The *Cultural Competency Program for Oral Health Professionals* (CCPOHP) is a key component of the department's Oral Health Initiative launched in 2010. The initiative promotes the effective delivery of oral health services to underserved populations, emphasizes that oral health is an essential component of overall health and promotes awareness and reduction of oral health disparities in minority and underserved populations.

Oral health disparities remain high among certain racial and ethnic groups. The public health implications

of persistent oral health disparities are striking: untreated tooth decay can cause pain and infections that lead to additional problems in daily activities such as eating and speaking. In addition, African American and Mexican American adults are more likely than Caucasian adults to have untreated dental caries (Dye et al., 2007) and racial and ethnic minority youth are more likely to be uninsured and have more unmet dental needs than Caucasian youth (Flores and Lin, 2013). Furthermore, oral health disparities are associated with reduced overall quality of life.

The *Cultural Competency Program for Oral Health Professionals* is designed for a broad range of oral health professionals, including dentists, dental hygienists and dental assistants. The three-course program will offer eligible oral health professionals the opportunity to gain up to six continuing education credits at no cost. The ultimate goal for this e-learning program is for oral health professionals to gain the basic cultural and linguistic competency and skills necessary to provide high-quality, effective oral health care to all individuals. For information, visit oralhealth.thinkculturalhealth.hhs.gov. For additional information, visit thinkculturalhealth.hhs.gov and minorityhealth.hhs.gov.

T Cell Isolation May Lead to Oral Disease Research

Traditionally, researchers have had to use immune cells from blood in order to learn more about treating and preventing oral cancers, cardiovascular disease, AIDS and other infectious diseases.

Researchers at Case Western Reserve University, however, have discovered a new method to extract single rare immune cells from the mouth. This could allow a unique opportunity to study how the mouth stops infection and inflammation.

Pushpa Pandiyan, lead author and assistant professor of biological sciences at the Case Western Reserve University dental school, said immune cells from the mouth could not previously be isolated sufficiently to study them.

The new method is being labeled as an "isolation of T cells from mouse oral tissues." The method was able to extract isolated cells that lived long enough to study; in fact, more than 94 percent lived long enough to be studied.

According to the official description of the method, "Using mouse models, the researchers isolated two important specialized immune T lymphocytes that play a role in fighting oral diseases. The cells are part of the adaptive immune system in which cells respond to pathogens invading the body. The researchers took tissue samples from the mouths of mice and washed them several times in saline and chemical solutions with antibiotics. This was followed by disintegrating the tissue using salts and enzymes. The solution was centrifuged and strained to separate different tissue parts with more washings and separations before the cells could be studied and grown."

To read the article, visit biologicalproceduresonline.com/content/16/1/4.

Rare Bone Diseases and Their Dental, Oral, Craniofacial Manifestations

Hereditary diseases affecting the skeleton are heterogeneous in etiology and severity. Though many of these conditions are individually rare, the total number of people affected is great. These disorders often include dental-oral-craniofacial (DOC) manifestations, but the combination of the rarity and lack of in-depth reporting often limit the understanding and ability to diagnose and treat affected individuals.

The International and American Associations for Dental Research (IADR/AADR) have published a paper titled "Rare Bone Diseases and Their Dental, Oral and Craniofacial Manifestations" in the *Journal of Dental Research*.

Discussed in this report are defects in four key physiologic processes in bone/tooth formation that serve as models for the understanding of other diseases in the skeleton and DOC complex: progenitor cell differentiation (fibrous dysplasia), extracellular matrix production (osteogenesis imperfecta), mineralization (familial tumoral calcinosis/hyperostosis hyperphosphatemia syndrome, hypophosphatemic rickets, and hypophosphatasia), and bone resorption (Gorham-Stout disease). For each condition, the authors highlight causative mutations (when known), etiopathology in the skeleton and DOC complex and treatments.

By understanding how these four foci are subverted to cause disease, the researchers aimed to improve the identification of genetic, molecular and/or biologic causes, diagnoses and treatment of these and other rare bone conditions that may share underlying mechanisms of disease. For more information, see the OnlineFirst version of the *Journal of Dental Research at* jdr.sagepub.com/content/early/recent.

New Grafting Procedure for Oral Implantation

A goal of current oral surgery is not merely to replace a problematic tooth, but also to keep the supporting tissue structure of the mouth and jawline intact. This helps in maintaining the long-term effectiveness of the surgery, the oral cavity and jawline esthetics. However, if infection is present, surgery is usually delayed, which may compromise the supporting tissues.

An innovative new procedure utilizes a single incision for access and localized antibiotics to treat infection, and will enable immediate implantation with a bone graft harvested from a portion of the patient's own lower jaw. A case study in the *Journal of Oral Implantology* provides an in-depth analysis of this new approach for immediate treatment and implantation of an infected area.

(16a) Periapical radiograph three years after the implant placement of tooth No.10. (16b) The final restoration, three years after implant placement of tooth No.10. *(Images courtesy of Aladdin Alardah, DDS, MS, assistant professor, Advanced Education in Implant Dentistry, Loma Linda University.)*

Required surgeries frequently coincide with oral infection, and surgeons prefer to wait until the infection is resolved before performing the reconstructive implant surgery. This time lapse in placement of reconstructive bone grafts reduces the success rate of the implantation from 100 percent with immediate implantation to 92 percent.

In the case study, a 43-year-old female presenting with a front-tooth infection underwent a root canal and antibiotic treatment. When symptoms persisted, tooth removal was recommended. Despite the infection, the patient was able to receive a bone graft harvested from the symphysis of her mandible. Application of localized antibiotics was used to treat the infection. Three years postoperatively, the patient presented with no negative effects.

For more information, see "Three Year Follow-Up of a Single Immediate Implant Placed in an Infected Area: A Clinical Report of a Novel Approach for the Harvesting Autogenous Symphysis Graft," in the *Journal of Oral Implantology*, vol. 40, no. 2, 2014.

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Medical Management of Dental Caries

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GUEST EDITOR

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Conflict of Interest Disclosure: None reported.

In this special issue examining the medical management of dental caries, authors look at methods, programs and means to deal with dental caries as a disease. Although dental caries is the most prevalent infectious disease in humans, affecting 97 percent or more of the population in their lifetime, we primarily treat the effects of dental caries and not the disease itself.

Most restorative dentistry, endodontic and prosthodontic procedures in adults are performed to treat the results of dental caries, not to treat the disease. We are generally limited to surgical restorative interventions because we have historically lacked clinical caries detection tools sensitive enough to see a caries lesion at such an early stage that it can be treated with medicinal therapeutic approaches. Remineralization and other techniques that can assist in reversing the progression of a caries lesion are well established in vitro, but have not found routine clinical use because of the absence of clinically feasible early detection methods. When it comes to reducing the risk of caries within populations or groups of patients within a practice, we typically provide empirical standardized recommendations such as "brush and floss" and "use fluoride toothpaste." Although many methods of intervention to reduce caries risk are extremely effective within populations at risk, routine measures do not target individual patients who might be at much greater than average risk. New ways of thinking combined with new technologies will dramatically change the way we deal with dental caries as a disease. Managing the disease process by mitigating risk instead of identifying the disease at a later stage when surgical restorative intervention is required will soon become the norm.

The gross domestic consumption of the entire dental profession stands at around $115 billion per year in the U.S. The dental business in the U.S. has grown at a greater rate than the economy as a whole over the last decades, although its growth has recently slowed. Approximately 80 percent of all dental expenditures are for professional services, mainly dentists' fees. Only 12 percent of expenditures are for consumer products (toothpaste,

Video for this article is available in the e-pub version of the *Journal*, available at cda.org/apps.

mouth rinses, etc.), with approximately 8 percent for professional product sales, including consumable materials and dental equipment. However, when one examines the estimated $115 billion gross domestic consumption in dentistry each year, it becomes apparent that approximately 60 percent of the total expenditure, or about $75 billion a year, is spent on treating the results of dental caries. The vast majority of the caries expenditures (most restorative dentistry) does not treat caries at all, but provides surgical repair for the damage done by dental caries disease. The main reason this situation exists is that dentists do not have the necessary detection tools to identify the caries process on a site-specific basis until very late in the disease progression. At that late stage, surgical intervention is the only available approach.

The caries lesion detection devices the dental profession currently uses are extremely insensitive. Visual examination using an explorer and mirror can identify caries lesions only at a stage when restorative interventions are needed. Radiography is also extremely insensitive in spite of the introduction of digital radiography. The core technology of X-radiation allows detection of proximal caries lesions only when they are at least halfway through the enamel radiographically. At this stage, demineralization can be challenging to undertake, and it is even more challenging to confirm that one has successfully reversed the course of the lesion directionally. Additionally, the ability to superimpose the current status of the caries lesion upon a later-identified status is, at a minimum, challenging. A product that would treat a caries lesion medicinally and later identify the reversal of its progression with adequate precision and specificity is not currently available. This lack significantly reduces the likelihood that a pharmaceutical company would be interested in developing new categories of pharmaceuticals to medicinally treat caries lesions early. The limitation on early detection also causes the profession to miss caries lesions at early stages when remineralization and other medicinally mediated techniques might be effective. Transillumination to identify caries lesions in interior teeth has been used for centuries but is limited to the identification of lesions that are already extensive in their progress within the enamel and are well under way toward cavitation, if that has not already occurred.

Visual examination using an explorer and mirror can identify caries lesions only at a stage when restorative interventions are needed.

The changes that will transpire in this area of dental practice will alter dentistry perhaps more than anything that has happened to date. When assessing new caries detection tools, one must evaluate them based on important criteria, including sensitivity and specificity. I define sensitivity as the ability of a tool or device to identify the presence of the caries process without false negatives. By this measure, all the tools we have historically used to detect caries lesions are extremely insensitive. Included in this list are visual examination, radiography and transillumination. Specificity by my definition refers to the accuracy of the tool or device in its identification of the condition it detects; in others words, no false positives. Yet, one must further differentiate two distinct components of specificity. The first is whether what has been detected is indeed what it is believed to be. If a radiograph or visual examination detects what appears to be a caries lesion, how certain can one be that what was detected is indeed a caries lesion? The second important part of specificity, which becomes even more crucial as we begin to detect caries lesions at earlier stages, is whether the detected lesion will progress if it is left untreated. This is perhaps the more difficult challenge. Clearly, the earlier one detects caries lesions, the greater the chance that the detected lesions will not progress to a stage requiring surgical intervention. This creates a set of false-positive lesions that, although identified, may not have progressed and resulted in unnecessary (medicinal) treatment. Although this type of unnecessary treatment is not the same as cutting into a healthy tooth unnecessarily, it would undoubtedly generate exceptional unnecessary cost, for which third-party payers would not be likely to reimburse. The natural compensatory mineralization process might allow routine reversal of very small lesions by naturally occurring demineralization. This aspect of specificity — considering whether the lesion would progress if untreated — is important to understand. But most experts are not significantly concerned about employing mineralization techniques for early-detected small lesions, even at the risk of treating some that would not have progressed if untreated.

The greater concern arises when these lesions are treated by surgical restorative interventions, even when they might not have progressed at all or were perhaps treatable with medicinal mineralization approaches. The dental marketplace will not be receptive to these newer highly sensitive tools, even with increased specificity, unless prediction of lesion progression can be maximized. Third-party payers are not

currently positioned to reimburse for mineralization therapies; in fact, they do not reimburse for detection methods or techniques that might obviate the need for radiographs, which are currently billable. Much needs to change in our focus on compensation to allow all the many expected technological innovations in this field to advance into practice.

A variety of means are available today to assess an individual patient's risk for developing caries lesions. These tools gather historical and environmental information to determine the risk level based upon interview data, and employ various forms of technology to assess distinct outcomes measures as determinants of risk. Featherstone et al. have developed a risk assessment tool with separate sections for adults and children. This tool, caries management by risk assessment (CAMBRA), includes historical and environmental factors and uses technology to evaluate such factors as bacterial counts and salivary flow rates, as well as other important aspects of saliva.

The American Academy of Pediatric Dentistry (AAPD) has recently published a revised caries assessment tool that allows the clinician to assign a relative risk to a child by virtue of historical and environmental data collection, as with the CAMBRA test. The greatest predictor for future caries is a history of caries. If a child has a single surface caries lesion, his or her risk of developing future caries lesions is dramatically increased, according to any risk assessment tool currently in use. Family history of caries, particularly from the mother, also increases the child's risk. The actual predictive value of the multiple caries assessment tools and their accuracy in predicting who will exhibit what number of caries lesions in the future is limited, as is their specificity in determining and predicting caries lesions. Therefore, we must develop outcomes studies that examine assessment tools, whether historical, environmental or in combination with technology, and judge them on their ability to predict actual caries lesion experience in the future. The prediction of caries lesion progression is the ultimate indicator of success for a caries assessment tool or technology.

The dental marketplace, including patients, dental professionals and third-party payers, continues to engage in discussions that would allow the ideal caries assessment tool to be used routinely in practice. Many payers encourage dentists to use caries assessment tools, regardless of their ability to specifically identify caries lesions. The ability to predict caries lesions is the ultimate consideration. Once a caries assessment tool employs technology (yet to be developed fully) that can predict caries experience with great specificity, we will enter a new era of dentistry in which patients are offered screening services such as risk assessment and subsequent medicinal therapeutic interventions, rather than the exclusive use of surgical restorative intervention. Although it is assumed that most patients would prefer earlier, nonsurgical treatments, these will not be universally available until compensation means are in place.

The prediction of caries lesion progression is the ultimate indicator of success for a caries assessment tool or technology.

Besides looking at the environmental conditions in the patient's history as a predictor of caries risk, multiple technologies in various stages of development might aid in predicting caries lesion progression. Over the next years, validated outcomes data will emerge to determine which technologies or collection of technologies and assessment tools will provide the needed predictive value in indicating a precise risk of caries lesion experience.

The caries process is exceptionally complex and involves the host, the bacterial biofilm composition and the interface between host and biofilm. The term "acid production potential" has been employed to examine the risk of caries regardless of the composition of the biofilm and other factors. If a biofilm is capable of producing large quantities of acid very quickly at a sustained rate, given fermentable carbohydrate exposure, that patient is more likely to develop caries lesions. However, many mitigating factors, such as oral hygiene behaviors, fluoride regimens and host factors, are still unknown.

Today, no technology or product is perfect in predicting caries experience in children or adults. The acid production potential appears quite promising regardless of the biofilm composition, as its capability for identifying acid when challenged with fermentable carbohydrates is significant. Therefore, any methodology that could measure the acid production potential of the biofilm as a diagnostic tool might be useful in predicting caries experience. A product known as Cariostat, which is available in Japan but not yet in the U.S., has been around for decades. Shimono and colleagues at Okayama University studied this interesting risk assessment tool and showed years ago that it could predict caries lesion experience measured as decayed and filled surfaces in children. The test has reliably predicted caries experience in toddlers two years

later by sampling as early as 18 months of age. This tool takes a plaque sample and subjects it to a sucrose solution, incubates it for two days and then looks for a colorometric change to identify the acid production potential of the biofilm. This is not new, but rather is an old idea that has been shown to be effective.

Many of these tools will be extremely useful in a variety of environments, not limited to dental offices. Pediatricians, nurses and other health care providers typically encounter children and adults more frequently than dentists do, particularly at certain stages of life. The recent trend toward interprofessional education in academic health centers provides a laboratory for interprofessional practice and is extremely important for engaging the entire health care team in identifying patients at risk for caries. As technologies unfold that are easy to use and highly specific in their ability to predict caries experience in children and adults, they will likely be employed in various venues in the future.

Other papers in this issue will examine medical management of caries from a variety of perspectives. The ability to assess a population's risk and compare that risk to other populations will undoubtedly focus attention on dentistry's participation in the various elements of health care reform. The triple aim of the Affordable Care Act (ACA) requires us to focus more on quality outcomes in terms of objective and subjective quality from the patient's perspective, increasing efficiency while improving quality and reducing cost. This effort will require the cooperation of the entire health team. The examples given in the papers in this issue are significant both in their focus on medicinal management of caries, the corrective actions important for all of us in the dental profession and the need to address the management of one of the most expensive diseases in the U.S.

The $75 billion spent each year on dental caries in this country is primarily allocated to treating the results of the disease, mostly in the form of restorative dentistry, prosthodontics and endodontics. Given that we understand the science of caries and how it progresses but do not understand the complex nature of caries progression in different individuals, the need for technology risk assessment tools to help predict who will develop caries lesions becomes ever more important. By specifically identifying individuals at risk, we can engage the entire industry, including third-party payers, in developing health outcomes with measures that concentrate on prevention and management of caries lesions prior to cavitation. This will initiate a whole new era of dental practice, which will include professionally applied treatments in the dental office combined with OTC products to reduce the risk of caries experience and to treat specific caries lesions.

Caries experience in preschoolers remains extremely high, and this is the only category of patients whose caries rates are going up.

In 2000, the U.S. surgeon general's report called the dental caries problem in children "a silent epidemic." Not a lot has changed in the past 14 years. Caries experience in preschoolers remains extremely high, and this is the only category of patients whose caries rates are going up. Included in the report was an extensive explanation of the problems with access to care in this country. As with many other conditions, the vast majority of disease manifestation exists in a small percentage of the population. Caries disease affects those with poor access to care more than those with easy access. Therefore, the entire community of health care professionals must work together to identify those who may be at risk, regardless of their access point, and focus our caries management efforts on venues and treatments which allow medical management interventions that do not involve only surgery.

The future of dentistry's technology development is not entirely known, but very exciting times are ahead, as we are currently examining all aspects of dental practice. This includes the change from manual fabrication of precision impressions, provisional restorations and laboratory-fabricated customized restorations to scanning the patient's teeth with direct digital transfer of data to a laboratory and subsequent fabrication of a crown. Nor do we know whether this technique will take place primarily in the dental office or in dental laboratories. It seems to be a race to the finish line as to who can develop digital technologies faster in an effort to better prepare teeth for restorative procedures.

Yet, there is typically much less discussion in the dental profession on the topic of this special issue. Management of caries lesions by medicinal approaches versus restorative techniques is a major question to be dealt with over time, depending on how quickly the necessary technologies and systems can be deployed. The entire subject of computer-aided design and computer-aided manufacturing (CAD/CAM) of digital impressions and laboratory- or dental office-fabricated restorations is based on the assumption that restorative dentistry remains the mainstay of the profession. It certainly will for some time, as caries lesions continue

to progress, need to be replaced after the initial restorations and eventually require extracoronal restorations. In time, however, additional therapeutic treatments to reduce both the number of initially progressing caries lesions and the resultant number of restorations will delay the replacement of existing restorations. The ability to treat secondary caries activity around the margins of existing restorations will slow the overall progression of caries lesions and the need for restorative intervention across the entire population.

This more comprehensive outcome will take decades, but it must start somewhere. The implementation of data analytics, data mining and access to patient information through a host of sources in the cloud will enable us to use forms of artificial intelligence to create predictive models of the outcomes of all treatments in the dental office. This predictability of outcomes through sharing large datasets will quickly enable us to examine which treatments create the best outcomes. This in turn will accelerate medicinal product development along with identification of highly specific detection tools to shift the curve toward caries lesion management, caries risk management and reduced surgical intervention in favor of medical management of caries and caries lesions. ■

RECOMMENDED READING

1. Masood M, Yusof N, Hassan MI, Jaafar N. Assessment of dental caries predictors in 6-year-old school children – results from five-year retrospective cohort study. *BMC Public Health* 2012 Nov. 16;12:989.
2. Gao XL, Seneviratne CJ, Lo EC, Chu CH, Samaranayake LP. Novel and conventional assays in determining abundance of *Streptococcus mutans* in saliva. *Int J Paediatr Dent* 2012 Sep;22(5):363-8.
3. Rochlen GK, Wolff MS. Technological advances in caries diagnosis. *Dent Clin North Am* 2011 Jul;55(3):441-52, vii.
4. Dounis G, Ditmyer MM, McClain MA, Cappelli DP, Mobley CC. Preparing the dental workforce for oral disease prevention in an aging population. *J Dent Educ* 2010 Oct;74(10):1086-94.
5. Soxman JA. Improving caries diagnosis and early intervention in the primary and young permanent dentition. *Gen Dent* 2010 May-Jun;58(3):188-93.
6. Milgrom P, Zero DT, Tanzer JM. An examination of the advances in science and technology of prevention of tooth decay in young children since the *Surgeon General's Report on Oral Health*. *Acad Pediatr* 2009 Nov-Dec;9(6):404-9.
7. Strassler HE, Sensi LG. Technology-enhanced caries detection and diagnosis. *Compend Contin Educ Dent* 2008 Oct;29(8):464-5, 468, 470 passim. Review.
8. Ahovuo-Saloranta A, Hiiri A, Nordblad A, Mäkelä M, Worthington HV. Pit and fissure sealants for preventing dental decay in the permanent teeth of children and adolescents. *Cochrane Database Syst Rev* 2008 Oct 8;(4):CD001830.
9. van Palenstein Helderman WH, Van't Hof MA, van Loveren C, Bronkhorst E. Utility technology in the assessment of the cut-off between a negative and a positive test in a caries prediction model. *Caries Res* 2007;41(3):165-9.
10. Berg JH. Minimal intervention: motivating patients through caries risk assessment. *Compend Contin Educ Dent* 2007 Mar;28(3):162, 164.
11. Berg JH. Early dental caries detection as a part of oral health maintenance in young children. *Compend Contin Educ Dent* 2005 May;26(5 Suppl 1):24-9.
12. Mejàre I, Axelsson S, Dahlén G, Espelid I, Norlund A, Tranæus S, Twetman S. Caries risk assessment. A systematic review. *Acta Odontol Scand* 2014 Feb;72(2):81-91. Epub 2013 Sep 2.
13. Hallett KB. The application of caries risk assessment in minimum intervention dentistry. *Aust Dent J* 2013 Jun;58 Suppl 1:26-34.
14. Carson SJ. Limited evidence for existing caries assessment systems. *Evid Based Dent* 2013 Mar;14(1):10-1.
15. Tellez M, Gomez J, Pretty I, Ellwood R, Ismail A. Evidence on existing caries risk assessment systems: are they predictive of future caries? *Community Dent Oral Epidemiol* 2012 Sep 15.
16. Madan N, Rathnam A, Bajaj N. Palmistry: a tool for dental caries prediction! *Indian J Dent Res* 2011 Mar-Apr;22(2):213-8.
17. Fontana M, Santiago E, Eckert GJ, Ferreira-Zandona AG. Risk factors of caries progression in a Hispanic school-aged population. *J Dent Res* 2011 Oct;90(10):1189-96.
18. Fontana M, Jackson R, Eckert G, Swigonski N, Chin J, Zandona AF, Ando M, Stookey GK, Downs S, Zero DT. Identification of caries risk factors in toddlers. *J Dent Res* 2011 Feb; 90(2):209-14.
19. Li Y, Zhang Y, Yang R, Zhang Q, Zou J, Kang D. Associations of social and behavioural factors with early childhood caries in Xiamen city in China. *Int J Paediatr Dent* 2011 Mar; 21(2):103-11.
20. Sánchez-García S, Reyes-Morales H, Juárez-Cedillo T, Espinel-Bermúdez C, Solórzano-Santos F, García-Peña C. A prediction model for root caries in an elderly population. *Community Dent Oral Epidemiol* 2011 Feb;39(1):44-52.
21. Gao XL, Hsu CY, Xu Y, Hwarng HB, Loh T, Koh D. Building caries risk assessment models for children. *J Dent Res* 2010 Jun;89(6):637-43.
22. Petersson GH, Isberg PE, Twetman S. Caries risk assessment in school children using a reduced Cariogram model without saliva tests. *BMC Oral Health* 2010 Apr 19;10:5.
23. Parhar G, Yoon RK, Chussid S. Maternal-child oral health behaviors and caries experience in the child. *J Clin Pediatr Dent* 2009 Winter;34(2):135-9.
24. Ewoldsen N, Koka S. There are no clearly superior methods for diagnosing, predicting and noninvasively treating dental caries. *J Evid Based Dent Pract* 2010 Mar;10(1):16-7.
25. Aleksejūniene J, Holst D, Brukiene V. Dental caries risk studies revisited: Causal approaches needed for future inquiries. *Int J Environ Res Public Health* 2009 Dec;6(12):2992-3009.

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CDA JOURNAL, VOL 42, N°7

Management of Patients With Active Caries

Peter Milgrom, DDS

ABSTRACT This paper reports on a mechanism to manage caries as a disease and to medically intervene in the disease process to halt progression. The goal of this paper is to provide this alternative to a surgical-only approach. The management of caries begins with assessing lesion activity and the potential for arrest. This requires a clinical and radiological assessment and evaluation of risk. Hopeless teeth are extracted and large cavities filled to reduce infection. Risk reduction strategies are employed so efforts to arrest lesions can be successful. Teeth with lesions in the enamel or outer third of the dentin should be sealed, not restored, as restorations can weaken teeth and can be traumatic to pulps.

AUTHOR

Peter Milgrom, DDS, is professor of Dental Public Health Sciences and Pediatric Dentistry in the School of Dentistry and adjunct professor of Health Services in the School of Public Health and Community Medicine at the University of Washington. He also directs the university's Northwest Center to Reduce Oral Health Disparities. Dr. Milgrom maintains a practice limited to the care of fearful patients and was the director of the Dental Fears Research Clinic at the University of Washington. *Conflict of Interest Disclosure: None reported.*

Historically, there was little difference between detecting a carious lesion and placing a filling. There was no diagnostic step. I am reminded of a young man, 18 years old, with not a single filling. He was seen for the first time by a young dentist and left the office with multiple small Class II fillings. Indeed, his bitewing X-rays showed multiple interproximal lesions, some in the enamel and some in the outer third of the dentin. The dentist took no history, sought no records from the previous dentist, nor asked himself why a healthy individual would suddenly develop all these new lesions. Before moving to town, the patient had seen a dentist in the city where he was a student. That dentist had diagnosed these lesions, assessed risk and provided frequent topical fluoride treatments and dietary counseling to lower the caries risk. He monitored his patient frequently but placed no fillings in these otherwise intact teeth. When the lesions were opened, they were found to be hard and inactive.

The tragedy of this story is not the stark contrast in caries management styles, but that neither dentist explained to this patient the rationale for his approach, nor had the second dentist sought out the treatment records, which were readily available. Fifty or more years ago, there was no diagnostic step in a caries exam in dental practice. It was assumed that all lesions were active and that most patients had them, as this was the prefluoride period. There was generally inadequate technology available to the clinician to identify early lesions, and remineralization techniques were not widely accepted.[1]

This history has persisted with the lack of actual diagnostic codes for dental caries disease within the CDT system until very recently. Detecting and treating were conceptually a single continuous process, with treatment decisions dictated by the size of the lesion and the pocketbook of the patient. In fact, until the 1970s, dental examinations were often free in private offices.

Collection of Information

Studies have demonstrated that a careful visual exam by a trained examiner using good light, a mirror and a blunt probe is equal to or more likely more accurate and reproducible than using laser fluorescence, especially since the testing equipment use is largely confined to accessible smooth surfaces and is ineffective in pits and fissures and interproximally.[2] The visual tactile exam or findings from the use of the various devices results in information about the state of the teeth. Neither provides sufficient information alone for a diagnosis and treatment plan.

Bitewing radiographs are an essential part of a dental caries examination. They reveal possibly precavitated lesions with the potential for remineralization and deeper lesions that can be arrested. With ultrafast film and appropriate radiation hygiene, X-rays are safe, but digital X-rays have largely displaced traditional films. Caries lesion detection on digital films has been shown to be similar to that with traditional films, with increased safety and efficiency.[3] Nevertheless, the inability of a single X-ray image to distinguish between cavitated and noncavitated interproximal lesions or to detect lesion activity remains the same. Fifty-six to 80 percent of lesions visible on bitewings are not cavitated.[4] The ability to manipulate the images on the computer leads to a false confidence in the information from the films.

Studies have repeatedly demonstrated that lesion progression from the outer half of the enamel into the dentin takes three to four years in healthy children where there is water fluoridation or where fluoride toothpaste is used, but not all lesions progress.[5] Progression is related to the initial depth of the lesion. In one study of 13-year-olds who were followed for 10 years, 63 percent of interproximal lesions detected by X-rays did not progress and 86 percent of enamel lesions remained unchanged.[6] The point is there is always time to employ remineralization and caries arrest techniques. That is not the same as the traditional "watch," which, in the absence of intensive efforts to change caries risk status, is simply watching things get worse.

Unstandardized X-ray diagnosis of the presence or depth of lesions over time is likely to be unreliable.

Inactive Caries

Inactive caries usually refers to cavities that are radiographically unchanged or lesions that are dark in color and hard on visual tactile examination. Such lesions are often present at the cervical of teeth in older adults, and "burned out" carious lesions in primary teeth are common among older preschoolers whose caries risk status changed after they were weaned and switched to solid food or who received xylitol chewing gum.[7] Sharp instruments can always damage arrested dentin, so the test is not whether the surface can be excavated.[8] Unstandardized X-ray diagnosis of the presence or depth of lesions over time is likely to be unreliable.[9] Variation in film and device placement precludes the dentist from making fine gradations in changes in lesions. There will be many false positives in judging lesion progression, although deeper lesions are more likely to progress.[5]

Can a Patient Have Active and Inactive Caries?

One thinks of the patient with an inlay or onlay with cement washout or a defect in whom active caries develops when no other teeth are affected. The cause is failure of the cement and probably does not indicate that the caries risk status of the patient has changed. This situation requires management of the individual tooth and not a major shift in caries management for the patient.

Caries Risk Assessment With Active Caries Lesions

Nearly all dentists today do an informal or formal caries risk assessment. The pages of this journal have been filled with information on conducting risk assessments. However, risk is automatically moderate or high if lesions are present. The value of the assessment — used repeatedly over time — is to identify modifiable factors than can lower risk. Dental caries does not progress without some high risk factors. It is important to recognize that the most significant risk factor changes in both adults and children may stem from medical illness and medication use.

Arresting Active Caries

Control Extent of Biofilm Infection

The major dietary risk in the U.S. today is from sugar-sweetened beverages and sports drinks. Soft drinks, fruit drinks and sports drinks represent about one-

third of all added sugar consumption for children and many adults. Typical daily consumption of added sugar in 2001 was 22 teaspoons per person for the whole population.[10-11] Sugar feeds the caries biofilm and results in high levels of plaque that are associated with dental caries. This pattern is not hard to identify, but many patients are unaware that these beverages and their pattern of use are the source of increased caries risk. This dietary pattern is also a frequent cause of obesity in children and teenagers. There is evidence from the obesity literature that targeted counseling and substitution of water for these beverages can be effective.[12] Newer, personalized and targeted counseling approaches can also be successful.[13]

Antiseptics

There are two main biological arguments for adding a broad-spectrum topical antimicrobial to change caries risk. The first is that individuals with high rates of tooth decay are much more heavily colonized with pathogenic organisms than those who experience less tooth decay.[14] While the primary pathogen is *Streptococcus mutans*, other bacteria have been associated with tooth decay. A broad-spectrum antimicrobial can be effective against a wide range of pathogens associated with dental caries.

Iodine (I_2) is among the most potent of bactericidal agents, and its action is rapidly bactericidal. I_2 has excellent penetration into intact dental plaque biofilm[15] and its bactericidal and penetrability characteristics make it an excellent choice for dental use. A single dental prophylaxis followed by application of a 2% I_2-KI solution immediately and again at three and five days following the single prophylaxis significantly reduced *S. mutans* levels in tooth fissure and proximal surface plaques and saliva of dental assistants and dental hygiene students. Reductions

FIGURE 1.H TOPICAL APPLICATION OF POVIDONE IODINE TO THE TEETH OF A CHILD.

of *S. mutans* persisted 20-24 weeks in proximal plaque and saliva; fissure plaques were significantly suppressed for four weeks but gradually returned to baseline in the absence of dietary restrictions.[16]

The second argument in favor of I_2 is that it is known to impact the ability of *S. mutans* to bind to tooth surfaces by disrupting the expression and production of glucosyltransferase by the mutans streptococci.[17] Glucosyltransferase made by them is critically involved in mediation of adherence of these bacteria to the teeth biofilm and is established to be a potent virulence determinant. Furthermore, I_2 has potent antifungal effects, suggesting that overgrowth of such potential pathogens should not be a concern.

Two studies, in high-risk preschoolers and school-age children, have shown that the combination of readily available povidone iodine (e.g., Betadine) plus sodium fluoride (NaF) varnish applied sequentially at the same appointment is more effective in reducing caries than fluoride varnish alone.[18,19] Povidone iodine is nonstaining and does not taste or feel bad. It works on contact. The excess can be wiped off and the teeth then coated with fluoride varnish. **FIGURE 1** shows this application.

Chlorhexidine rinses available in the U.S. have been shown to reduce plaque accumulation but acceptance is limited. Evidence for caries reduction from the 0.12% rinses is limited.[20]

Interproximal Resin Sealants

It is possible to separate teeth and infiltrate early interproximal lesions with unfilled resins. This has been done with standard unfilled resins, such as single bond products and with single purpose materials and kits. Evidence suggests that this treatment arrests the progression of these lesions.[21]

Promoting Remineralization

Fluorides promote remineralization both of damaged teeth and of intact tooth surfaces that may be damaged by acid-producing bacteria. In order for fluorides to work, fluoride levels in saliva and plaque must be habitually maintained. Fluoridated toothpaste used twice daily maintains salivary fluoride levels sufficient to remineralize teeth if the mutans infection is not severe. Twice-daily supervised toothbrushing with fluoridated toothpaste in schools, for example, has shown to be effective in reducing the caries rate. All fluoride toothpastes sold in the U.S. meet the FDA standard and there should be virtually no difference among them except taste and other esthetic properties. Patients with lesions that need to be managed should understand the role that toothpaste and toothbrushing play in the carious prevention process.

Topical NaF varnish is the mainstay of tooth decay prevention. However, topical fluoride alone is not sufficient to prevent tooth decay in high-risk individuals. Varnishes are especially useful because they are inexpensive, user-friendly and require minimal training to use. The varnish is applied to teeth that have been dried with gauze. Once applied, the user can immediately return to normal activities. A Cochrane critical review of fluoride varnish

clinical trials reported the pooled D(M)FS prevented fraction estimate was 46 percent (95 percent confidence interval [CI], 30 percent to 63 percent; P < 0.0001) and the pooled d(e/m)fs prevented fraction estimate was 33 percent (95 percent CI, 19 percent to 48 percent; P < 0.0001).[22] However, topical fluoride alone provides incomplete protection, at least in children.[23]

Promoting Host Defenses

Sugarless Chewing Gum

Chewing gum typically consists of a sweetener, gum base, flavoring and aromatic agent. Common claims for the benefits of gum chewing include the cleansing of food debris from teeth and plaque and stimulating salivary flow. Chewing gum is a potent stimulator of salivary flow, a function of the mechanical act of mastication. Chewing gum after meals stimulates saliva flow with increased concentration of bicarbonate that results in elevated plaque pH and enhanced acid buffering capacity. This stimulated saliva is also in a state of mineral supersaturation, which promotes enamel remineralization. Clearly, sugar-free chewing gum, especially those sweetened with polyols such as xylitol, have potential for enhancing host defense and lowering caries risk.[20]

Bicarbonates

Dentifrices, rinses and even chewing gum containing sodium bicarbonate or arginine bicarbonate may be helpful in restoring normal plaque pH after exposure to dietary sugars. [24-27]

Surgical Management

Unrestorable teeth and those with big unfilled cavities are a reservoir of caries-causing bacteria. While modifying other risk factors may reduce the impact of this reservoir, comprehensive caries management includes removal of hopeless teeth and restoration of large cavities so that the remaining teeth can return to function. The choice of material depends largely on the physical characteristics of the cavity and esthetic considerations. Smaller occlusal lesions can be sealed using pit and fissure sealants carefully placed in a scrupulously dry field. Some interproximal lesions can be sealed or resin impregnated if the surface is accessible. Lesions under carefully placed restorations, especially amalgam and glass ionomer cement (GIC), typically arrest.[28,29] Some of the GIC materials release fluoride and protect surrounding areas, but in practice, it is difficult to know whether a particular material has that potential. However, GIC will serve as a fluoride reservoir when treated topically with varnish. Nevertheless, caries organisms colonize the margins of all restorations.

Cavities in Permanent Teeth

Noncavitated lesions and those in the outer third of the dentin have the potential for remineralization or arrest and should not be filled. Small lesions can be minimally excavated, treated with GIC and then sealed if accessible. Deeper lesions in permanent molars — where the pulp would be exposed if conventional treatment were carried out — can be opened minimally with a bur, excavated only to provide retention and filled with GIC. The surface can then be sealed. This maximizes the potential for maintaining pulp vitality and avoids root canal treatments that are expensive and can be problematic in teeth without fully formed root apices.

A special case exists for primary teeth, especially molars, with interproximal caries. Traditional treatment has required cavity or crown preparation that often results in pulp exposure. This approach is expensive and problematic in many younger children unless they are under deep sedation or general anesthesia. It has been demonstrated that simply cementing a stainless steel crown over the unprepped tooth with GIC arrests the caries and allows the pulp to initiate repair mechanisms.[30] These treatments are provided without local anesthetic injection and are possible even in precooperative children. The occlusion adjusts within a couple of weeks. The teeth are then exfoliated normally. In the worst case, pulp treatments can be provided through the already-cemented crown.

FIGURE 2. Radiation-associated dental caries in an oral cancer patient arrested with diamine silver fluoride topical treatment.

Many older fillings, especially amalgams, are replaced because dentists detect recurrent caries at the margins of such fillings. The information may come from exploring a margin with a sharp explorer or from an X-ray image. Many of these teeth do not demonstrate active decay and can be observed or repaired.[31] Most dentists today see older adults with amalgam fillings placed 30 or more years earlier. They have rarely failed because of dental caries, but more likely because of a cusp fracture resulting from overly large cavity preparations.

Potential New Products

New products such as diamine silver fluoride or a PVP-I containing fluoride varnish may be on the horizon. Active research is ongoing and companies are working to address regulatory hurdles and bring these new materials to market. These products have the potential to further enhance the dentist's ability to manage dental caries lesions. Diamine

silver fluoride (also called silver diamine fluoride or silver fluoride) has been heavily studied and its effectiveness is well documented.[32] **FIGURE 2** shows an adult patient who was treated with surgery and radiation for squamous cell carcinoma of the tongue. He subsequently developed severe dry mouth and cervical caries. He sought care from the author, who treated the lesions topically with diamine silver fluoride. He was also counseled on careful toothbrushing with fluoridated toothpaste and the use of chlorhexidine rinses to minimize plaque accumulation. The lesions turned dark and arrested. His salivary flow improved somewhat but he still experiences dry mouth. The lesions are retreated every six months and have been stable for five years. He has developed no new cavities. It has been suggested that topical silver nitrate, used in conjunction with fluoride varnish, may have similar effects.[33] The commonality of these agents is that they are all antimicrobial.

Conclusion

Patients may expect traditional treatment and be concerned when lesions go unfilled, or the dentist may be fearful that lesions will progress unchecked. It is reasonable to decrease the interval between examinations or to increase the use of targeted radiographs in cases where lesions are being followed without surgical intervention. Frequency of examinations should always be based on risk status. Given the generally slow progression of active lesions, this approach provides reassurance and protection for the patient, assuming the plan is adequately explained. Recurrent caries around fillings when caries risk is high and unmodified after placement is more serious than the risk that a noncavitated lesion will progress. Thus, placing a filling provides false confidence for the patient who may not be seen on a regular basis. ■

REFERENCES

1. National Institutes of Health (U.S.). Diagnosis and management of dental caries throughout life. *NIH Consens Statement* 18(1):1-23, 2001.
2. Novaes TF, Matos R, Braga MM, Imparato JC, Raggio DP, Mendes FM. Performance of a pen-type laser fluorescence device and conventional methods in detecting approximal caries lesions in primary teeth – in vivo study. *Caries Res* 43(1):36-42, 2009.
3. Pontual AA, de Melo DP, de Almeida SM, Bóscolo FN, Haiter Neto F. Comparison of digital systems and conventional dental film for the detection of approximal enamel caries. *Dentomaxillofac Radiol* 39(7):431-6, 2010.
4. Hintze H, Wenzel A, Danielsen B. Behaviour of approximal carious lesions assessed by clinical examination after tooth separation and radiography. *Caries Res 33(6):*415-22, 1999.
5. Ferreira Zondoná A, Santiago E, Eckert GJ, Katz BP, Pereira de Oliveira S, Capin OR, Mau M, Zero DT. The natural history of dental caries lesions: a four-year observational study. *J Dent Res* 91(9):841-6, 2012.
6. Bille J, Carstens K. Approximal caries progression in 13- to 15-year-old Danish children. *Acta Odontol Scand* 47(6):347-54, 1989.
7. Mäkinen KK, Mäkinen PL, Pape HR Jr, Allen P, Bennett CA, Isokangas PJ, Isotupa KP. Stabilisation of rampant caries: polyol gums and arrest of dentine caries in two long-term cohort studies in young subjects. *Int Dent J* Feb. 45(1 Suppl 1):93-107, 1995.
8. Ekstrand KR, Zero DT, Martignon S, Pitts NB. Lesion activity assessment. *Monogr Oral Sci* 21:63-90, 2009.
9. Douglass CW, Valachovic RW, Wijesinha A, Chauncey HH, Kapur KK, McNeil BJ. Clinical efficacy of dental radiography in the detection of dental caries and periodontal diseases. *Oral Surg Oral Med Oral Pathol* 62(3):330-9, 1986.
10. Reedy J, Krebs-Smith SM. Dietary sources of energy, solid fats, and added sugars among children and adolescents in the United States. *J Am Diet Assoc* 110(10):1477-84, 2010.
11. NCI National Cancer Institute. Usual Intake of Added Sugars. Risk Factor Monitoring and Methods Branch website. Applied Research Program. 2010 [updated Feb. 4, 2011]. riskfactor.cancer.gov/diet/usualintakes/pop/added_sugars.html.
12. Ebbeling CB, Feldman HA, Chomitz VR, Antonelli TA, Gortmaker SL, Osganian SK, Ludwig DS. A randomized trial of sugar-sweetened beverages and adolescent body weight. *N Engl J Med* 367(15):1407-16, 2012.
13. Milgrom P, Sutherland M, Shirtcliff RM, Ludwig S, Smolen D. Children's tooth decay in a public health program to encourage low-income pregnant women to utilize dental care. *BMC Public Health* 10:76, 2010.
14. Featherstone JD. The science and practice of caries prevention. *J Am Dent Assoc* 131(7):887-99, 2000.
15. Tanzer JM, Slee AM, Kamay B, Scheer, E. In vitro evaluation of three iodine-containing compounds as antiplaque agents. *Antimicrob Agents Chemother* 12:107-113, 1977.
16. Caufield PW, Gibbons RJ. Suppression of *Streptococcus mutans* in the mouths of humans by a dental prophylaxis and topically-applied iodine. *J Dent Res* 58(4):1317-26, 1979.
17. Furiga A, Dols-Lafargue M, Heyraud A, Chambat G, Lonvaud-Funel A, Badet C. Effect of antiplaque compounds and mouth rinses on the activity of glucosyltransferases from Streptococcus sobrinus and insoluble glucan production. *Oral Microbiol Immunol* 23:391–400, 2008.
18. Tut OK, Milgrom PM. Topical iodine and fluoride varnish combined is more effective than fluoride varnish alone for protecting erupting first permanent molars: a retrospective cohort study. *J Public Health Dent* 70(3):249-52, 2010.
19. Milgrom PM, Tut OK, Mancl LA. Topical iodine and fluoride varnish effectiveness in the primary dentition: A quasi-experimental study. *J Dent Child* 78(3):102-106, 2011.
20. Rethman MP, Beltrán-Aguilar ED, Billings RJ, Hujoel PP, Katz BP, Milgrom P, Sohn W, Stamm JW, Watson G, Wolff M, Wright JT, Zero D, Aravamudhan K, Frantsve-Hawley J, Meyer DM. Nonfluoride caries-preventive agents: executive summary of evidence-based clinical recommendations. *J Am Dent Assoc* 142(9):1065-1071, 2011.
21. Paris S, Hopfenmuller W, Meyer-Lueckel H. Resin infiltration of caries lesions: an efficacy randomized trial. *J Dent Res* 2010 Aug;89(8):823-6, 2010.
22. Marinho VC, Worthington HV, Walsh T, Clarkson JE. Fluoride varnishes for preventing dental caries in children and adolescents. *Cochrane Database Syst Rev* Jul 11;7:CD002279, 2013.
23. Arruda AO, Senthamarai Kannan R, Inglehart MR, Rezende CT, Sohn W. Effect of 5% fluoride varnish application on caries among school children in rural Brazil: a randomized controlled trial. *Community Dent Oral Epidemiol* 40(3):267-76, 2012.
24. Blake-Haskins JC, Gaffar A, Volpe AR, Bánóczy J, Gintner Z, Dombi C. The effect of bicarbonate/fluoride dentifrices on human plaque pH. *J Clin Dent* 8(6):173-7, 1997.
25. Wang XL, Cheng CY, Peng D, Wang B, Gan YH. Dental plaque pH recovery effect of arginine bicarbonate rinse in vivo. *Chin J Dent Res* 15(2):115-20, 2012.
26. Anderson LA, Orchardson R. The effect of chewing bicarbonate-containing gum on salivary flow rate and pH in humans. *Arch Oral Biol* 48(3):201-4, 2003.
27. Putt MS, Milleman KR, Ghassemi A, Vorwerk LM, Hooper WJ, Soparkar PM, Winston AE, Proskin HM. Enhancement of plaque removal efficacy by tooth brushing with baking soda dentifrices: results of five clinical studies. *J Clin Dent* 19(4):111-9, 2008.
28. Hatibovic-Kofman S, Suljak JP, Koch G. Remineralization of natural carious lesions with a glass ionomer cement. *Swed Dent J* 21(1-2):11-7, 1997.
29. Mertz-Fairhurst EJ, Smith CD, Williams JE, Sherrer JD, Mackert JR., Richards EE, Schuster GS, O'Dell NL, Pierce KL, Kovarik RE, et al. Cariostatic and ultraconservative sealed restorations: six-year results. *Quintessence Int* 23(12):827-38, 1992.
30. Innes NP, Evans DJ. Modern approaches to caries management of the primary dentition. *Br Dent J.* 214(11):559-66, 2013.
31. Gordan VV, Riley JL 3rd, Blaser PK, Mondragon E, Garvan CW, Mjör IA. Alternative treatment to replacement of defective amalgam restorations: results of a seven-year clinical study. *J Am Dent Assoc* 142(7):842-9, 2011.
32. Rosenblatt A, Stamford TC, Niederman R. Silver diamine fluoride: a caries "silver-fluoride bullet." *J Dent Res* 88(2):116-25, 2009.
33. Duffin S. Back to the future: the medical management of caries introduction. *J Calif Dent Assoc* 40(11):852-8, 2012.

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Prevention and Nonsurgical Management of Dental Caries Over the Life Course for Individuals With Special Health Care Needs

Donald L. Chi, DDS, PhD, and Ronald L. Ettinger, BDS, MDS, DDSc

ABSTRACT Traditional approaches to caries prevention and management are unlikely to result in successful outcomes for individuals with special health care needs. Intensive prevention-oriented and minimally invasive restorative approaches have the greatest potential to address oral health disparities affecting vulnerable populations. This paper introduces readers to oral health-related issues for patients with special health care needs across the life course and outlines clinical strategies to prevent and manage caries in high-risk patients.

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Individuals with special health care needs have a "physical, developmental, mental, sensory, behavioral, cognitive or emotional impairment or limiting condition that requires medical management, health care intervention and/or use of specialized services or programs."[1] Across the life course, from infancy and adolescence to early and late adulthood, individuals with special health care needs are at increased risk for dental caries and poor oral health.[2-6] The main risk factors for dental caries are behavioral: frequent intake of fermentable carbohydrates (from foods, beverages and medications), inadequate exposure to topical fluorides and irregular use of preventive dental care services (**TABLE**).[7] Factors that compound these behavioral risks for individuals with special health care needs include individual-level characteristics such as hyposalivation or xerostomia caused by chronic medication use, medical treatments used to treat health comorbidities (e.g., radiation near salivary glands, chemotherapy) and intellectual or developmental disabilities, as well as factors beyond the individual, such as caregiver burden, inadequate access to healthy foods and lack of community water fluoridation.[8,9]

To ensure optimal oral health in patients with special health care needs over the life course, dental health

TABLE

Risk Factors Related to Dental Caries in Individuals With Special Health Care Needs Over the Life Course and Examples That Influence Dental Caries Risk

	Lower Risk for Dental Caries	Higher Risk for Dental Caries
Oral Health Behaviors		
Carbohydrate intake from foods and beverages	Well-defined meals and snack times. Low frequency of carbohydrate intake. Limiting sweets.	Irregular meals and snacks. Constant grazing on foods and beverages. Regular use of sweets as rewards.
Twice-daily toothbrushing	Consistent supervised toothbrushing with fluoridated toothpaste.	Nonsupervised or inconsistent toothbrushing. Use of nonfluoridated toothpastes.
Dental visits	Regular prevention-oriented dental visits, povidone iodine treatment, topical fluoride treatment.	Irregular, symptom-driven dental visits. No receipt of povidone iodine or topical fluoride.
Contextual Access Factors		
Access to healthy foods	Good access to grocery stores and cafeterias with healthy foods. Caregivers with high literacy on healthy eating.	Poor access to grocery stores and cafeterias with healthy foods. Caregivers with low literacy on healthy eating.
Access to dental health professionals with adequate training	Good access to dental health professionals who are trained and comfortable treating patients with special health care needs. Dental offices that are accommodating.	Poor access to dental health professionals who are trained and comfortable treating patients with special health care needs. Dental offices that are ill equipped.
Access to community water fluoridation	Community water source is fluoridated.	Community water source is not fluoridated.
Special Considerations		
Medication use	Medication does not contain sugar. Chronic use does not lead to hyposalivation or xerostomia.	Medication contains sugar. Chronic use leads to hyposalivation or xerostomia.
Radiation or chemotherapy	No history of radiation to head and neck area or chemotherapy.	History of radiation to head and neck area or chemotherapy.
Cognitive impairment	No cognitive impairments and cooperation with oral health behaviors.	Severe cognitive impairments that lead to poor cooperation with oral health behaviors.
Physical impairment	No physical impairments making it easier to engage in oral health behaviors. No transportation-related barriers to dental visits.	Severe physical impairments that lead to difficulty engaging in oral health behaviors. Transportation-related barriers to dental visits.

professionals must rethink traditional approaches that focus on the surgical management of caries (e.g., restorations, endodontics, extractions). Surgical approaches may be effective for patients at low risk for caries, but are largely ineffective for high-risk patients with special health care needs, many of whom present with new or recurrent caries in the middle of treatment plans or shortly after treatment plans are completed.[10,11] For individuals with special health care needs, changes in health status, the home environment and other social contextual factors such as access to healthy foods and fluoridated community water can lead to abrupt changes in caries risk and oral health status. The cycle of restoring teeth and replacing restorations can be frustrating to dental health professionals as well as for patients and their families. In addition, surgical approaches are resource-intensive, requiring many patients to return for an unrealistic number of dental visits that drain scarce resources from state Medicaid dental programs, which are increasingly under pressure to control costs.[12] Intensive preventive and nonsurgical (or minimally invasive) caries management strategies are available and can easily be incorporated into private practice and public health settings. The goals of this paper are two-fold: to introduce readers to specific oral health-related issues that affect individuals with special health care needs and to outline clinical strategies that can be used to prevent and manage caries in these patients. We adopt a life course perspective that posits that experiences during early childhood shape an individual's oral health throughout his or her life.[13,14] The life course is divided into six distinct periods: early childhood, middle childhood, late childhood and adolescence, young adulthood, middle adulthood and older adulthood.

Oral Health-related Issues Across the Life Course

Early Childhood (Ages 0 to 5)

Oral health behaviors are established during this period. Infants with special health care needs may be placed on special diets to help maintain weight or manage chronic conditions. Infants

may also consume large volumes of sugar-sweetened beverages (e.g., Ensure, artificial juices, soda, sports drinks) or 100 percent fruit juices for nutrients or hydration.[15] Caregivers may give beverages to their children in baby bottles or no-spill training cups.[16] Many infants with special health care needs take liquid medications containing sugars.[17,18] Frequent eating, snacking, drinking and medication use expose primary teeth and the developing permanent dentition to a continuous source of carbohydrates. In addition to dietary habits that increase caries risk, some caregivers find that it is difficult to brush their young child's teeth and that toothbrushing upsets the child. Other caregivers may be too busy to brush their child's teeth regularly.[19] Many caregivers report that their young child "loves to brush" and may allow unsupervised toothbrushing to nurture these early signs of independence. Because toothpaste labels warn caregivers about the safety of fluoride toothpaste for children younger than 2 years of age, caregivers may brush their young child's teeth with nonfluoridated toothpastes. Caregivers of children with special health care needs may also be concerned about fluoride safety and the causal links between fluoride and systemic health conditions such as autism and developmental disabilities. In terms of dental visits, most children younger than 3 years of age do not visit a dentist.[20] Caregivers of these children may be busy managing the child's systemic health care needs or may not receive appropriate advice from health professionals on when to take their child to the dentist for a first preventive visit.[21,22]

Middle Childhood (Ages 6 to 12)

Many of the behaviors established in early childhood are carried into middle childhood. Children with special health care needs may continue to take medications containing sugars. Those who attend school may have fewer opportunities to graze on foods, whereas children with special health care needs who are home schooled or institutionalized may be exposed to more frequent eating and snacking. Caregivers may encourage their child to begin taking responsibility for his or her own toothbrushing and oral hygiene. In terms of dental use, children with special health care needs ages 6 years and older are at greater risk for needing dental treatment under general anesthesia.[23] Oral rehabilitation under general anesthesia is frequently unavailable for older children because health insurance companies may not preauthorize treatment plans. Minimal or moderate sedation may not be offered to older children because of safety concerns associated with sedating older children in dental offices.[24]

> We adopt a life course perspective that posits that experiences during early childhood shape an individual's oral health throughout his or her life.

Late Childhood and Adolescence (Ages 13 to 17)

During this period adolescents with special health care needs may begin to develop independence in diet-related decisions and toothbrushing.[25] Adolescents may begin purchasing food from school cafeterias or student stores and are influenced by what their peers are eating. Participation in sports may encourage adolescents to drink high volumes of sports or energy drinks.[26] For adolescents with cognitive deficits, caregivers may find that toothbrushing behaviors are increasingly more difficult to enforce because of the adolescent's physical size and strength. Caregivers may continue to schedule dental visits. Some parents and adolescents express concerns about third molars. Orthodontic treatment is initiated during this period. Adolescents seen by a pediatric dentist may begin to feel less comfortable visiting clinics designed for young children. Dental visits start to decline during adolescence.[27]

Young Adulthood (Ages 18 to 21)

At this point, some young adults with special health care needs will continue to live at home, others will move into group homes or assisted living facilities where they become semi-independent in terms of oral health behaviors and others may go to college or find jobs and move away from home. For young adults who move to new home environments involving greater degrees of independence, previously established dietary and hygiene habits may begin to change. Late-night studying in college can prompt nighttime snacking and consumption of energy drinks.[28] Self-management of oral hygiene behaviors may result in irregular toothbrushing. Young adults with special health care needs may also transition out of pediatric dentist offices and into general dentist offices.[29]

Middle Adulthood (Ages 22 to 64)

Middle-aged adults with special health care needs may begin to develop additional co-morbidities that require medications that lead to xerostomia or taste alterations, which can prompt patients to consume hard candies or mints to increase salivary flow and mask medication flavors.

Some adults with special health care needs may lose their dental insurance coverage during this period, which creates financial barriers to dental care. Those with physical disabilities may find it difficult to find dental offices that accommodate wheelchairs.

Older Adulthood (Ages 65 and Older)

Older adults with special health care needs may live in institutions or long-term care facilities where staff members assist them with meal preparation and oral hygiene. Unhealthy snacks may be used to manage behaviors of older adults with special health care needs. Some older adults begin to lose manual dexterity and find it difficult to brush their own teeth, while facility staff may be too busy to assist with oral hygiene. Xerostomia secondary to medication use may get worse during older adulthood, leading to coronal and root caries.[30] Difficulties with swallowing can result in medications being administered in liquids that contain cariogenic sweeteners.[31] Mobility limitations make it difficult for older adults with special health care needs to travel to a dentist office. Medicare does not cover routine preventive and restorative care, which creates barriers to dental care, and state Medicaid programs may or may not provide dental coverage for adults.[32,33]

Preventive and Nonsurgical Management of Dental Caries

Early Childhood (Ages 0 to 5)

All infants with special health care needs should see a dentist for their first preventive dental visit and establish a dental home by 1 year of age.[34,35] Dental offices can partner with local pediatricians and family medicine clinics as well as Birth to Three Developmental Centers and Women, Infant and Children (WIC) Clinics to identify infants with special health care needs. Birth to Three Developmental Centers provide specialized services for young children with developmental or intellectual disabilities. WIC is a specialized supplemental nutrition program that provides low-income families with nutritional advice and education. During the first dental visit, dentists should collect a complete medical and dental history to identify relevant risk factors for caries. The American Academy of Pediatric Dentistry's (AAPD) Caries-risk Assessment Tool (CAT) or Caries Management by Risk Assessment (CAMBRA) can be used to evaluate caries risk.[7,36] Risk factors include use of medications, specialized diets or dietary needs, toothbrushing habits and the child's lack of exposure to fluorides through toothpaste, supplements and community water. Dentists should encourage the use of fluoride toothpastes consistent with the AAPD and the American Academy of Pediatrics (AAP).[37,38] Dental health professionals should demonstrate to caregivers that a smear of fluoridated toothpaste can be used safely with patients younger than 2 years of age and a pea-sized amount of fluoridated toothpaste can be used for patients age 2 and older.[39] Toothbrushing without fluoride toothpaste confers no benefits in terms of caries prevention.[40] The dentist can demonstrate how to position the child for toothbrushing using the knee-to-knee examination position. Caregivers should be advised to lift the child's lips during toothbrushing and to brush the gingiva as well as the teeth. Young children may "love to brush" but most end up chewing on the toothbrush bristles without removing plaque or exposing the teeth to fluoride, which makes toothbrushing ineffective. Caregivers can encourage children interested in brushing on their own but should always follow up with a second toothbrushing to make sure that all areas are brushed properly. All children should have their teeth brushed at least twice per day[41] — once in the morning after breakfast and once at night before bedtime.

> Dentists should encourage the use of fluoride toothpastes consistent with the American Academy of Pediatric Dentistry and the American Academy of Pediatrics.

In terms of diet, children should transition away from baby bottles and no-spill training cups between the ages of 12 and 18 months.[37] The use of open lid cups discourages continuous sipping on cariogenic beverages. If a caregiver insists on using bottles or training cups (e.g., at bedtime), only water should be placed in these containers. Consistent with the AAP guidelines, a child's juice intake should be limited to 4 to 6 ounces per day.[42] Most caregivers are shocked to learn how little volume this is. Thus, it may be helpful for dentists to demonstrate juice volumes using small cups. Juice diluted with water is not likely to reduce the cariogenic potential because juice is supersaturated with sugars. While frequent snacking is normal during early childhood, caregivers should be discouraged from allowing their child to graze on foods throughout the day. Studies have highlighted the health benefits associated with breastfeeding, but there is mixed evidence on whether breastfeeding is associated with caries.[43] If there is a need for frequent feedings, caregivers should be encouraged to increase the number

of times the child's teeth and gingiva are brushed with fluoridated toothpaste.

Caregivers of young children with special health care needs should be encouraged to take their child to a dentist regularly. The caregiver should select a dentist with whom they are most comfortable — this could be either a pediatric or general dentist. Most dentists have children come in for checkups every six or 12 months, depending on caries risk. Some states have special dental programs, such as Washington's Access to Baby and Child Dentistry (ABCD) program.[44] Young children in Medicaid who see an ABCD-certified dentist enjoy expanded dental benefits that include up to four visits to the dentist each year. At every visit, children with special health care needs should receive 10% topical povidone iodine, which is applied to the teeth and gingiva using a cotton tip brush and wiped off with gauze. Povidone iodine is bactericidal, eliminates cariogenic bacteria from the mouth and provides up to three months of substantivity.[45] Fluoride can be applied to the teeth immediately afterward.[46] Studies suggest that high-risk children need at least four fluoride treatments per year for therapeutic benefit in caries prevention.[47] Other states have medical office-based programs, such as North Carolina's Into the Mouth of Babes program, through which young children in Medicaid receive dental screenings and preventive care from physicians and referrals to dentists.[48] Physicians who see children with special health care needs for well-baby visits should encourage caregivers to take their child to the dentist by age 12 months.[20] Early and periodic dental visits allow dentists to monitor changes in caries risk over time and to provide caregivers with strategies to prevent caries and engage in positive oral health behaviors. Dentists can use techniques such as motivational interviewing to help caregivers ensure good oral health for their children.[49,50]

In cases where disease is already present in young children, the goals should be to noninvasively prevent infection and pain associated with cavitated primary teeth and to preserve the permanent first molars.[51] The first goal can be met through a number of minimally invasive approaches.[52-54] The first is aggressive chemotherapeutic treatment of incipient (noncavitated white spot) lesions and monitoring of cavitated lesions on anterior teeth. White spots and small cavitated lesions can be treated with regular applications of povidone iodine and fluoride during dental visits. When cavitated lesions are present on the anterior primary dentition, asymptomatic teeth with no abscesses or pulpal involvement in children 4 or 5 years of age can be managed chemotherapeutically and allowed to exfoliate naturally without restorative treatment. For children 3 years of age and younger, teeth with interproximal decay can be treated with interproximal reduction using a finishing bur and treated regularly with povidone iodine and fluoride.

Studies suggest that high-risk children need at least four fluoride treatments per year for therapeutic benefit in caries prevention.

If there is only smooth surface involvement (labial or lingual decay) or occlusal decay on primary molars, the interim restorative technique (IRT) can be used, in which teeth are restored without local anesthetics. Teeth can be prepped using a spoon or round bur and restored with glass ionomer, resin modified glass ionomer or other composite-based materials. These restorations are definitive and do not need to be replaced. If there is interproximal and smooth surface decay, glass ionomer crowns can be placed on anterior teeth after minimal preparation without local anesthetic and stainless crowns can be placed on posterior teeth with no tooth preparation using the Hall crown technique.[55,56]

Permanent molars should be sealed using glass ionomer immediately post-eruption and resealed using acid etch-based techniques when the molars can be isolated. Glass ionomer or resin-based composite sealants, which have been shown to be clinically effective in young Medicaid-enrolled children,[57] can be placed on occlusal surfaces of primary molars. One in three state Medicaid programs reimburse dentists for sealants placed on primary molars.[58] Sealants should be monitored and replaced as needed during dental visits.

Middle Childhood (Ages 6 to 12)

Oral health behaviors such as healthy eating and reduced frequency of snacking on cariogenic food and beverages should be encouraged. Children with special health care needs may continue to take medications containing sugar during middle childhood. To offset these dietary risk factors, caregivers should supervise and enforce twice-daily toothbrushing to ensure that children are brushing properly and that the teeth are adequately exposed to fluoride. A helpful rule of thumb for caregivers is to encourage supervised toothbrushing until a child is able to wash the dishes without help. Dental visits continue to be important. Dental health professionals should monitor caries risk, demonstrate proper toothbrushing of both

the teeth and gingival tissues and provide regular povidone iodine and fluoride treatments. Children who live in areas without community water fluoridation should be given prescriptions for fluoride supplements, which are available as drops, tablets or prescription-strength fluoride toothpastes.[7,59] The main goal for primary teeth during this period is to encourage natural exfoliation without invasive restorative or surgical interventions. For children 6 to 8 years of age with carious primary molars that are asymptomatic, IRT and Hall crown techniques can be used to deliver dental care noninvasively. It is also possible to monitor small interproximal carious lesions. Carious but asymptomatic primary molars in children 9 to 12 years of age should be treated chemotherapeutically and allowed to exfoliate naturally without restoring. Caregivers with children who have loose primary teeth should be encouraged to have the child wiggle these teeth at home. Children with carious lesions that are being treated chemotherapeutically should be recalled at appropriate intervals so that hygiene behaviors can be reinforced and povidone iodine and fluoride treatments can be provided.[60]

Late Childhood and Adolescence (Ages 13 to 17)

Adolescents may need reinforcement of the importance of caring for their permanent dentition. Those with a preference for sugar-sweetened beverages should be encouraged to consume sugar-free drinks. Constant sipping on sugared beverages throughout the day should be discouraged; rather, they should be consumed at once to reduce the amount of contact time between carbohydrates and tooth surfaces.

As is the case with younger children with special health care needs, regular toothbrushing with fluoridated toothpaste is critical to offsetting risks associated with cariogenic diets and chronic medication use for adolescents with special health care needs. Regular exposure to topical fluorides may mitigate potential oral health risks associated with gastroesophageal reflux disease (GERD) and mouth breathing, including dental erosion and increased salivary bacteria, respectively.[61,62] GERD is a common co-morbidity associated with asthma.[63] Additional research is needed on clarifying the dental effects of GERD and mouth breathing in children.[64]

Children who live in areas without community water fluoridation should be given prescriptions for fluoride supplements.

The potential role of peer social networks in shaping adolescent oral health behaviors can be used to reinforce regular toothbrushing as a strategy to maintain fresh breath.[65] Because dental visits often start to decline during early adolescence, dentists should reinforce with caregivers the importance of periodic dental checkups throughout adolescence. Caregivers and patients who are interested in the transition from pediatric dentists to general dentists should be provided with transitioning services and referrals. Detailed clinical information should be transmitted to the dentist to whom the child is being referred. Relevant information includes medical and behavioral diagnoses, special health care needs, medications, dental records and radiographs, helpful behavior management techniques, previous history of disease and data regarding carious lesions that are being treated chemotherapeutically. Information on carious lesions being treated chemotherapeutically is particularly important given the possibility that the new dentist may decide to treat lesions that have remained dormant for years. It may also be helpful for dentists to contact the adolescent's medical care providers to ensure that dental transitions are occurring in conjunction with the patient's health care transitions.[66] Adolescents should continue to receive fluoride treatments at regular intervals. There are no published studies on the use of povidone iodine in adolescents. Patients at higher risk should continue to brush with prescription-strength fluoride toothpastes twice daily.[7] Consistent with studies indicating no clinical benefits associated with the prophylactic removal of third molars, patients should not be routinely referred to oral surgeons for third molar extractions unless it is indicated.[67] Adolescents undergoing orthodontic treatment with fixed brackets or appliances should be closely monitored and encouraged to engage in regular toothbrushing, flossing and fluoride rinse use. MI Paste (casein phosphopeptide-amorphous calcium phosphate [CPP-ACP]) has been shown to prevent white spot lesion development during orthodontic treatment, although it does not appear to improve the appearance of white spot lesions.[68,69]

Young Adulthood (Ages 18 to 21)

Healthy eating and regular tooth-brushing should be reinforced. For young adults with special health care needs who are leaving for college, dentists can provide anticipatory guidance on how nighttime snacking can lead to increased caries risk. It is also important to ensure that young adults continue seeing a dentist

regularly. If young adults with special health care needs become disenrolled from Medicaid and lose their medical and dental insurance coverage, dental offices can help caregivers and families work with state Medicaid offices to ensure that their dental insurance coverage continues. Dental offices should help ensure dental transitioning of young adults with special health care needs who may be leaving pediatric dental offices. Susceptible pit and fissures should be sealed with glass ionomer. Fluoride should be applied to the teeth at each dental visit. As with adolescents, studies evaluating the caries preventive benefits of povidone iodine in young adults are needed.

Middle Adulthood (Ages 22 to 64)

Like younger patients with special health care needs, middle-aged adults should be encouraged to engage in healthy eating, twice-daily toothbrushing and regular visits to the dentist. When patients with cognitive deficits are brought to the dental office by a nonlegal guardian, informed consent documentation by their legal and financial guardian is required. If the patient is on medications that cause xerostomia, Biotene can be used to hydrate the oral tissues and relieve symptoms. Prescription-strength fluoridated toothpastes may be indicated for high-risk adults with special health care needs. For patients whose behaviors make it difficult or impossible to brush their teeth regularly, studies suggest that chlorhexidine sprays may be beneficial for root caries prevention in the absence of toothbrushing.[70,71] Another promising root caries preventive agent is chlorhexidine varnish with thymol.[72] Fluoride should be applied to the patient's teeth and gingival tissues at every dental visit. Whenever possible, the IRT should be used to provide patients with no-anesthetic restorations. As with children, IRT-based restorations do not need to be replaced unless the restoration becomes nonserviceable. Noncavitated carious pit and fissures should be sealed rather than restored.[73]

Older Adulthood (Ages 65 and Older)

Caries prevention and management approaches in older adults with special health care needs are similar to those taken with younger populations. A healthy diet, twice-daily toothbrushing and regular dental visits should be enforced by providing caregivers from group homes written and verbal instructions. Prescription-strength toothpastes can be used to prevent coronal and root caries. Biotene and saliva substitutes can be used to manage xerostomia-related symptoms, though evidence on the effectiveness of such therapies is limited.[74] Larger toothbrush handles and ultrasonic toothbrushes may help older adults with lower levels of manual dexterity brush more easily.[75] Fluoride and sealants should be used regularly. Research supports the use of povidone iodine in elders to promote oral health and prevent adverse systemic health outcomes such as pneumonia.[76] Exposed root surfaces at risk for developing root caries can be sealed with dentin bonding agents. MI Paste may help to remineralize carious lesions and relieve symptoms associated with dry mouth, though additional prospective studies are needed.[77,78] Dental offices are required to accommodate nonambulatory older adults by providing ramps and walkways wide enough for wheelchairs. Older adults with special needs who are insured by Medicaid may or may not have dental coverage. Medicare does not cover routine preventive and restorative care, which creates barriers to dental care for older adults, many of whom pay out of pocket. Dentists can help older adults access dental care by identifying community-based financial resources.

> Dentists can help older adults access dental care by identifying community-based financial resources.

Additional Preventive Considerations

Depending on local availability, emerging chemotherapeutic strategies can be used in caries prevention and management. The first is xylitol and other polyols.[79] One study suggests that giving young children xylitol syrup two to three times per day (total daily dose of five to six grams) prevents caries.[80] A similar trial conducted on adults reported that xylitol lozenges were not effective in preventing caries, though this intervention may have involved subtherapeutic doses of xylitol.[81] A recent trial conducted among Head Start enrollees found that a toothpaste containing fluoride and xylitol conferred no additional therapeutic benefit compared to a fluoride-only toothpaste.[82] Additional prospective studies are needed to determine whether xylitol and other polyols are effective in populations with special health care needs.

The second chemotherapeutic agent is diamine silver fluoride,[83] which has proved effective in preventing caries in children and adults and is used extensively outside the U.S.[84,85] Investigators at the University of Washington are devoting efforts to make diamine silver fluoride available for clinical use. Additional chemotherapeutics (e.g., licorice root extract, probiotics, CPP-ACP) are under

investigation and may become part of the caries prevention armamentarium.[86-88]

Dentists in both private practice and the public health setting should implement caries risk assessment protocols, such as the CAT or CAMBRA, to determine baseline caries risk, select appropriate preventive strategies and set dental recalls.[7,36] Repeated risk assessments over time are critical to track changes in caries risk and modify preventive and restorative treatment strategies as needed.

Conclusions

Patients with special health care needs are at increased risk for caries over the life course, requiring the use of intensive preventive and nonsurgical strategies in clinical settings. Such approaches are readily implemented, help make dental visits easier for patients and their caregivers and may reduce restorative treatment-related costs. In addition to home-based strategies that involve regular toothbrushing and limiting intake of carbohydrates, regular dental visits present opportunities to provide patients with special health care needs with topical iodine, fluoride and sealants. For young children with asymptomatic carious primary teeth, strategies such as IRT and Hall crowns should be used to preserve teeth noninvasively. IRT can also be used to treat permanent teeth in middle-aged and older adults with special health care needs. Collectively, these strategies are expected to help manage the caries epidemic among special needs populations and ensure that these patients enjoy optimal oral health throughout the life course. ■

REFERENCES

1. American Academy of Pediatric Dentistry. Definition of special health care needs. *Pediatr Dent* 34(special issue):16, 2013.
2. Anders PL, Davis EL. Oral health of patients with intellectual disabilities: a systematic review. *Spec Care Dentist* 30(3):110-7, 2010.
3. Chi DL, Rossitch KC, Beales EM. Developmental delays and dental caries in low-income preschoolers in the USA: a pilot cross-sectional study and preliminary explanatory model. *BioMedCentral Oral Health* 12(1):53, 2013.
4. Fernandez JB, Lim LJ, et al. Oral health findings in athletes with intellectual disabilities at the NYC Special Olympics. *Spec Care Dentist* 32(5):205-9, 2012.
5. Iida H, Lewis C, et al. Dental care needs, use and expenditures among U.S. children with and without special health care needs. *J Am Dent Assoc* 141(1):79-88, 2010.
6. Morgan JP, Minihan PM, et al. The oral health status of 4,732 adults with intellectual and developmental disabilities. *J Am Dent Assoc* 143(8):838-46, 2012.
7. American Academy of Pediatric Dentistry. Guideline on caries-risk assessment and management for infants, children, and adolescents. *Pediatr Dent* 34(special issue):118-125, 2013.
8. American Academy of Pediatric Dentistry. Guideline on management of dental patients with special health care needs. *Pediatr Dent* 34(special issue):152-157, 2013.
9. Watt RG. Social determinants of oral health inequalities: implications for action. *Community Dent Oral Epidemiol* 40 Suppl 2:44-8, 2012.
10. Trachtenberg F, Maserejian NN, et al. Extent of tooth decay in the mouth and increased need for replacement of dental restorations: the New England Children's Amalgam Trial. *Pediatr Dent* 30(5):388-92, 2008.
11. Berkowitz RJ, Amante A, et al. Dental caries recurrence following clinical treatment for severe early childhood caries. *Pediatr Dent* 33(7):510-4, 2011.
12. Wallace NT, Carlson MJ, et al. The individual and program impacts of eliminating Medicaid dental benefits in the Oregon Health Plan. *Am J Public Health* 101(11):2144-50, 2011.
13. Gluckman PD, Hanson MA, Beedle AS. Early life events and their consequences for later disease: a life history and evolutionary perspective. *Am J Hum Biol* 19(1):1-19, 2007.
14. Braveman P, Barclay C. Health disparities beginning in childhood: a life-course perspective. *Pediatrics* 124 Suppl 3:S163-75, 2009.
15. Moursi AM, Fernandez JB, et al. Nutrition and oral health considerations in children with special health care needs: implications for oral health care providers. *Pediatr Dent* 32(4):333-42, 2010.
16. Sealy PA, Farrell N, Hoogenboom A. Caregiver self-report of children's use of the sippy cup among children 1 to 4 years of age. *J Pediatr Nurs* 26(3):200-5, 2011.
17. Pomarico L, Czauski G, et al. Cariogenic and erosive potential of the medication used by HIV-infected children: pH and sugar concentration. *Community Dent Health* 25(3):170-2, 2008.
18. Neves BG, Farah A, et al. Are paediatric medicines risk factors for dental caries and dental erosion? *Community Dent Health* 27(1):46-51, 2010.
19. Huebner CE, Riedy CA. Behavioral determinants of brushing young children's teeth: implications for anticipatory guidance. *Pediatr Dent* 32(1):48-55, 2010.
20. Chi DL, Momany ET, et al. Relationship between medical well baby visits and first dental examinations for young children in Medicaid. *Am J Public Health* 103(2):347-54, 2013.
21. Chi DL, McManus BM, Carle AC. Caregiver burden and preventive dental care use for U.S. children with special health care needs: a stratified analysis based on functional limitation. *Matern Child Health J* Epub ahead of print, 2013.
22. Brickhouse TH, Unkel JH, et al. Infant oral health care: a survey of general dentists, pediatric dentists and pediatricians in Virginia. *Pediatr Dent* 30(2):147-53, 2008.
23. Chi DL, Momany ET, et al. Impact of chronic condition status and severity on dental treatment under general anesthesia for Medicaid-enrolled children in Iowa state. *Pediatr Anesth* 20(9):856-65, 2010.
24. Johnson C, Weber-Gasparoni K, et al. Conscious sedation attitudes and perceptions: a survey of American Academy of Pediatric Dentistry members. *Pediatr Dent* 34(2):132-7, 2012.
25. Stokes E, Ashcroft A, Platt MJ. Determining Liverpool adolescents' beliefs and attitudes in relation to oral health. *Health Educ Res* 21(2):192-205, 2006.
26. Han E, Powell LM. Consumption patterns of sugar-sweetened beverages in the United States. *J Acad Nutr Diet* 113(1):43-53, 2013.
27. Chi DL, Momany ET, et al. Impact of chronic condition status and severity on dental utilization for Iowa Medicaid-enrolled children. *Med Care* 49(2):180-92, 2011.
28. Nelson MC, Kocos R, et al. Understanding the perceived determinants of weight-related behaviors in late adolescence: a qualitative analysis among college youth. *J Nutr Educ Behav* 41(4):287-92, 2009.
29. Nowak AJ, Casamassimo PS, Slayton RL. Facilitating the transition of patients with special health care needs from pediatric to adult oral health care. *J Am Dent Assoc* 141(11):1351-6, 2010.
30. Chi DL, Berg JH, et al. Northwest Practice-based REsearch Collaborative in Evidence-based DENTistry. Correlates of root caries experience in middle-aged and older adults in the Northwest Practice-based REsearch Collaborative in Evidence-based DENTistry research network. *J Am Dent Assoc* 144(5):507-16, 2013.
31. Maguire A, Baqir W. Prevalence of long-term use of medicines with prolonged oral clearance in the elderly: a survey in Northeast England. *Br Dent J* 189(5):267-72, 2000.
32. Moeller JF, Chen H, Manski RJ. Investing in preventive dental care for the Medicare population: a preliminary analysis. *Am J Public Health* 100(11):2262-9, 2010.
33. Bailit H, D'Adamo J. State case studies: improving access to dental care for the underserved. *J Public Health Dent* 72(3):221-34, 2012.
34. American Academy of Pediatric Dentistry, Policy on the dental home. *Pediatr Dent* 34(special issue):24-25, 2013.
35. Kagihara LE, Huebner CE, et al. Parents' perspectives on a dental home for children with special health care needs. *Spec Care Dentist* 31(5):170-7, 2011.
36. Doméjean S, White JM, Featherstone JD. Validation of the CDA CAMBRA caries risk assessment – a six-year retrospective study. *J Calif Dent Assoc* 39(10):709-15, 2011.
37. American Academy of Pediatric Dentistry, Policy on Early Childhood Caries (ECC): classification, consequences and preventive strategies. *Pediatr Dent* 34(special issue):50-55, 2013.
38. American Academy of Pediatrics. Oral health risk assessment tool. www2.aap.org/oralhealth/docs/riskassessmenttool.pdf. Accessed Oct. 15, 2013.
39. Huebner CE, Thomas A, et al. Parents' interpretation of instructions to control the dose of fluoridated toothpaste used with young children. *Pediatr Dent* 35(3):262-6, 2013.

40. Walsh T, Worthington HV, et al. Fluoride toothpastes of different concentrations for preventing dental caries in children and adolescents. *Cochrane Database Syst Rev* 20;(1):CD007868, 2010.
41. Pine CM, McGoldrick PM, et al. An intervention programme to establish regular toothbrushing: understanding parents' beliefs and motivating children. *Int Dent J* 312-23, 2000.
42. Rampersaud GC, Bailey LB, Kauwell GP. National survey beverage consumption data for children and adolescents indicate the need to encourage a shift toward more nutritive beverages. *J Am Diet Assoc* 103(1):97-100, 2003.
43. Salone LR, Vann WF Jr, Dee DL. Breastfeeding: an overview of oral and general health benefits. *J Am Dent Assoc* 144(2):143-51, 2013.
44. Milgrom P, Hujoel P, et al. A community strategy for Medicaid child dental services. *Public Health Rep* 114(6):528-32, 1999.
45. Berkowitz RJ, Koo H, et al. Adjunctive chemotherapeutic suppression of mutans streptococci in the setting of severe early childhood caries: an exploratory study. *J Public Health Dent* 69(3):163-7, 2009.
46. Milgrom PM, Tut OK, Mancl LA. Topical iodine and fluoride varnish effectiveness in the primary dentition: a quasi-experimental study. *J Dent Child (Chic)* 78(3):143-7, 2011.
47. Pahel BT, Rozier RG, et al. Effectiveness of preventive dental treatments by physicians for young Medicaid enrollees. *Pediatrics* 127(3):e682-9, 2011.
48. Rozier RG, Sutton BK, et al. Prevention of early childhood caries in North Carolina medical practices: implications for research and practice. *J Dent Educ* 67(8):876-85, 2003.
49. Weinstein P. Motivational interviewing concepts and the relationship to risk management and patient counseling. *J Calif Dent Assoc* 39(10):742-5, 2011.
50. Milgrom P, Riedy CA, et al. Design of a community-based intergenerational oral health study: "Baby Smiles." *BMC Oral Health* 13(1):38, Epub ahead of print, 2013.
51. Milgrom P, Chi DL. Prevention-centered caries management strategies during critical periods in early childhood. *J Calif Dent Assoc* 39(10):735-41, 2011.
52. Ericson D. What is minimally invasive dentistry? *Oral Health Prev Dent* 2 Suppl 1:287-92, 2004.
53. Murdoch-Kinch CA, McLean ME. Minimally invasive dentistry. *J Am Dent Assoc* 134(1):87-95, 2003.
54. Vila Verde A, Ramos MM, Stoneham AM. Benefits in cost and reduced discomfort of new techniques of minimally invasive cavity treatment. *J Dent Res* 88(4):297-9, 2009.
55. Nelson T. An improved interim therapeutic restoration technique for management of anterior early childhood caries: report of two cases. *Pediatr Dent* 35(4):124-8, 2013.
56. Innes NP, Evans DJ, Stirrups DR. The Hall Technique; a randomized controlled clinical trial of a novel method of managing carious primary molars in general dental practice: acceptability of the technique and outcomes at 23 months. *BMC Oral Health* 7:18, 2007.
57. Chi DL, van der Goes D, Ney JP. Cost-effectiveness of pit-and-fissure sealants on primary molars in Medicaid-enrolled children. *Am J Public Health* Epub ahead of print, 2014.
58. Chi DL, Singh J. Primary molar pit-and-fissure sealant reimbursement rates and policies across state Medicaid programs. *J Am Dent Assoc* 144(11):1272-8, 2013. Erratum in: *J Am Dent Assoc* 145(1):21, 2014.
59. Rozier RG, Adair S, et al. Evidence-based clinical recommendations on the prescription of dietary fluoride supplements for caries prevention: a report of the American Dental Association Council on Scientific Affairs. *J Am Dent Assoc* 141(12):1480-9, 2010.
60. Amin MS, Harrison RL, et al. Effect of povidone-iodine on Streptococcus mutans in children with extensive dental caries. *Pediatr Dent* 26(1):5-10, 2004.
61. Ranjitkar S, Kaidonis JA, Smales RJ. Gastroesophageal reflux disease and tooth erosion. *Int J Dent* 479850, 2012.
62. Weiler RM, Fisberg M, et al. A study of the influence of mouth-breathing in some parameters of unstimulated and stimulated whole saliva of adolescents. *Int J Pediatr Otorhinolaryngol* 70(5):799-805, 2006.
63. Gibson PG, Henry RL, Coughlan JL. Gastro-oesophageal reflux treatment for asthma in adults and children. *Cochrane Database Syst Rev*, 2:CD001496, 2003.
64. Wild YK, Heyman MB, et al. Gastroesophageal reflux is not associated with dental erosion in children. *Gastroenterology* 141(5):1605-11, 2011.
65. Dorri M, Sheiham A, Watt R. The influence of peer social networks on toothbrushing behaviour in Iranian adolescents in Mashhad. *Community Dent Oral Epidemiol* 38(6):498-506, 2010.
66. Chi DL. Medical care transition planning and dental care use for youth with special health care needs during the transition from adolescence to young adulthood: a preliminary explanatory model. *Matern Child Health J* Epub ahead of print, 2013.
67. Friedman JW. The prophylactic extraction of third molars: a public health hazard. *Am J Public Health* 97(9):1554-9, 2007.
68. Robertson MA, Kau CH, et al. MI Paste Plus to prevent demineralization in orthodontic patients: a prospective randomized controlled trial. *Am J Orthod Dentofacial Orthop* 140(5):660-8, 2011.
69. Huang GJ, Roloff-Chiang B, et al. Effectiveness of MI Paste Plus and PreviDent fluoride varnish for treatment of white spot lesions: a randomized controlled trial. *Am J Orthod Dentofacial Orthop* 143(1):31-41, 2013.
70. Faulks D, Hennequin M. Evaluation of a long-term oral health program by carers of children and adults with intellectual disabilities. *Spec Care Dentist* 20(5):199-208, 2000.
71. Slot DE, Vaandrager NC, et al. The effect of chlorhexidine varnish on root caries: a systematic review. *Caries Res* 45(2):162-73, 2011.
72. Rethman MP, Beltrán-Aguilar ED, et al. Nonfluoride caries-preventive agents: executive summary of evidence-based clinical recommendations. *J Am Dent Assoc* 142(9):1065-1071, 2011.
73. Borges BC, de Souza Borges J, et al. Arrest of non-cavitated dentinal occlusal caries by sealing pits and fissures: a 36-month, randomised controlled clinical trial. *Int Dent J* 62(5):251-5, 2012.
74. Furness S, Worthington HV, et al. Interventions for the management of dry mouth: topical therapies. *Cochrane Database Syst Rev* (12):CD008934, 2011.
75. Whitmyer CC, Terezhalmy GT, et al. Clinical evaluation of the efficacy and safety of an ultrasonic toothbrush system in an elderly patient population. *Geriatr Nurs* 19(1):29-33, 1998.
76. Yoneyama T, Yoshida M, et al. Oral care reduces pneumonia in older patients in nursing homes. *J Am Geriatr Soc* 50(3):430-3, 2002.
77. Azarpazhooh A, Limeback H. Clinical efficacy of casein derivatives: a systematic review of the literature. *J Am Dent Assoc* 139(7):915-24; quiz 994-5, 2008.
78. Yengopal V, Mickenautsch S. Caries preventive effect of casein phosphopeptide-amorphous calcium phosphate (CPP-ACP): a meta-analysis. *Acta Odontol Scand* 67(6):321-32, 2009.
79. Milgrom P, Söderling EM, et al. Clinical evidence for polyol efficacy. *Adv Dent Res* 24(2):112-6, 2012.
80. Milgrom P, Ly KA, et al. Xylitol pediatric topical oral syrup to prevent dental caries: a double-blind randomized clinical trial of efficacy. *Arch Pediatr Adolesc Med* 163(7):601-7, 2009.
81. Ritter AV, Bader JD, et al. Tooth-surface-specific effects of xylitol: randomized trial results. *J Dent Res* 92(6):512-7, 2013.
82. Chi DL, Tut O, Milgrom P. Cluster-randomized xylitol toothpaste trial for early childhood caries prevention. *J Dent Child* In press.
83. Rosenblatt A, Stamford TC, Niederman R. Silver diamine fluoride: a caries "silver-fluoride bullet." *J Dent Res* 88(2):116-25, 2009.
84. Zhi QH, Lo EC, Lin HC. Randomized clinical trial on effectiveness of silver diamine fluoride and glass ionomer in arresting dentine caries in preschool children. *J Dent* 40(11):962-7, 2012.
85. Zhang W, McGrath C, et al. Silver diamine fluoride and education to prevent and arrest root caries among community-dwelling elders. *Caries Res* 47(4):284-90, 2013.
86. Peters MC, Tallman JA, et al. Clinical reduction of *S. mutans* in pre-school children using a novel liquorice root extract lollipop: a pilot study. *Eur Arch Pediatr Dent* 11(6): 274-8, 2010.
87. Burton JP, Drummond BK, et al. Influence of the probiotic *Streptococcus salivarius* strain M18 on indices of dental health in children: a randomized double-blind, placebo-controlled trial. *J Med Microbiol* 62(Pt 6):875-84, 2013.
88. Twetman S, Keller MK. Probiotics for caries prevention and control. *Adv Dent Res* 24(2):98-102, 2012.

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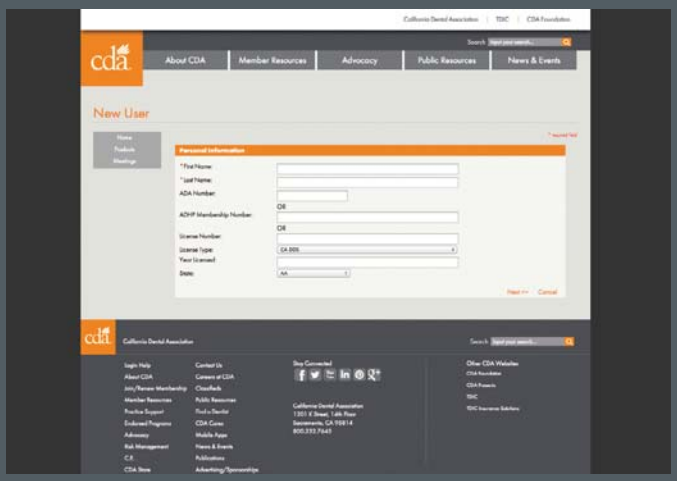

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Promoting Oral Health Through Community Engagement

Paul Glassman, DDS, MA, MBA; Maureen Harrington, MPH; and Maysa Namakian, MPH

ABSTRACT Persistent health disparities still exist in the U.S. despite decades of focus on the importance of prevention. Individual behaviors are the major contributor to oral health. By partnering and linking with community organizations, oral health professionals can expand their reach, overcome the obstacles to delivering effective prevention activities in dental offices and improve the oral health of the most underserved and vulnerable populations, who bear the greatest burden of dental disease.

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The need for an increased focus on prevention of dental disease as opposed to surgical treatment was described in the 2000 *Oral Health in America: A Report of the Surgeon General*, the national Healthy People goals, the Institute of Medicine's (IOM) two 2011 reports on oral health, *Advancing Oral Health in America* and *Improving Access to Oral Health Care for Vulnerable and Underserved Populations* and many other reports.[1,4] In addition, the 2010 *National Prevention Strategy* set forth a national goal of moving the U.S. health care system from a paradigm of sick care to one based on wellness and prevention.[5] In spite of these efforts, the 2000 surgeon general's report and the 2011 IOM reports describe the persistent profound health disparities that still exist in the U.S. population despite decades of focus on the importance of prevention. This paper will review factors that lead to health, some of the reasons traditional prevention efforts in oral health often fall short of their goals, current developments leading to new ideas about prevention and strategies for oral health prevention activities based on community engagement.

Factors That Lead to Healthy Lives

It has long been understood that the factors leading to long and healthy lives have less to do with interventions performed by health care professionals than with other considerations.[6,7] In fact, as illustrated in the **FIGURE**, the contribution to health and longevity from interventions performed by health care professionals is about 10 percent of the total. The most important contribution, approximately 40 percent of the total, arises from personal behaviors performed at the discretion of the individual. These behaviors include choices about the use of alcohol and tobacco, exercise, diet and personal hygiene. About 30 percent of the total is ascribed to genetics,

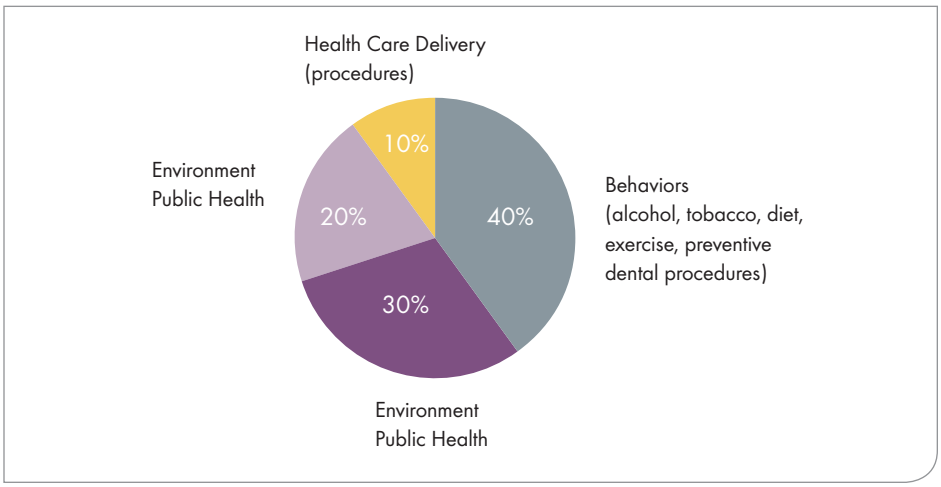

FIGURE. Factors that lead to long and healthy lives.[6,7]

which at present, we cannot do much about. The final 20 percent is related to the environment and public health measures, which, in some cases, we can do something about collectively. These measures include systems to produce clean water and food, reduce pollution, prevent injuries, fluoridate community water supplies and adopt societal norms and structures fostering healthy behaviors.

While the data presented in the **FIGURE** come from studies about health in general, it is reasonable to assume that the conclusions also apply to oral health. Without appropriate individual behaviors practiced by patients outside the dental office, there is little that oral health professionals can do to maintain an individual's oral health. These behaviors include a noncariogenic diet, use of fluoride and daily mouth care. With this in mind, it is clear that the most effective strategy for improving the oral health of the population is one that would result in changes in individual behaviors known to promote oral health.

Chronic Disease Management

One strategy, now widely applied in general health care, is referred to as chronic disease management. This idea was formalized in 1978 when the Robert Wood Johnson Foundation (RWJF) began its Improving Chronic Illness Care program.[8] In 1994, RWJF funded a study to synthesize what had been learned about the care of chronically ill patients in the previous several decades. The findings indicated that:

- The typical primary care office was set up to respond to acute illness rather than to anticipate and respond proactively to patients' needs. Chronically ill patients, however, needed the latter approach in order to avoid acute episodes of illness.
- Chronically ill patients were not sufficiently informed about their conditions, nor were they supported in self care beyond the doctor's office.
- Physicians were too busy to educate and support chronically ill patients to the degree necessary to improve their health.

An additional evaluation by the Rand Corporation indicated that application of the chronic care model could lead to:

- Organizations that were able to improve their ability to manage disease.
- Patients with diabetes whose risk of cardiovascular disease was significantly reduced.
- Patients who were more knowledgeable about, and more often adhered to, recommended therapy.
- Thirty-five percent fewer hospital days.
- Patients participating in asthma and diabetes pilot programs who were more likely to receive appropriate therapy.[9]

These results led to the development and spread of the chronic care model, which has had a major impact on care for people with chronic illnesses in the subsequent decades.[10] This model is now widely accepted and practiced in the medical care system.[11] A 2012 IOM report, *Living Well With Chronic Illness: A Call for Public Health Action*, emphasizes the need to develop and use cross-cutting coordinated strategies to help Americans with chronic illnesses live well.[12]

Edelstein, in a paper commissioned for the IOM's 2011 report *Improving Access to Oral Health Care for Vulnerable and Underserved Populations*, indicated that, like medical care in the 1970s, dental care in the U.S. still emphasizes surgical repair of the effects of disease.[13] However, there is increasing awareness that dental diseases are primarily chronic conditions which are not cured by acute surgical interventions. In the same way that a physician will not "cure" his or her patient's diabetes in a visit to the medical office, dentists cannot "cure" dental caries or periodontal disease through a patient's visit to a dental office. The need for a broader emphasis on influencing individuals' daily behaviors through health promotion activities and community organizations was recognized in the surgeon general's report in 2000.[1] Edelstein reviewed the literature on the science of "chronic disease management" employed in general health care delivery and concluded that this strategy holds promise for improving the oral health of the population.[13]

The **TABLE** describes some characteristics of an acute care/surgical model and one that emphasizes chronic disease management. The acute care/surgical system tends to be provider-centric, with care delivered in fixed offices and clinics. Both treatment and payment are based on discrete episodes of

TABLE

Care for Chronic Oral Diseases

Acute Care/Surgical Intervention	Chronic Disease Management
Provider-centric model	Patient-centric model
Care delivered in fixed offices and clinics	Care delivered where people are, to the extent possible
"Treatment" based on discrete procedure-based episodes of care	"Management" based on maintaining health across the life cycle of a condition
Payment based on discrete procedure-based episodes of care	Payment based on value of health improvement across the life cycle of a condition
Emphasis on surgical interventions	Emphasis on risk assessment, prevention and early intervention using biological, medical, behavioral and social tools

care, and the emphasis is on surgical intervention. On the other hand, the chronic disease management model tends to be more patient-centric, with an emphasis on delivering services where people are, in community settings or in educational, social and general health care settings. The chronic disease management model is based on managing disease across the life cycle of a condition.[14] Payment is based on improvements in health outcomes that come from managing disease across the life cycle of a condition. This model uses biological, medical, behavioral and social tools, and thus is well suited to guide more effective preventive activities in oral health. However, its full adoption will require a significant redesign of dental education programs, retraining of existing dental personnel, reform of oral health payment systems to reward these activities and a major emphasis on integrating oral health activities into educational, social and general health systems (**TABLE**).

Influencing Oral Health Behaviors: Is the Dental Office the Best Place?

A critical component of chronic disease management in preventing dental disease is the ability to influence individual behaviors. As indicated earlier, these are among the most important factors leading to health, but influencing people to change habitual behaviors is extremely difficult. Providing information, even when it results in increased knowledge, does not necessarily lead to behavior change.[15,16] In fact, a 2000 report on social and behavioral research from the Institute of Medicine stated, "To prevent disease, we increasingly ask people to do things that they have not done previously, to stop doing things they have been doing for years, and to do more of some things and less of other things. Although there certainly are examples of successful programs to change behavior, it is clear that behavior change is a difficult and complex challenge. It is unreasonable to expect that people will change their behavior easily when so many forces in the social, cultural and physical environment conspire against such change."[17]

Providing information about health-producing behaviors does not necessarily lead to behavior change. A 2006 study aimed at modifying behaviors among caregivers of people with disabilities demonstrated that caregivers' knowledge about preventive procedures was improved after training. But this only translated into behavior change and incorporation of new techniques into daily routines after a dental assistant observed the prevention session in the residential environment and provided hands-on, real-time coaching.[18]

There are many examples of successful efforts and techniques for influencing people to adopt effective oral health practices.[19] However, efforts to improve health through oral health education activities performed in a dental office are not likely to be successful in many segments of the population. Several important reasons account for this conclusion. The dental office is not the best place to deliver oral health messages, oral health professionals are not the best people to deliver those messages and the dental office does not provide the best timing for delivering them. Unfortunately, the populations for whom dental office-based education is not likely to be successful are those with the highest rates of dental disease. Therefore, alternate strategies, including community engagement, need to be employed.

A number of approaches have been described to improve health communication in dental offices.[20] Unfortunately, evidence indicates that these techniques are not widely used.[21] However, even if they were more widely adopted, dental offices would still not be the best places to deliver oral health education messages in order to improve the health of many segments of the population. A major factor is that the people with most of the dental disease do not take advantage of the traditional office- and clinic-based dental care system and are therefore not commonly found in dental offices.[1,3,4] And a dental office is not the best place to educate even those who do visit because most people are nervous, if not afraid, in that environment.[22] They may be worried about what is going to happen on the way in, and how they feel when they are on the way out. Even though dental professionals generally perceive their offices as friendly environments, many of their patients see them as surgical suites and not a place where they feel open to receiving and incorporating new information. Providing the traditional short lesson

on oral hygiene or even a longer "anticipatory guidance" session at the end of a dental appointment may not have any impact on the subsequent behavior of the individual or on the caregivers for dependent children or adults.[1,18,23]

Oral health professionals are not the best people to delivery oral health education messages designed to change behaviors for many segments of the population. Although some communication techniques, such as motivational interviewing, have shown positive results, there is inadequate training in this or other behavior change techniques in the crowded curriculum of oral health professional education programs.[21]

Even if oral health professionals had additional training and were in contact with those individuals with the greatest health disparities, a cultural gap often exists between the two groups.[24] Oral health professionals are generally not skilled at determining the literacy level of patients and caregivers and delivering messages at the appropriate level. In the 2010 census, just over one-third of the U.S. population reported their race and ethnicity as other than non-Hispanic White alone. This group, referred to as the "minority" population, increased from 86.9 million (30.9 percent) to 111.9 million (36.3 percent) between 2000 and 2010, a growth of 29 percent over the decade.[25] In California the "minority" population grew from 18.1 million (53.3 percent) in 2000 to 22.3 million (59.9 percent) in 2010. California is one of four states with a "majority-minority" population (i.e., more than 50 percent of the population is composed of minorities). This distribution is markedly different from the composition of dentists in the U.S. The cultural divide that many groups of people experience results in their not fully understanding what the oral health professional says, their being embarrassed to talk about personal behaviors with oral health professionals and their concluding that oral health professionals don't understand their lives or the challenges they face in implementing the recommendations they are given.

Finally, delivering dental health messages in dental offices may not involve the optimal timing for some segments of the population. Those with the greatest burden of dental diseases do not visit dental offices at all or do so infrequently.[26] Therefore, messages delivered in dental offices are not delivered repeatedly to these groups and not at a time when they are most receptive to considering changes in their behavior.

The term virtual dental home refers to the fact that this system delivers all the components of the *health home* model.

The most effective messages are those that are delivered by people considered trusted members of an individual's own community, delivered by multiple people on multiple occasions and incorporating a feedback system so people who run into challenges can obtain additional instruction and coaching over time.[27] The ability to employ these principles is enhanced by delivering oral health information and coaching in places where people receive educational, social or general health services on a regular basis.[28-30] Thus, the best opportunity for oral health professionals to influence the preventive practices of many underserved populations is through partnerships with organizations that deliver educational, social and general health services.

Using Community Engagement to Promote Oral Health Activities

The virtual dental home (VDH) is a community-based system of care that uses geographically distributed, telehealth-facilitated oral health teams to provide preventive and early-intervention oral health services to people who do not take advantage of the traditional oral health care system.[31] This strategy is being demonstrated by the Pacific Center for Special Care at the University of the Pacific, Arthur A. Dugoni of School of Dentistry, and multiple resources and reports about the system are available on the organization's website.[32] The VDH concept has been implemented in Head Start preschools, elementary schools, residential facilities for dependent adults and nursing homes.

The VDH emphasizes the integration of oral health awareness and behaviors into the structure and activities of educational, social and general health organizations in which the system functions, with particular focus on health promotion and education. The intention is to raise the level of awareness and understanding of oral health issues among administrators and staff at these facilities. These individuals, who are seen as trusted members of the community, then act to promote activities that improve oral health among parents, caregivers and individuals who use their services.

The term virtual dental home refers to the fact that this system delivers all the components of the *health home* model, including care management over time, health promotion activities, access to technical medical services when needed and, in pediatric medical home models, an emphasis on early intervention

services.[33-35] Some descriptions of a health home that include oral health activities, or a *dental home*, portray them as located in and managed through a dental office.[36] However, these services are not confined to a dental office in the VDH model, but are delivered using geographically distributed teams based primarily in community locations, including dentists via telehealth technologies.

The VDH system has demonstrated that community partnerships between oral health professionals and community organizations can reach people who do not take advantage of the traditional dental care system and can provide prevention and early intervention services for them.[37] The important lesson from the VDH concept in the context of this paper is that, by partnering and linking with community organizations, oral health professionals can expand their reach, overcome the obstacles to delivering effective prevention activities in dental offices and improve the oral health of the most underserved and vulnerable populations, who bear the greatest burden of dental disease.

The VDH system is not unique in using community engagement to reach underserved populations and emphasize prevention in community settings. However, it offers a unique combination of community-delivered prevention procedures, telehealth-facilitated teams and the integration of oral health awareness and messaging using staff at Head Start preschools, elementary schools, residential facilities for dependent adults and nursing homes.

Conclusions

Persistent profound health disparities still exist in the U.S. despite decades of focus on the importance of prevention. The methods used to promote behavior change in dental offices are largely ineffective, particularly among those who do not regularly visit dental offices, have

the highest rates of dental disease and face cultural gaps in relation to most dentists. Behavior change leading to improved oral health is more likely to occur in settings where people feel more comfortable and open to receiving information, when messages are delivered by trusted members of their community and when information is repeated multiple times by multiple people. These conditions are most likely to be found in education, social and general health service settings.

Adopting community engagement strategies in dental care will require a significant redesign of dental education programs, retraining of existing dental personnel, reform of oral health payment systems to reward these activities and a major emphasis on integrating oral health activities into educational, social and general health systems.

By using systems like the VDH, oral health professionals have an opportunity to extend their practices into community sites, engage populations of people who do not traditionally visit dental offices and use the tools of chronic disease management and community engagement to prevent dental disease and improve oral health. ■

REFERENCES

1. U.S. Department of Health and Human Services. *Oral Health in America: A Report of the Surgeon General*. Rockville, MD: U.S. Department of Health and Human Services, National Institute of Dental and Craniofacial Research, National Institutes of Health, 2000.
2. HealthyPeople.gov. www.healthypeople.gov/2020/default.aspx. Accessed Oct. 23, 2013.
3. The Institute of Medicine. *Advancing Oral Health in America*. 2011. The National Academies Press. Washington D.C.
4. The Institute of Medicine and the National Research Council. Improving *Access to Oral Health Care for Vulnerable and Underserved Populations*. 2011. The National Academies Press. Washington D.C.
5. National Prevention Council, National Prevention Strategy, Washington, D.C.: U.S. Department of Health and Human Services, Office of the Surgeon General, 2011.
6. McGinnis JM, Foege WH. Actual Causes of Death in the United States. *J Am Dent Assoc* 1993:270(18):2207-12 (Nov 10).
7. McGinnis JM, Williams-Russo P, Knickman JR. The case for more active policy attention to health promotion. *Health Aff* 2002:21(2):78-93 (Mar).
8. The Robert Wood Johnson Foundation. Improving Chronic Illness Care. 2011. www.rwjf.org/content/dam/farm/reports/program_results_reports/2011/rwjf71050. Accessed Oct. 24, 2013.
9. Improving Chronic Illness Care. The Chronic Care Model: The RAND Evaluation. www.improvingchroniccare.org/index.php?p=The_RAND_Evaluation&s=32. Accessed Nov. 2, 2013.
10. Wagner EH. Chronic Disease Management: What Will It Take To Improve Care for Chronic Illness? *Eff Clin Pract* 1998:1(1):2-4:Aug-Sep.
11. Congressional Budget Office. An Analysis of the Literature on Disease Management Programs. www.cbo.gov/publication/16076. Accessed Nov. 1, 2013.
12. Institute of Medicine. 2012. Living well with chronic illness: A call for public health action. Washington, D.C.: The National Academies Press.
13. Edelstein, BL. 2010 (unpublished). Lessons from medicine: Opportunities and constraints for oral disease management. Commissioned paper for the IOM Committee on Oral Health Access to Services.
14. Porter ME. What is Value in Health Care? *N Engl J Med*:2010:363(26):2477-2481.
15. Freeman R, Ismail A. Assessing patients' health behaviors: Essential steps for motivating patients to adopt and maintain behaviors conducive to oral health. *Monogr Oral Sci* 2009:21:113-127.
16. Satur JG, Gussy MG, Morgan MV, Calache H, Wright C. Review of the evidence for oral health promotion effectiveness. *Health Educ J* 2010:69(3):257-266.
17. The Institute of Medicine. Promoting health: Intervention strategies from social and behavioral research. 2000. Washington, D.C. The National Academy Press.
18. Glassman P, Miller C. Effect of Preventive Dentistry Training Program for Caregivers in Community Facilities on Caregiver and Client Behavior and Client Oral Hygiene. *N Y State Dent J* 2006:72(2):38-46.
19. Institute of Medicine. 2013. Oral health literacy: Workshop summary. Washington, D.C.: The National Academies Press.
20. Horowitz AM, Kleinman DV. Creating a Health Literacy-Based Practice. *J Calif Dent Assoc* 2012:40(4):331-340.
21. Rozier RG, Horowitz AM, Podschun G. Dentist-patient communication techniques used in the United States. *J Am Dent Assoc* 2011:142(5):518-50.
22. McNeil DW, Randall CL. *Dental Fear and Anxiety Associated with Oral Health Care: Conceptual and Clinical Issues*. Chapter 12 in Mostofsky DI, Fortune F, *Behavioral Dentistry* 2nd ed. 2014. John Wiley & Sons Inc., Ames, Iowa.
23. American Academy of Pediatric Dentistry. Guideline on Periodicity of Examination, Preventive Dental Services, Anticipatory Guidance/Counseling, and Oral Treatment for Infants, Children and Adolescents. Revised 2009.
24. Centore L. Dental Health Literacy and California's Clarion Call. *J Calif Dent Assoc* 2012:40(4):352-359.
25. U.S. Census. 2010 Census Briefs. Overview of Race and Hispanic Origin: 2010. Issued March 2011.
26. Wallace BB, Macentee MI. Access to dental care for low-income adults: perceptions of affordability, availability and acceptability. *J Community Health* 2012 Feb;37(1):32-9.
27. Bauer S. Building Pathways of Trust. *J Calif Dent Assoc* 2012:40(4):361-363.
28. Braun B, Horowitz AM, Kleinman DV, et al. Oral Health Literacy: at the Intersection of K–12 Education and Public Health. *J Calif Dent Assoc* 2012:40(4):323-330.
29. Simmer-Beck M, Gadbury-Amyot CC, Ferris H, et al. Extending oral health care services to underserved children through a school-based collaboration: part 1: a descriptive overview. *J Dent Hyg* 2011:85(3):181-92.
30. Keselyak NT, Simmer-Beck M, Gadbury-Bmyot C. Extending oral health care services to underserved children through a school-based collaboration: part 2: the student experience. *J Dent Hyg* 2011 Summer;85(3):193-203.
31. Glassman P, Harrington M, Namakian M, Subar P. The Virtual Dental Home: Bringing Oral Health to Vulnerable and Underserved Populations. *J Calif Dent Assoc* 2012: 40(7)569-577.
32. The Virtual Dental Home. Pacific Center for Special Care. University of the Pacific School of Dentistry. www.virtualdentalhome.org. Accessed Nov. 4, 2013.
33. American Academy of Pediatrics. Role of the medical home in family-centered early intervention services. Council on Children With Disabilities. *Pediatrics* 2007:120(5);1153-1158.
34. American Academy of Pediatrics. The medical home. Supplement to *Pediatrics*. *Pediatrics* 2004:113(5):1471-1548.
35. Edwards ES. Forward. Supplement on the Medical Home. *Pediatrics* 2004:113(5):1471.
36. American Academy of Pediatric Dentistry Council on Clinical Affairs. Policy on the dental home. Adopted 2001. Revised 2004. Reaffirmed 2010. www.aapd.org/media/Policies_Guidelines/P_DentalHome.pdf. Accessed Jan. 14, 2012.
37. Pacific Center for Special Care. Our Impact. http://dental.pacific.edu/Community_Involvement/Pacific_Center_for_Special_Care_(PCSC)/Our_Impact.html. Accessed Nov. 5, 2013.

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You Set the Tone

James D. Stephens, DDS

Leadership Education is not only a buzzword these days but a hot topic in the business and professional worlds. When I did a search for leadership education recently, Google responded with 880,000 references in 0.32 seconds. There must be something important going on if there is this much chatter about leadership. I am very aware of the importance of leadership in my role as CDA president and work very hard to use the skills I have learned over the years in my volunteer positions. Yet I had to be reminded recently that all those leadership skills are also important in my role at my office.

A few months ago, after spending many hours trying to work out the bugs from a change in the office 401k plan, having trouble with the State Board of Equalization website and trying to bring together the tax information, I was in a bad mood. I came into the office in the morning and went about my business with no pleasantries or kind words. Of course, I could turn on the charm for the patients, chat about the kids, smile and enjoy those interactions, but everything else was bleak. I had a little black cloud hanging around my head.

After a day or so of this, I was hiding in my office, not wanting to see another human being, when my long-time office manager knocked on the door. I grudgingly acknowledged the knock with a low growl, "Come in." Her head poked in slowly; I presume she was checking to make sure the bear in the cave was not going to bite her head off. After confirming that she had a reasonable chance of survival, she was fully in my office and ready to deliver the message: "You know that you

set the tone for the whole office, don't you?" She followed with "Happy balloons are bursting everywhere the minute you walk in the door; everyone just wants to stay out of your way." So much for being a positive leader. I had let my frustration over business matters overwhelm me and in turn let my staff down. I have to say that I'm lucky to have someone who is strong enough to call me out when necessary. After that timely reminder of my role, I now make a conscious effort to walk in the door, close out the turmoil and be the positive leader my team needs.

You can try to evade responsibility for office morale, but no one in your office has more influence on the atmosphere each day than you. As hard as we try, we are human beings and things can pile up and dampen our outlook on the world and our practices. The message here may seem to be that you are not allowed to have a bad day or be human. However, since none of us will pass that test, the challenge is to recognize and overcome the little black cloud that can occasionally be our nemesis and be the positive leader your office needs. Remember, they look to you to "Set the Tone." ■

James D. Stephens, DDS, is the president of the California Dental Association and a fellow of the American College of Dentists, the International College of Dentists and the Pierre Fauchard Academy. He practices general dentistry in Palo Alto, Calif.

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Minimizing Vicarious Liability for Employee Actions

TDIC Risk Management Staff

In conversations about dental practices, two commonly heard terms are "captain of the ship" and "vicarious liability." Both terms relate to dentists' responsibility for their staff.

Under the captain of the ship doctrine, the doctor is accountable for everything that happens while he or she is in charge, including the actions of staff under supervision.

The captain doctrine relates to the legal concept of vicarious liability that holds employers responsible for the acts and oversights of their employees.

For dentists to minimize this vicarious risk, analysts recommend giving sufficient time and attention to hiring, training, supervising and evaluating employees.

Dentists, as employers, are vicariously liable for the negligent behavior of staff, including allied dental professionals and nonclinical team members who are acting within the scope of their employment.

For dentists to minimize this vicarious risk, analysts recommend giving sufficient time and attention to hiring, training, supervising and evaluating employees, and fostering open communication within the practice. "Dental offices are close-knit, and you have to be careful about who you are letting into your practice," said Yasica Corum, a risk management analyst for The Dentists Insurance Company.

"We receive questions from dentists who are looking to hire an assistant or other staff," said Corum, who fields calls for TDIC's Risk Management Advice Line. "We always ask if the dentist has a job description that clearly defines the duties of the position." A detailed job description is the first step in setting specific performance expectations for staff.

When interviewing potential staff, try not to rush the process. "Have a second interview if you need to, and talk to previous employers," Corum said. Paid skills assessments allow dentists to observe a potential employee's work, interactions with patients and communication style. "It's a lot about personality," she added. "Tasks can be taught, but kindness, empathy and concern cannot."

For licensed dental staff, ask to see their active license, and keep a copy of the license on file. "Far too often," Corum related, "I hear dentists say, 'she told me her license was active, but it was not.'"

It's also essential that employees stay within the scope of their license. Review the Dental Practice Act and do not assign duties that fail to comply with the Dental Practice Act.

CONTINUES ON 479

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GREATER SACRAMENTO—NEW LISTING! General Dentistry. 5 Equipped Ops (1 Add'l plumbed). 1,600 SF. Eaglesoft, E4D, Intraoral, Pano. 9 Days hygiene/week. 2012 GR $888K+. #CA156

GREATER SACRAMENTO/ ROSEVILLE: General Dentistry. 6 Ops. 2,200 SF. Pr[illegible] Panorex, CAD/CAM, Laser, Eaglesoft. 2013 GR $966K. Low overhead. #CA143 SOLD

GREATER SACRAMENTO/ ROSEVILLE: Partnership Position in General Dentistry Group Practice. Each partner has own patients. Intraoral, Digital x-rays (Dexis), Digital Pan. Possible owner financing. #CA126

HAWAII (MAUI): General Dentistry. 4 Equipped Ops. ~1,200 SF. GR $636K. #20101

HUNTINGTON BEACH: General Dentistry. 6 Ops, 3 Equipped, 3 Plumbed. Est. 18 years. Spacious suite. #CA155

INDIAN WELLS: General Dentistry/TMJ Practice, 6 Ops. 4,000 SF. 2011 GR $350K+ on 1 doctor-day/week. #CAM530

LA MESA: General Dentistry. 3 Ops. 2,000 SF. Prof. bldg.. Dentrix, Laser, Digital x-rays. 2012 GR $396K w/Adj Net $155K. #CA127

LONG BEACH: General Dentistry. 8 Ops, 6 Equipped. Associate-run practice. 8 Days hygiene/week. Dentrix, Dexis. GR $1.2MM. #CA152

MORENO VALLEY: General Dentistry. 5 Ops. Busy retail center near freeway. Est. 14 years. 2013 GR $291K w/Adj Net $121K. #CA151 – In Escrow

NEWPORT BEACH—PRICE REDUCED! General Dentistry. 3 Ops. New high-end equipment. 2012 GR $350K on 3.5 days/week. #CAM534

NORTH EAST BAY: General Dentistry. 7 Ops. 2,324 SF. Dental Mate software, Intraoral camera, Pano, Digital x-ray. 2012 GR $885K. Bldg. to be sold with practice. #CA108

NORTH OF SACRAMENTO: General Dentistry. 5 Ops. 2,050 SF. Dentrix, Intra-oral camera, Digital x-ray, Imaging system, Pano. 2012 GR $1.2M+. #CA106

NORTH ORANGE COUNTY: Endodontic Practice. 5 Ops. 3 Zeiss wall-mounted microscopes. Est. 30 years. GR $370K w/Adj Net $172K on 3 days/week. #CAM561

NORTHERN CALIFORNIA: Periodontal Practice. 5 Ops with equipment for right or left-handed provider. Eaglesoft software. 2013 GR $890K+. #CA153

NORTHERN CALIFORNIA—NEW LISTING! Endodontic Practice. 3 Ops, 1 Add'l plumbed. 1,200 SF. Two microscopes, Digital. 2013 GR $319,865. #CA158

ORANGE: Removable Prosthetics Practice. 2 Equipped Ops, 1 Add'l plubmed. Est. 14 years. Retail location. 2013 GR $279K w/ Adj Net $125K. #CA142

ORANGE COUNTY: General Dentistry. Located in retail center in desirable area of Orange County. 2013 GR $900K+ w/Adj Net $393K. #CA132 – In Escrow

PITTSBURG: General Dentistry. 5 Ops. 1,400 SF. Pano, Fiber optics. 12 New patients/month. Low rent. GR $236K w/60% overhead. #CA133

PLUMAS COUNTY: General Dentistry Practice & Building. 4 Equipped Ops, 5 available. ~1,500 Active patients. EZ Dental, Pan. 2012 GR $515K on 32 hours/ week. #CA558

POWAY: General Dentistry. 4 Ops. 1,100 SF. Est. 1985. Digital x-rays, Intra-oral camera. GR $720K w/Adj Net $241K. #CA139 – In Escrow SOLD

REDLANDS: General Dentistry. 3 Ops. Est. 48 years. GR $364K on 3 doctor days, 3 hygiene days/week. #CA160

RIDGECREST: General Dentistry Practice & Building. 4 Ops. 1,500+ SF. Small practice. 2012 GR ~$175K. #CA523

RIVERSIDE: General Dentistry Practice & Building. Emphasis on Implants. 5 Ops. Est. 50 years. 2012 GR $500K+. #CA120

SOUTH LAKE TAHOE: General Dentistry. 5 Ops, 1 Add'l plumbed. 1,450 SF. Avg GR $733K. #CA134

SOUTH ORANGE COUNTY: General Dentistry. 4 Ops. Dentrix. Coastal location. #CA[illegible] – In Escrow SOLD

SACRAMENTO: General & Specialty Dentistry. Stand-alone, leased office w/2 suites. 4 Ops (GP), 6 Equipped Ops w/3 Add'l plumbed (Specialty). ~4,000 SF. Dentrix, Intraoral, Digital x-ray, Pano. 2013 GR $1.3M. #CA157

SAN BERNARDINO: General Dentistry. 4 Ops. 30+ years goodwill. Street sign. Avg GR $265K. Dr. retiring. #CA150

SAN CLEMENTE: General Dentistry. 3 Equipped Ops, 2 Add'l plumbed. Est. 10 years. PracticeWorks, Digital x-rays, Pano. #CA129

SAN DIEGO: General Dentistry. 5 Ops. 1,200 SF. Est. 22 years. EagleSoft, Digital x-rays. 2012 GR $442K w/Adj Net $161K. #CA130

SAN DIEGO: General Dentistry. 3 Ops. Small FFS practice. Ideal starter or satellite location. #CA161

SAN FERNANDO VALLEY: General Dentistry. 3 Ops, 2 Equipped. Established 30+ years. 2013 GR $177K. #CA159

SAN JOSE—FACILITY ONLY! 6 Ops. 3,700 SF. Digital x-ray, Sterilization, Computer workstations. Reception w/flat screen TV. #CA565

SANTA ANA: General/Pedo/Ortho Practice. 11 Ops. Main street location. Est.20+ years. Pano, Intraoral camera. 2013 GR $424K w/Adj Net $138K, 35% Denti-Cal. #CA136

SANTA CRUZ COUNTY: General Dentistry. 3 Ops. 1,100 SF. Prof. bldg. 2,200 Active patients. Schick Digital x-ray, Dentrix, 5 Y/O equipment. GR $338K on 2 days/week. #CA550

SOUTH COUNTY SAN DIEGO: General Dentistry Practice & Building. 4 Ops. 1200 SF. Est. 38 years. Main street location. 2013 GR $310K on 150 days worked. #CA148

THOUSAND OAKS: General Dentistry. 6 Ops. Dentrix. [illegible] days hygiene. Retiring Dr p[illegible]g for 37 years. 2013 GR $576K w/Adj Net $163K. #CA118 SOLD

THOUSAND OAKS—FACILITY ONLY! 4 Ops. 1,325 SF. Move-in ready. Modern design. Dentrix w/4 workstations, Equipped business office, Sterilization area. Great start-up location/Satellite office. #CA137

TUSTIN: General Dentistry. 3 Ops. CEREC 3D Machine. GR $300K w/Adj Net $103K. #CA131 – In Escrow

VICTORVILLE: General Dentistry. 3 Equipped Ops, 3 Add'l plumbed. 2,150 SF. Est. 34 years. SoftDent. 2013 GR $313K w/Adj Net $147K. #CA149

WALNUT CREEK—PRICING REDUCED! Prosthodontic Practice. 3 Ops. Full lab. 2013 GR $399K w/Adj Net $143K. #CAM540

WEST LOS ANGELES: General Dentistry. 4 Equipped Ops, 1 Add'l plumbed. Great location on West Side. GR $342K on 2 doctor days/week. #CA117

YORBA LINDA—NEW LISTING! General Dentistry. 4 Equipped Ops, 1 Add'l plumbed. Prof. bldg. Est. 30+ years. 4 Days hygiene. EagleSoft, digital, paperless. 2013 GR $914K w/Adj Net $301K. #CA146

YORBA LINDA: General Dentistry. 5 Ops. Laser, Intra-oral camera, Digital x-rays. 3 Doctor, 3 Hygiene days/week. #CAM531 – In Escrow

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Through open communication with staff, dentists can reduce their vicarious risk and increase patient care. TDIC recommends that dentists maintain an open door policy for staff to discuss their concerns. Every office is busy, but it pays to schedule time to talk to staff and make adjustments when needed.

"Be aware of what's going on in your practice, carefully review charts and make sure you are informed," Corum said.

One common mistake is allowing staff to speak for the dentist. "In some cases, a staff member may seem like a family member after several years of employment and may be able to anticipate what the dentist will say," Corum said. No matter what the circumstance, do not allow staff to speak for you regarding patient dental care.

Similarly, be cautious about delegating responsibility to staff, especially when it comes to difficult conversations or managing angry patients. "Dentists must address these situations directly," Corum advised. "A complaint may start in the front office with billing, but if a patient is unhappy, the dissatisfaction can become treatment related. So dentists must be prepared to personally investigate complaints right away." ■

The Dentists Insurance Company offers policyholders a free advice line at 800.733.0634 for assistance with questions or concerns about potential liability. TDIC risk management analysts will work with policyholders to develop a solution.

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BAY AREA

AC-243 SF Facility: Occupies entire 8th floor of beautiful Downtown SF Fin. Dist. Bldg 2500 sf w/ 7ops **$150k**

BN-183 HAYWARD: ***Kick it up a notch by increasing the current very relaxed work schedule!*** 1,300 sf w/ 3 ops **$150k**

BN-233 ALAMEDA: Real Estate and Practice Available! 3,139 sf w/ 8 ops PR: **$275k / RE: $825k**

BN-248 NORTHEAST BAY: Opportunity to own Building also! 1,160 sf w/ 3 ops + room for 1 add'l **PR: $195k / RE $250k**

BN-276 OAKLAND: GREAT Location, Open Floor Plan, Lg Windows. 1,225 sf w/ 3 ops **ONLY $285k**

BN-279 CONTRA COSTA COUNTY: Excellent Merger Opportunity! 2-story. 1,350 sf w/ 3 ops +1 add'l **$60k**

CC-170 SOLANO COUNTY: Near Wine Country! 950 sf w/3 ops **$225k**

CN-189 RIO VISTA: In the heart of the beautiful California Delta! 3 ops **$275k**

CN-262 PETALUMA: HMO Practice in very desirable area. 1,200 sf w/ 3 ops **$450k**

DC-257 SAN JOSE: Highly Motivated Seller! GP in desirable Silicon Valley. Office is 900 sf w/ 3ops in single-story bldg. **REDUCED! $250K**

DC-287 DUBLIN Facility Only: Space Share Facility with OS. 2ops + 1 add'l, 1100 sf **$125k**

DG-116 SALINAS AREA: Large, loyal & stable patient base! 1,400 sf w/5 ops. State-of-the-art Equipment **$195k**

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

DG-232 SANTA CRUZ: Large, well-established Medical/Dental Prof complex! 1,063 sf w/ 3 ops **REDUCED ! $330k**

DG-239 PALO ALTO: Amazing Location! Pristine practice. "Top-of-the-line" Pelton Crane . 2000 sf w/5 + 1 add'l **$1.05m**

NORTHERN CALIFORNIA

EG-198 SACRAMENTO: Tucked in well established "Pocket Area" in highly desirable corridor. 1,112 sf w/3 ops **Now Only $95k**

EG-237 ROCKLIN: State-of-the-art, top-of-the-line equipment. 1,000 sf w/ 2 ops. Plumbed for 2 add'l **REDUCED! $230k**

EN-245 SACRAMENTO: Immaculate! Long established, warm, inviting practice! 1,335 sf w/ 3 op + 1 add'l. **Reduced! $135k**

EG-283 ROSEVILLE: Visibility & location are unsurpassed! 1,008 sf w/ 4 ops **$228k**

NORTHERN CALIFORNIA CONTINUED

EG-285 SACRAMENTO: Seller retiring! 40 years Goodwill! 2 ops. ~ $200k in collections/yr **$125k**

EN-294 SACRAMENTO: Well-established, restorative practice offering full spectrum dentistry. 1,363 sf w/ 5 ops. **$475k**

FN-181 NORTH COAST: Well respected FFS GP. Stable patient base. 1,000 sf w/3 ops **$150k (25% int. in bldg. avail.)**

FN-185 UKIAH: 900 sf w/ 3 ops. Seller Willing to Negotiate! **$250k**

FN-299 FERNDALE: Live and practice on the beautiful North Coast! 1,300 sf w/ 3 ops **$225k (Real Estate: $309k)**

GN-201 CHICO: Beautiful practice, major thoroughfare, stellar reputation! 1,400 sf w/ 4 ops & room for another **$425k**

GN-244 OROVILLE: Must See! Gorgeous, spacious 2,500 sf office w/5 ops! Collections over $450k in 2013. **Only $315k**

GG-273 WILLIAMS: **Must Sell by End of Month!** Live & Practice in this wonderful close-knit community! 1,800 sf w/ 2 op + 2 add'l **$75k**

GN-275 GREATER SACRAMENTO AREA: Beautiful "Spa Like" Practice! 1,596 sf w/ 4 ops **$525k**

GN-258 REDDING: Pristine and attractive! Conveniently located! 1,050 sf w/ 2 ops. **$215k**

HG-298 REDDING FOOTHILLS: Includes Cerec! 2,000 sf w/ 5 ops **Practice $188k / Real Estate Also Available!**

HN-213 NORTH EAST CA: Close to the Oregon Border, this FFS practice is 2,200 sf w/ 3op +1 **add'l REDUCED $115k**

HN-197 EAST LODI FOOTHILLS: Two practices for one great price! Call today for details! **$595k**

HN-242 YOSEMITE (Charts Only): Increase your Patient Base! Procure 500+ charts for only **$75k**

HN-268 CALAVERAS COUNTY: "Main Street" charm & picturesque views of Central Sierra Foothills. 2,000 sf w/4 ops + 2 add'l **$250k**

HN-280 N. EASTERN CA: "Only Practice in Town" 900 sf w/ 2 ops **$110k**

HN-290 PLACERVILLE: Embrace the lifestyle and build your success story here! FFS. Office ~ 1,400 sf w/ 4 ops, **$210k**

CENTRAL VALLEY

IC-277 STOCKTON & TRACY: 2 Quality FFS Practices **$600k**

IG-067 STOCKTON: Fully computerized, paperless, digital. 5,000 sf w/10 ops **REDUCED! Now ONLY $360k**

IG-292 TRACY: PPO/HMO, Family Oriented, 1,300 sf w/ 4 ops Over $200k in collections in 2013 **$129k**

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CENTRAL VALLEY CONTINUED

IN-193 MODESTO Facility: Recently remodeled! High foot traffic! 2,300 sf w/6 ops **$169k equipped or $85k w/o equipment**

IN-205 STOCKTON Facility: Desirable professional corridor. Newly remodeled. 1,565 sf w/ 4 ops **$169k equipped or $69k w/o equipment**

IN-211 MODESTO: **Seller Motivated!** Located in a single story, multi-unit Professional building. 1,500 sf w/ 4 ops. **$230k**

IG-247 ATWATER: Stunning practice! Cash flows well and profits better than most! 1,090 sf w/ 3 ops. State of the Art & Top of the Line! **REDUCED! NOW ONLY $550k**

IN-297 MODESTO: The beautiful practice is set in a pristine, contemporarily designed medical/professional center. Office ~ 1,980 sf w/ 4 ops. PR: **$475k / RE : $425k**

JN-251 FRESNO: Dedicated to delivering the highest quality of care! 1,565 sf w/ 4 ops **$140k**

JN-254 FRESNO: "Retro-vintage-designed". All this practice needs is you! 2,159 sf w/ 4 ops **$140k**

JN-259 FRESNO Facility: **Newly Remodeled!** Low rent & overhead! 1,197 sf w/ 3 ops + 1 add'l. Seller Motivated! **$45k**

JG-261 TULARE CO: Seller willing to stay for transition! 730 sf w/ 3 ops **$325k**

JG-278 GREATER VISALIA: Runs like a well-oiled machine! 1,500 sf w/ 4 ops **$320k (Real Estate Also Available)**

JN-295 VISALIA: Practice & Real Estate 2,000 sf w/ 5 ops **PR: $185k RE: $300k**

SPECIALTY PRACTICES

DC-246 PLEASANTON Pediatric: Highly Motivated Seller! Pediatric Practice/Facility Only. 1700 sf w/ 4 ops. Plumbed for additional ops. **Practice $325k or Facility only $250k**

I-7861 CENTRAL VALLEY Ortho: 2,000 sf, open bay w/ 8 chairs. Fee-for-Service. **$370k**

I-9461 CENTRAL VALLEY Ortho: 1,650 sf w/5 chairs/bays & plumbed for 2 add'l **$180k**

EN-203 SACRAMENTO Oral Surgery: Highly efficient office. 3,000 sf w/ 4 ops **ONLY $235k**

GN-284 CHICO Ortho: Warm, caring and well established! 900 sf w/ 2 ops + 1 add'l. **$75k**

BC-230 CENTRAL CONTRA COSTA Perio: Loyal patients @ 2 locations! **$650k**

EG-225 SACRAMENTO Ortho: Well-maintained, single-story Medical/Dental complex. 1,200 sf w/ 4 chairs **$95k**

DN-229 EAST BAY Endo: Strong referral & patient base. High foot traffic. 975 sf w/ 2 ops **$245k**

DG-264 SAN JOSE Ortho: $300-400k in build-outs alone! 1800 sf w/ 5 chairs. **ONLY $270k**

ASK THE BROKER

In a saturated market such as San Francisco, what are the key factors in making a successful office purchase?

This is actually a two-prong question. I will address the saturated market component first. In a competitive market, the easy answer is to make the highest offer! Seriously though, if a Seller has several buyers to choose from, it's just common sense that they will pick a buyer a) who is happy to pay the full price or more *and* b) who will consummate the transaction in the easiest path. If a buyer comes into a practice and points out all the perceived flaws of the practice, even rightfully so, the Seller will most likely go with a buyer who is not doing that.

In a saturated market, it is very important for buyers to do their homework in advance. They should have reviewed the practice information provided by the dental broker to gain a thorough understanding of how a practice is evaluated in their market. They should also have a general knowledge of which computer reports are important in evaluating the full spectrum of dentistry being performed in the practice.

In addition, the buyer should already have contacted several dental lenders to ensure that they are "pre-approved". This is technically a misnomer as "real" approval comes only after the Lender evaluates the cash-flow of the practice and the buyer's personal financial strength. Being "pre-approved" will definitely put you ahead of another buyer who is not.

The second prong of the question assumes that a "successful office purchase" means that the buyer succeeds after the sale. To cover all the issues would take up the entire space of this publication! However, I believe that the success of any buyer is probably 20% clinical skill and 80% personality/people management skill. The right fit in a practice purchase ultimately means that the Buyer comes close to duplicating or exceeding the collections in the practice they just purchased.

No two dentists are alike in their clinical or communication skills, but hopefully a buyer finds a way to get the return on their investment needed to meet his/her financial needs. While hiring the best dental CPA, dental attorney and the best dental accountant is helpful in the process, it does not guarantee success.

Only the dentist can really determine if he/she has the similar skill sets as the selling doctor to duplicate or improve the financial situation of the practice.

Timothy G. Giroux, DDS is currently the Owner & Broker at **Western Practice Sales** and a member of the nationally recognized dental organization, ADS Transitions.
You may contact ***Dr Giroux at*: wps@succeed.net or 800.641.4179**

CDA JOURNAL, VOL 42, N°7

Prescription Drug Monitoring Program

CDA Practice Support

California dentists who are registered with the U.S. Drug Enforcement Agency (DEA) may apply to access the state's Prescription Drug Monitoring Program (PDMP), a searchable database that allows controlled substance prescribers and pharmacists to ascertain individual patients' prescription history. The state attorney general's office has said that if doctors and pharmacies have access to controlled substance history information at the point of care it will help them make better prescribing decisions and cut down on prescription drug abuse in California. Law enforcement agencies and regulatory boards may also access the database.

PDMP access allows a prescriber to view the last 12 months of controlled substance prescriptions for a patient (patient activity report or PAR). If you determine that a patient has multiple prescribers, you can exercise caution in prescribing or dispensing controlled substances to that patient. Another use of the database is to detect pharmacy errors or fraudulent use of the prescriber's DEA registration. The database contains patient name, date of birth, drug name, drug form, strength, quantity, pharmacy name, pharmacy number and prescriber information. Researchers also may apply to request data.

The PDMP is a component of the state Department of Justice Controlled Substances Utilization Review and Evaluation System (CURES) program. Pharmacies and prescribers who dispense controlled substances must report prescriptions to CURES regularly. CURES captures data regarding prescriptions for all substances in Schedules II through IV.

Registration to access the PDMP will be mandatory beginning Jan. 1, 2016 for all California prescribers registered with the DEA.

System Requirements

A computer with Internet access is required, as well as a browser such as Microsoft Internet Explorer 6.0, Mozilla Firefox or Adobe Acrobat reader 7.0 or higher. JavaScript should be enabled for proper functioning of pop-up windows.

Application Procedures

To access the PDMP, a practitioner must first apply online at https://pmp.doj.ca.gov/pmpreg/RegistrationType_input.action#. Upon submitting the online application, the practitioner will see on the website additional instructions to mail notarized copies of DEA registration, dental license and state-issued identification to CURES. PDMP login information will be sent to the practitioner thereafter. Individual practitioner login and password may not be shared.

Rules of Access/Sanctions

Once access to the PDMP has been granted, a prescriber must notify CURES within three days of any changes to the prescriber's account (for example, address change). Access to the PDMP may be denied or suspended for a number of reasons, including but not limited to failure to maintain effective controls for access to patient activity reports, accessing information for purposes not allowed and falsifying an application for access.

The Department of Justice may conduct audits of the PDMP and its users. Dissemination or distribution of the controlled substance history information to anyone other than the registered user is prohibited. HIPAA and all confidentiality and disclosure provisions of state law cover the information contained in the database. All users of the information must comply with state and federal health information privacy laws. Disciplinary, civil or criminal actions will be taken by the Department of Justice and/or the appropriate licensing agency for any misuse or inappropriate access of patient data.

Refer to the CURES website for additional information: oag.ca.gov/cures-pdmp. ■

Regulatory Compliance appears monthly and features resources about laws and regulations that impact dental practices. Visit cda.org/practicesupport for more than 600 practice support resources, including practice management, employment practices, dental benefit plans and regulatory compliance.

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4013 STANISLAUS COUNTY GP

Well-managed GP with regularly increasing revenue. State-of-the-art 1,600 sq. ft. well-equipped office w/ 4 ops. Digital x-ray, Dexis, 4 x-ray machines, laser, pano and recent leasehold improvements. 2012 GR $883K+, 2013 on schedule for $968K+ as of Oct. Located near hospital in well-travelled area. Asking $604K+.

3088 SAN JOSE GP & BUILDING

Offering well-est. practice and 20 year old, 3,500 sq. ft. professional building. Office space is 1,755 sq. feet with 4 fully equipped ops. New laser, and Dexis digital x-ray, digital camera, intra oral camera, and panorex. Approx. 1,200 active pts. and 3.5 doctor days/week. Call for details.

SOLD

4015 LOS ANGELES COUNTY GP

Quality East San Gabriel Valley, Foothill Community practice. Retiring seller working 4 doctor-days, approx. 1,600 active pts., seasoned & loyal staff. 1,103 sq. ft. modern office w/4 fully-equipped ops. Prominent, well-travelled street corner in desirable neighborhood surrounded by healthcare professionals with large daytime population draw. Recent equipment upgrades. New computers and new cabinets. 2012 GR $877K+ Asking $722K.

SOLD

4020 MID PENINSULA GP

Well est. practice with modern recently upgraded equipment in 2 op. facility. Located in professional & residential area close to downtown, convenient to 101wn to the community for health care professionals. Asking $134K.

4025 SAN JOSE GP FACILITY

Great opportunity for a start up practice in a 1,029 sq. ft. fully equipped state-of-the-art 6 op. dental office in desirable San Jose location on a well traveled street and highly visible modern building in high-tech area. 6 ops. w/modern equipment. Assignable long term lease. Asking $250K.

4007 FREMONT PERIO

Seller retiring from 30 year est. Periodontal practice in 3 op facility located in medical/dental building on well-traveled avenue in commercial neighborhood. Strictly Perio - no implants. Great starter practice opportunity, turnkey operation with equipment and no construction hassles. 2012 GR $133K+ w/just 1 Dr. day/week. Avg. 8 new pts. per month, 6 pts. per Dr. day & 7-8 pts. per hygiene Asking $75K.

SOLD

4011 SANTA ROSA GP

Seller is changing careers and offering a well-established and successful practice. No insurance contracts, 4 doctor day/week & attractive 1,700 sq. ft. office close to downtown. 2012 $576K+, 2013 on schedule for $612K+ as of June. Asking $450K.

SOLD

4014 SAN FRANCISCO GP

Seller has a sterling reputation throughout the community, and is ready to retire. Facility has 3 fully-equipped ops, reception area, business office, private office, lab + sterilization area, x-ray room, dark room + storage and bathroom. Asking $125K.

SOLD

4018 NAPA COUNTY GP

Seller retiring from a profitable, well-established Napa County practice w/large & loyal patient base. Located in 2,750 sq. ft. office w/6 modern fully-equipped & upgraded ops. including digital x-ray in each op. 2012 GR 1.7M+ & 2013 GR on schedule for 1.8M+ as of October. Asking $1.4M.

SOLD

3094 NORTH BAY PERIO

North Bay Perio now available. Seller retiring from well-est. practice with seasoned staff and active referral base. 2,000 sq. ft. very nice office with 4 fully- equipped operatories. 2012 GR $450K+ with just 3 1/2 doctor days and 5 days of hygiene per week. Great upside potential since owner does few implants. Asking $271K.

SOLD

UPCOMING:

MARIN COUNTY GP
SANTA CRUZ GP
SANTA ROSA GP
SOLANO COUNTY GP & BLDG

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ORAL AND MAXILLOFACIAL SURGERY

Lingual nerve injuries

Fagin AP, Susarla SM, Donoff RB, Kaban LB, Dodson TB. What Factors Are Associated With Functional Sensory Recovery Following Lingual Nerve Repair? Harvard School of Dental Medicine, Boston. *J Oral Maxillofac Surg* 2012; 70 (December): 2907-2915.

Objective: The objective of the article was to identify factors associated with an improved likelihood of functional sensory recovery after the repair of lingual nerve injuries. The article was based on a retrospective cohort study of 55 patients who underwent lingual nerve repair from 2004-2010. Patients who presented with lingual nerve injuries who had surgical management with primary repair and at least one postoperative evaluation were included in the study.

Materials and methods: Patients were evaluated based on light touch, two-point discrimination, proprioception, pain and temperature to determine British Medical Research Council (BRMC) level of sensation as well as the Zuniga and Essick level of sensation. Demographic data were collected, including age, gender, presenting complaint and the duration since the injury. A total of 55 patients was included in the study; 42 of those were female. The average age of the patients was 30.7 years.

Results: The mean duration from injury to repair was 151.6 days. Following the repair, 74.5 percent of the patients achieved functional sensory recovery (FSR) within an average 263 days. Eighty-six percent had an increase in sensation of at least two levels of BMRC scale. None of the patients in the study became worse.

Conclusions: Younger patients had a higher likelihood of achieving FSR. For every additional year of age, FSR decreased at a rate of 9 percent. Patients with higher sensory function preoperatively had shorter times to FSR.

Clinical relevance: Most patients who undergo lingual nerve repair achieve FSR; however, the procedure should be performed within six months after initial injury in younger patients.

– Dennis Yamashita, DDS

PEDIATRICS

Success rates of pulpotomies and pulpectomies

Howley B, Seale NS, McWhorter AG, Kernis C, Broozer DB, Lindsey D. Pulpotomy Versus Pulpectomy for Carious Vital Primary Incisors: Randomized Controlled Trial. *Pediatr Dent* v 34 no. 5 Sep/Oct 112-119.

Purpose: The purpose of this prospective, randomized split-mouth investigation was to compare the success rates of pulpotomies and pulpectomies in asymptomatic primary incisors with large carious lesions, approximating the pulp that would result in pulp exposure if all the caries were removed.

Methods: Institutional review board approval was obtained at Baylor College of Dentistry. Patients 18 months to 5 years of age with at least one pair of matched, contralateral primary incisors in the maxillary arch with large carious lesions approaching the pulp that were restorable with a stainless steel crown were included in the study. All the teeth were vital.

Twenty-nine subjects with 50 matched pairs of incisors were selected from a pediatric dental practice. The teeth were randomly assigned by a coin toss to either the experimental group (pulpectomy with Diapex) or the control group (formocresol pulpotomy) with the contralateral incisor assigned to the other group. All the teeth were restored with stainless steel crowns. All patients were treated under general anesthesia by two standardized operators.

Postoperative radiographs were taken and the patients were recalled at approximately six-month intervals. Clinical signs of pathology, i.e., pain, mobility and presence of fistula/abscess, were evaluated. Radiographic outcomes using the scale devised by Seale and Zurn were used. Overall treatment outcomes were rated as success, failure or questionable by two standardized and calibrated examiners who were not involved in the study.

Results: Seventy-three incisors were followed clinically and radiographically for 23 months (mean time of 13.0 +/- 5.6 months). Calcific metamorphosis was the most common finding in the pulpotomy group. Partial or complete intracanal radicular resorption of Vitapex was seen in all the teeth treated with pulpectomy. Fill of the Vitapex had no significant effect on the outcome at any point. Final radiographic outcomes for all 37 matched pairs revealed an

89 percent (n=33) success rate for pulpotomies and a 73 percent (n=27) success rate for pulpectomies. In the pulpectomy group, teeth that were rated questionable subsequently progressed to failure.

Conclusion: There were no significant differences in the success of rates of pulpotomies and pulpectomies in treating carious vital primary incisors. Overall success rates of pulpotomy and pulpectomies were 89 percent and 73 percent respectively. Partial or complete intracanal resorption was seen in all pulpectomy-treated teeth. This did not significantly affect the outcome of the tooth.

Reviewer comments: This is a well-designed study comparing outcomes of pulpectomy and pulpotomy on large carious and vital upper maxillary incisors. There is a lack of good evidence-based literature supporting one technique over the other. According to this study, both techniques are equally successful. It is also important to note that all the teeth were restored with a sealed, durable restoration (stainless steel crown). The authors also suggest that a future study comparing pulp treatment to indirect pulp therapy should be conducted.

– Thomas S. Tanbonliong Jr., DDS

IMPLANTS

Titanium sensitivity

Javed F, Al-Hezaimi K, Almas K, Romanos G. Is Titanium Sensitivity Associated with Allergic Reactions in Patients with Dental Implants? A Systematic Review. *Clin Implant Dent Relat Res* 15(1):47-52.

Purpose: The goal of this study was to systematically search the literature for the answer to the question "Is titanium sensitivity associated with allergic reactions in patients who have dental implants?"

Method: The focus question addressed was stated above in the purpose. The usual selection protocol was followed, including original articles, clinical and experimental studies, reference lists of potentially relevant original and review articles, intervention studies and articles published only in English. The authors searched electronic databases and hand searched the reference lists of original and review articles. Their initial efforts yielded 17 articles that were cut to seven relevant articles. Because of the limited number of original studies investigating allergic reactions in patients with titanium dental implants, the result of the review was changed to mainly summarize the relevant data.

Results: Six of the seven studies reported the duration of Ti implants in situ: one week to two years. Four of the studies showed the development of dermal inflammatory conditions, one study noted gingival hyperplasia and a case report described swelling in submental and labial sulcus and soft tissue hyperemia. Two of the included studies showed no allergic reaction. Metal hypersensitivity was detected using lymphocyte transformation testing and memory lymphocyte immunostimulation. Epicutaneous patch tests were performed in two studies and histological assessment of biopsy tissue obtained from inflamed peri-implant tissue was done in three studies.

Conclusion: Because titanium alloys are commonly used in implant dentistry due to their higher strength, the presence of alloy metals cannot be ruled out as the cause of the allergic reactions reported in these papers. Therefore, whether it is the titanium or other metals as alloys or contaminants in the implants that caused the reactions is unproven.

Clinical relevance: As is often the case in fundamental clinical questions, this systematic review yielded too few results to allow for a direct positive or negative conclusion to the question. However, the presence of several studies that show metal hypersensitivity related to titanium implant placement is of clinical significance and warrants our attention. This is not a trivial question, it is routinely asked by patients and it cannot be answered purely in the negative.

– David W. Richards, DDS, PhD

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6061 LODI Beautiful 5-op office. Digital and paperless. 16+ years left on Lease.

6060 CONCORD Practice has impressive history. 2013 collected $940,000 with very strong Profits. 5-ops, Digital & CT scan.

6059 MODESTO Long established. 2013 collected $283,000 with Profits of $146,600. Nice foundation to build upon.

6058 MODESTO On 2-day week, produced $522,000 and collected $404,000 for 12-months ending 3/31/14. Profits totaled $211,000 in 2013. Owner unable to spend more time here and knows practice would be better served by full-time DDS.

6056 STOCKTON 3-op practice averages 9 New Patients per month. Collected $368,000 in 2013 with Profits of $178,700. Near Sherwood and Weberstown Malls. .

6055 VACAVILLE Strong reputation. 3-days of Hygiene. 3-ops. 2013 collected $568,000 on 3-day week. Profits totaled $240,000.

6054 TRACY Great launching pad waiting for opportunistic buyer. Best location. Beautiful 4-Op office. Digital and paperless. Part-time management collected $189,000 in 2013. Will do well with full-time attention. Full Price $125,00. SOLD

6053 SAN FRANCISCO'S SOUTH BAY – PEDO PRACTICE Long established. 2013 tracking $600,000 in production, $650,000 in collections and $255,000 in Available Profits. Great staff. SOLD

6052 BERKELEY Trendy north side shopping area. Very strong foundation. 2,000 active patients. 2 days of Hygiene. Beautiful hi tech office with great curb appeal. 2012 collected $590,000. Lots of work referred out. SOLD

6051 FRESNO'S FIG GARDEN VILLAGE AREA Not a Delta Premiere practice. Collected $430,000 in 2013 on 3.5 day week.

6050 MERCED 2013 trending $360,000. Very profitable. Refers Endo, OS & Perio. Not a Delta Premiere practice. Great foundation to build upon. Full Price $125,000. SOLD

6048 SALINAS Great opportunity for the ambitious, Ideal for two Dentists. 10 days of Hygiene per week. 2012 collected $1.1 Million. 2013 tracking $1.2 Million. Practice did well during Great Recession. SOLD

6047 STOCKTON Best location outside Brookside Community on West March Lane. 2013 collected $375,000. Attractive 3-Op office. Package sale includes condo. SOLD

6046 PINOLE Collected $500,000 in 2012. 4-days of Hygiene produced $178,600. Beautiful office. Refers Endo. Lots of Goodwill here. SOLD

6043 EL SOBRANTE 3-day practice collected $184,000 in 2013. 3-ops. Building optional purchase. Full price $50,000.

ANAHEIM $30,000/mth part-time. 6 ops, $30,000 invested in digital Dentrix upgrade and x-ray system. Full Price $225,000.

ANAHEIM Near Highway 91 and Harbor. Grosses $300,000+. Full Price $250,000.

ANAHEIM HILLS Grossing $400,000. Buy half now and remaining 50% when Lease expires in 1.5 years.

BAKERSFIELD AREA Grossing $400,000. Full Price for practice & building $265,000.

BAKERSFIELD Grosses $800,000. Net Profits $400,000+. 5 Ops. Successor should do $1 Million. Full Price $500,000.

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CORONA – NORCO AREA Grossing $90,000/month. Free-standing building with 8 ops. Full Price for practice and RE $1,850,000.

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HEMET Grosses $650,000 part-time. Will do $1,000,000. 10 op office. Full Price $585,000.

HMO 3 Practices grossing $6 Million. $52,000 cap checks/mth. One includes RE.

HUNTINGTON PARK 98% Hispanic. Grosses $600,000. Low overhead. 4-ops.

LAKE FOREST 2-years old. 7-ops. Grossing $10,000/mth. Absentee Owner. Full Price $385,000.

LOS ANGELES – NEAR KOREATOWN Grossing $195,000. Hi visibility. Great upside. Full Price $150,000.

PASADENA AREA Grosses $950,000 part time. Did $1 Million+ with more time. Hi identity building also For Sale.

RESORT AREA NORTH OF BAKERSFIELD Seller grosses $1,500,000 on 24 hour week.

RIVERSIDE Grosses $860,000+. Can do $1.5 with right Buyer. Digital 10 Ops in hi identity center near Walmart. Full Price $800,000.

SAN FERNANDO VALLEY Part-time $300,000+. Full time will do $500,000. Building also available.

SAN FERNANDO VALLEY – BEST HISPANIC LOCATION 7 Ops & room to grow. 70 New Patients/mth. $2 Million location. Practice $1 Million, Building $1.75 Million.

SOUTH ORANGE COUNTY BEACH CITY Grossed $950,000 in 2013. 5-ops.

SOUTH ORANGE COUNTY SHOPPING CENTER $415,000 investment with $2 Million gross upside.

SANTA ANA Hi identity strip center. 3 Ops, low overhead, Grosses $200,000.

TORRANCE Grossing $300,000+ Serves Palos Verdes. 3-ops.

TORRANCE - GARDENA Conservative Chinese DDS. Refers lots of work. Chinese/American Successor will do $600,000 first year. Bargain at $185,000.

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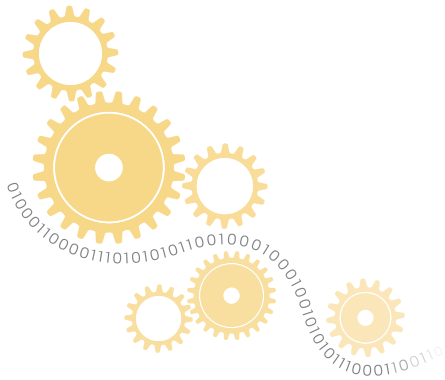


A look into the latest dental and general technology on the market

Google Docs and Sheets (Google Inc., Free)

Google Docs and Sheets for iOS was released shortly after our review of Office for iPad in the June issue. Docs and Sheets allows a user to create, view or edit word processing and spreadsheet documents on Google Drive, the cloud-based storage offering from Google. Files on Docs and Sheets are synchronized with Google Drive along with the ability to work offline when users are not connected to the Internet. Slides, the presentation component of the productivity suite from Google, was not available for iOS at the time of this review. Users can directly access word processing files and spreadsheets stored on Google Drive once logged into the Docs and Sheets apps with their Google accounts, respectively. Although users can upload and view Microsoft Word or Excel documents from the Google Drive app, those files must be converted to a compatible format before they are visible in the file browsers for the Docs or Sheets apps. Conversion of these files, unfortunately, requires the use of Google Drive on a desktop and cannot be converted with the iOS apps themselves. Docs and Sheets are productivity apps that provide basic word processing and spreadsheet features only. Formatting options include bold, italics and underline. Paragraph options include left, center, right and justify. Simple bullets and indenting are present. Also included is a find and replace option. Along with a few basic fonts, these apps do not contain many other features. Sheets includes a basic set of functions that includes more differences than similarities with Excel function names. Built into the apps themselves are the options to comment and share documents. Users can grant permission for other users with Google accounts to view and/or edit files. Comments from any shared user can also be left on these documents. Printing to an AirPrint-compatible printer or Google Cloud Printer is available.

– Hubert Chan, DDS

Rachio Iro (Rachio, $249)

The wave of products tapping into the "Internet of Things" continues with the debut of Rachio's Iro, a smart sprinkler controller that can wirelessly connect to and be controlled right from a smartphone or tablet. Installation is quick and simple, requiring 15 minutes, a screwdriver and the installation of an app to a mobile device. Once the sprinkler control wires are plugged into the Iro and it is connected it to a Wi-Fi network, all configuration and setup of the system is done via the intuitive interface of the Rachio app. With only the flick of the finger, users can configure their sprinklers and zones and input the type of plant (grass, shrubs, trees, etc.), soil, shade and type of sprinkler head. Users can then set their sprinkler schedule or enable auto scheduling, based upon their ZIP code and Rachio's weather intelligence to ensure their system is optimized around rain, wind and humidity. Obviously, it is also possible to manually run any of the sprinklers right from the app, so no more having to run back and forth between the sprinkler control and the different corners of the yard when troubleshooting sprinkler issues. The highest praise that can be given to the Iro is that it just simply works, period. And it is infinitely more functional than previous "dumb" generations of sprinkler controllers.

– Blaine Wasylkiw, CDA director of online services

News Digest (Yahoo! Inc., Free)

Originally launched in January for iOS, Yahoo!'s News Digest app was made available to Android users in May. What is unique about this app is that it provides top stories twice a day that are delivered via push notifications – once at 8 a.m. and again at 6 p.m. The app keeps it simple with the top eight to 12 stories of the day appearing on the home screen. Scroll down to view the headlines and click on a story to read it in its entirety within the app. Stories range in topics from U.S. news, world news, business, sports and "odd news." At the top of each story is a share function. At the bottom of each story is a Twitter feed with tweets relevant to that story, as well as a list of references used on that story. Scroll through all of the stories and the user will come to a "Did you know" page that features a random fact, followed by an option to read more news. The format is user-friendly and each story features a crisp, lively photo. All stories are built into the app, which means no linking out to a browser. If you want to avoid information overload and are looking for a quick news recap, this is a good app to have.

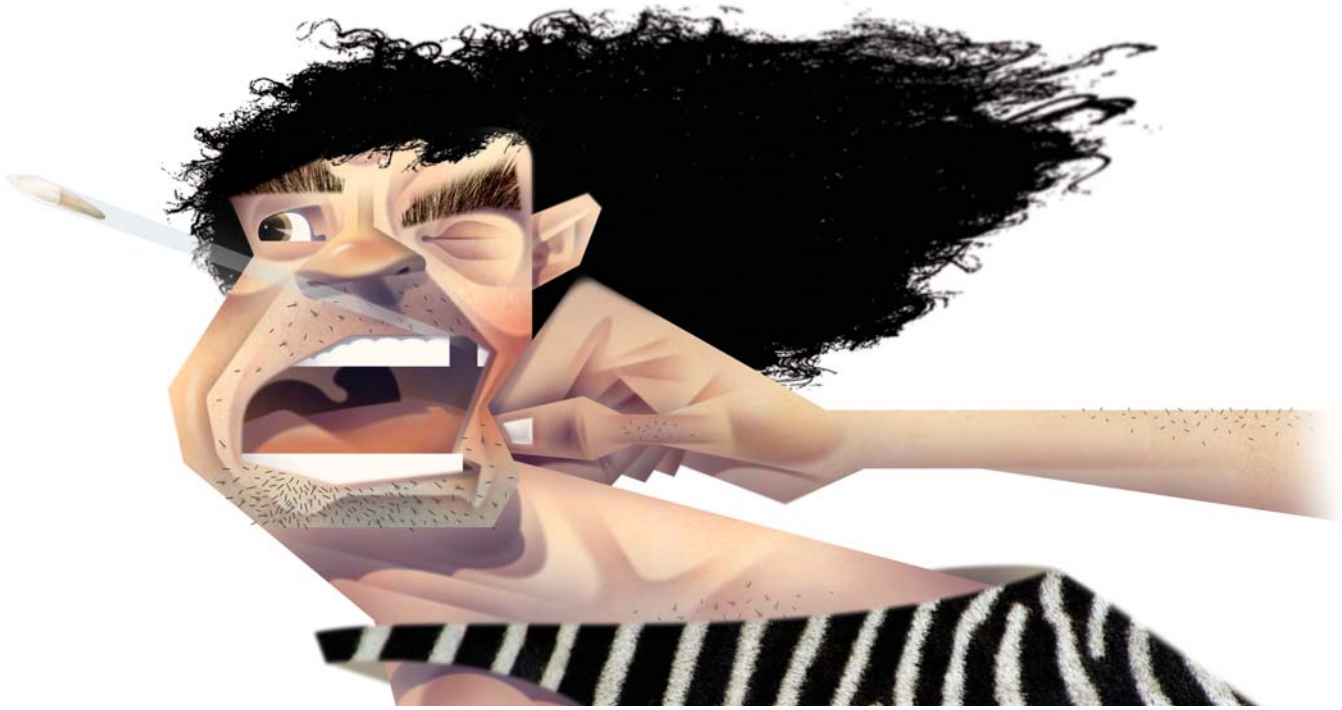
– Blake Ellington, Tech Trends Editor

Would you like to write about new technology?

Dentists interested in contributing to this section should contact Tech Trends Editor Blake Ellington at blake.ellington@cda.org.

CDA JOURNAL, VOL 42, N°7

Dentistry: The Early Years



The following Dr. Bob column was originally printed in the May 1999 issue of the Journal.

When the first man discovered sugar cane tasted better than bamboo, civilization started its long downhill slide that made the advent of dentists inevitable.

Robert E. Horseman, DDS

ILLUSTRATION BY VAL B. MINA

Riffling through the Yellow Pages today, it is hard to believe that many years ago there were no dentists. There were also no lawyers, making us wonder why we didn't leave well enough alone. The reason, of course, was because the earth was a molten sphere of lava and hot gases. Dental equipment wouldn't have lasted a week. In some early accounts, this gaseous globe was thought to be the original site of Hell. Later on when things cooled off, Monday morning was accorded that designation.

When the first people appeared several million years later, if you can believe Darwin, Leakey, et al., there were still no dentists. Mainly, this was because there was no demand for dental services. Early Man complained, "Teeth, schmeeth, I'm hungry, cold and naked. I live in a bad neighborhood in this cave that don't even have an en suite bathroom, and I got no shoes." He had a point. Fortunately, he had excellent teeth and a nice complexion marred only by a Gillette-deprived beard, because two of the latter-day food groups, sugar and grease, hadn't been invented yet.

When the first man discovered sugar cane tasted better than bamboo, civilization started its long downhill slide that made the advent of dentists inevitable. The use of sugar cane became

very popular. Kids would go around all day with a length of sugar cane stuck in their faces. Mothers would yell at them to not run with a stick in their mouths, but they kept bonking into things that resulted in palatal and uvular discomfort. It was a habit that persisted even among adults until the discovery of tobacco. For an alternative to sugar cane, youngsters had to wait until M&Ms came along that were just the right size to stuff up their nostrils.

Tobacco was slow in finding favor with primitive man until the discovery of fire. This was another one of those accidents that turn out to be so beneficial, like being run down by a Mercedes whose owner has a pile of liability insurance. A man sucking on a rolled leaf of tobacco was standing in an open field contemplating his navel when he was struck by lightning. Although stunned, he was quick to discover that the ignited tobacco gave him a definite lift, even though it tasted like broiled camel dung.

The prime elements that made the entrance of a professional tooth person a foregone conclusion were now in place — sugar to rot the teeth, tobacco to stain them and enough ignorance to ensure neglect would continue. The final elements to establish dentistry as a viable business, anesthesia and VISA, would appear later.

The very first toothache treatment occurred sometime around 2000 B.C. when a chap who had been whining and complaining for weeks took a roundhouse right from another cave person who got tired of listening to his caviling. Luckily, the blow luxated the offending tooth and the ache promptly subsided. "Well, hey," concluded the victim, "I think we got something here."

After that, whenever a toothache manifested itself, the sufferer got a friend to knock it out for him. Certain

The very first toothache treatment occurred sometime around 2000 B.C. when a chap who had been whining and complaining for weeks took a roundhouse right from another cave person who got tired of listening to his caviling.

individuals with genetic personality defects actually enjoyed knocking out peoples' teeth and became adept at it. When a toothache took its toll on a member of the group, someone would offer, "Go get Oog, he'll take care of it for you." Oog, whose last name has been forgotten, was probably the first dentist.

Eventually, Man began to see a pattern here, one that finally rendered him nearly toothless and one that prompted him to find alternative treatment modalities. Despite the fact that some early civilizations such as the Mayans, the Incas, the Egyptians, the forty-niners and the Elks had made primitive inlays and bridges, dentistry was going nowhere fast as a profession.

A breakthrough came on a Thursday in Weehawken, N.J., when a customer, asked by his barber, "Do you want a haircut?" riposted just once too often, "No, I want them ALL cut!"

When it was all over and the shop's other customers were admiring the expertise with which the barber had rendered the customer edentulous, it was decided that barbers would henceforth be the officially designated town dentist.

Besides being clever with the clippers, barbers were very good with extractions and would even do a bit of gum surgery if they had imbibed enough bay rum, but the problem of edentulous patrons was a limiting factor in their dual careers. Finally, deciding that hair grew back better than teeth and thus afforded a self-perpetuating customer base, barbers concluded that offering an eight-year course leading to a DDS or DMD degree was probably a better way to go.

If truth be known, their decision to eschew dentistry was predicated more on these considerations:

1. A little Brylcreem was the worst thing they could get on their hands.
2. Dandruff was less yucky than saliva.
3. Insurance companies didn't interfere in the sacred barber/customer relationship.
4. Iatrogenic errors grew back in two weeks, and
5. They could give away all-day suckers to little kids without feeling guilty.

In retrospect, we're inclined to consider this a wise move. I can still go the barber of my choice, unhampered by any Hair Management Organizations. Even though he spends less time with me than he did 20 years ago, that's not his fault. Although he deals with sharps on a daily basis, his hands are unsheathed, his face unmasked, and the place still looks like it did when we were kids. On the downside, I don't get offered a sucker any more, and he still doesn't think, "No, cut 'em ALL" is funny. ■

We're Taking Your Requests

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

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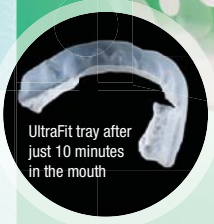

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