

Journal

CALIFORNIA DENTAL ASSOCIATION

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November 2017

Low-Risk Mandibular
Symphysis Grafts

Oral Health and Nutrition
in Vietnam

Asthmatic Therapy and
Oral Health Study

DENTAL STUDENT RESEARCH
Bradley S. Henson, DDS, PhD





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How I Learned To Stop Worrying and Love Dental Amalgam

Brian K. Shue, DDS, CDE

The first annual session of the California State Dental Association occurred in 1870 at the YMCA building in San Francisco. It was a historic occasion. Twenty-three members signed the constitution and founded what would become our modern-day California Dental Association. Newly elected President C.C. Knowles of San Francisco presented his priority agenda for three necessary statewide issues: California desperately needed a dental college, a dental journal and most important, a law to finally regulate the practice of dentistry to protect the public from the humbugs and charlatans. Little did he know it would take more than a decade to accomplish anything on this ambitious platform.

Nevertheless, San Francisco dentist J. Ball threw a bylaws monkey wrench into the midst of the second day of the session. He sprung the “amalgam resolution,” which stated, “Whereas, certain persons, calling themselves dentists, are filling all decayed teeth with an amalgam of base metals, combined with mercury, to the great injury of the profession and of their patients,” and “Resolved, that we do most earnestly protest against the use of any amalgam in any tooth that gives evidence of permanent usefulness when properly filled with gold.”¹

Did a collective groan arise from the room? The minutes don’t specify. But the resolution was “indefinitely postponed.”

A ban of amalgam by a dental society? Nothing new. Thirty years prior, the groundbreaking American Society of Dental Surgeons (not the American Dental Association) adopted one. It did not work out well for this first national but remarkably short-lived association.



They are like tiny, shiny badges of courage in the never-ending battle against *Streptococcus mutans*, acidic environments and the modern world’s non-Paleolithic diet.

Undaunted by the term “indefinitely,” Ball reintroduced the amalgam resolution the next day (insert jarring noise of an LP record scratch here). Uh-oh. “Motion out of order,” the chair said. J. Ball appealed, but the chair sustained. Next, it was motioned to lay it on the table. Lost. Then it was motioned to amend. Lost. It was motioned to adopt. *For the third time*. Lost. It seems that J. Ball had significant concerns about this 19th century restoration.

Fast forward to today. Amalgam isn’t a foreign substance. It doesn’t harm precious body fluids. Much is known about it.

My amalgam of choice is a dispersed phase alloy with just 50 percent mercury by weight and alloy comprised exactly of 53 percent silver, 23 percent tin and 24 percent copper, with less than 0.5 percent zinc. Yes, the container has the following Proposition 65 warning in eye-strain-inducing font: “This product contains mercury, a chemical known to the state of California to cause birth defects and other reproductive harm.” Yet my favorite brand of canned albacore tuna doesn’t. And the warning goes further, “Whenever possible, amalgam fillings should not be placed in or removed from teeth of pregnant women” and “when possible, nonmercury filling material should be considered for treating primary teeth in children.”

Digging deeper, I looked up the SDS (the papers formerly known as MSDS) data of my amalgam. This product’s SDS includes three hazard designations: the “skull and crossbones” symbol to indicate “acute toxicity (fatal or toxic),” the “corrosive” symbol and the “exclamation point” symbol (as an aside, I prefer the scarier European SDS “skull and crossbones” symbol, which is more Pirates of the Caribbean-ish, instead of the U.S. version, which smiles like that cute emoji on my iPhone). And the classification of substance or mixture is labeled “very toxic,” “very toxic by inhalation,” “may cause harm to unborn child” and “danger of serious damage to health by prolonged exposure through inhalation.”

But there is no cause for alarm.

Dental amalgam is safe.

The ADA’s Statement on Dental Amalgam affirms, “Dental amalgam is considered a safe, affordable and durable material that has been used to restore the teeth of more than 100 million Americans” and “the scientific evidence supports the position that amalgam is a valuable, viable and safe choice for dental patients.”²

Although the Dental Board of California's mandatory patient-centered brochure "The Facts About Fillings" says, "A diversity of opinions exists regarding the safety of dental amalgams," it then reports "... scientific evidence and research literature in peer-reviewed scientific journals suggest that otherwise healthy women, children and diabetics are not at an increased risk from dental amalgams in their mouths."

The U.S. Food and Drug Administration classified encapsulated dental amalgam as a class II medical device — the same classification as other restorative products — and asserts, "Clinical studies have not established a causal link between dental amalgam and adverse health effects in adults and children aged 6 and older. In addition, two clinical trials in children aged 6 and older did not find neurological or renal injury associated with amalgam use."³

Also, the Environmental Protection Agency implemented the amalgam separator requirement, which took effect July 14, 2017. This is the final rule from the Clean Water Act. It is effective immediately for new dental offices and will be phased in for existing offices. This requirement is just the latest measure to protect our spillways and of course our planet. It requires best management practices in handling amalgam, which is basically scrap amalgam recycling and cleaning dental traps with approved cleansers.

What more is needed to prove the safe use of amalgam?

There is just something exceptional about amalgam restorations. Ever since I was exposed to them at my school of dentistry's laboratory benches, I was hooked. Prepping, packing and carving Class II amalgams on

all those typodont teeth gave me the reassurance that I was finally on my way to becoming a dentist. I felt more confident than a 19th century Crawcour "brother." With tight contacts, closed margins and predictability under various conditions, an amalgam restoration clinically just feels *right*.

HIPAA privacy aside, my mouth has four amalgams. They are like tiny, shiny badges of courage in the never-ending battle against *Streptococcus mutans*, acidic environments and the modern world's non-Paleolithic diet. Two of those amalgams are buccal pits on lower first molars that were placed almost 40 years ago. Would I still have them if they were originally composite resins? Systemic reviews found at the ADA evidenced-based dentistry webpage conclude not all composites and bonding agents are created equal and that amalgams seem to be, if you'll pardon the term, the "gold standard" in comparison for longevity.

I am sure that J. Ball had the best intentions in mind in his failed attempt to ban amalgam. Although his peer group did not agree with him on this issue, he garnered enough respect to be an elected officer in CSDA's first year: CSDA librarian. To J. Ball's credit, after all these years, although there is no amalgam ban, there has been a significant reduction in use of amalgam restorations in the U.S. Furthermore, the U.S. signed onto the Minamata Convention on Mercury in 2013, which is the international treaty to "phase down" (not "phase out") the use of dental amalgams and ultimately reduce mercury waste. Due to the decision for a global phase down of amalgam (Minamata Convention on Mercury) general opinion on its safety is unlikely to change.

When offered the choice of either an amalgam or composite restoration, patients often ask me, "What do you recommend?" I say "amalgam" without pause. Why? It's simple. I love amalgam. J. Ball, someday I think you and I are going to have a serious disagreement. ■

REFERENCES

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- 2 ADA. Statement on Dental Amalgam. Adopted August 2009. www.ada.org/en/about-the-ada/ada-positions-policies-and-statements/statement-on-dental-amalgam.
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Brian K. Shue, DDS, CDE, is the dental director of a federally qualified health center. He is a certified dental editor, the San Diego County Dental Society editor and is a fellow of the American College of Dentists and the Pierre Fauchard Academy.

Informed Consent

As usual, I always enjoy the *Journal* and its articles. After reading the September RM Matters, Informed Consent: More Than Just a Form, I could not help but think about this quote from attorney John Sillis, “Informed consent is not a form. It is a conversation.” That was spot-on.

It is so important to keep that line of communication open because more times than not a patient’s displeasure occurs when communication breaks down. That said, a consent form helps to keep that communication open about the seriousness of medical and dental treatment.

One aspect I missed in this article was the fiduciary legality of a consent form. My understanding is that a consent form is a legal instrument that can be used in court to better defend a doctor in a malpractice case. Because most consent forms are prepared by attorneys, usually to protect a dentist, there is an element of fiduciary duty for the dentist to inform the patient that the consent form has legal implications. Should the patient not be a trained attorney, they would have the right to have their personal attorney read/evaluate this legal consent form for any potential patient concerns.

Failing to inform the patient of his or her right to have an attorney review the form before they sign it would potentially negate its legal protective value. The argument from a patient of a “signed” consent form that was used in a contested matter may very well be, “It’s a legal form with verbiage I was not familiar with because I am not an attorney. The doctor said that if I do not sign it, he will not proceed, and since I was in pain, I signed it.” The

plaintiff’s attorney may ask the court to throw out this consent form and try the case on its merits. Something to think about, and it would be interesting to hear from an attorney or two.

STEVEN JAKSHA, DMD
San Diego

TDIC Responds

Thank you for your letter.

A fiduciary duty implies a higher level of care than ordinary care. Dentists owe a duty defined as the standard of care. It is not a heightened duty. A dentist has a duty to use the skill, knowledge and care that other “reasonably careful” dentists would use, nothing more. Therefore, there is no “fiduciary duty” for the doctor to advise the patient that the consent form can be used to demonstrate that the patient was apprised of the associated risks, benefits and alternatives to treatment prior to the performance of the procedure. The informed consent form is not a contract, such as a binding arbitration agreement, and does not bind the patient to anything. It is an acknowledgment that the patient accepts the treatment listed on the form, which can be revoked at any time. Whether the form becomes a “legal” document typically only arises in reference to a claim of malpractice to dispel any argument by the patient or their attorney that informed consent was not obtained. The duty of the doctor is to obtain informed consent. TDIC’s recommendation is the use of a written form, complemented with a discussion by the doctor. The form should be written in plain English and should promote an open dialogue with the patient. By signing the form, absent an admission by the doctor that no consent discussion occurred, a presumption arises that the patient read the form.



The Journal welcomes letters

We reserve the right to edit all communications. Letters should discuss an item published in the *Journal* within the last two months or matters of general interest to our readership. Letters must be no more than 500 words and cite no more than five references. No illustrations will be accepted. Letters should be submitted at editorialmanager.com/jcaldentassoc. By sending the letter, the author certifies that neither the letter nor one with substantially similar content under the writer’s authorship has been published or is being considered for publication elsewhere, and the author acknowledges and agrees that the letter and all rights with regard to the letter become the property of CDA.

CORRECTION

The pull quote on page 567 is attributed to Dewhirst and Hoffmann and not the author of the manuscript, Marcelle Nascimento. The *Journal* selected the quote without consulting the author. The *Journal* apologizes for any confusion.

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Caring Enough to Criticize

David W. Chambers, EdM, MBA, PhD



The nub:

1. Honest peer criticism benefits the group as a whole.
2. Criticism only works in caring communities.
3. Start worrying when criticism from friends stops.

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

I played football in high school. Strictly second string. I did not mind because my senior year we went to the state championships and I got to square off against all-state tight end Rob Haskins four days a week. Our coach was named Spike Hilstrom. He was a bullet-shaped, baby-faced former lineman for one of the state colleges.

Playing in the line is about center of balance, heads up, wide stance and owning as much space as possible. One of Spike's drills involved two linemen, face to face, north to south, with a two-by-four board running north to south between our legs. This taught a wide stance. It was fatal to bring your feet directly under you as one would naturally do. The cleats would slide on the board and down you went. I was no match for Haskins and remember much time on my face with Spike Hilstrom yelling at me. Did I tell you he had an unnaturally annoying voice?

After one session, Coach called me aside and said, "Chambers, I can tell that you do not like me yelling at you." [silence] "I'll tell you why I bother to yell at you. It's because I respect you and I want to see you do better." [silence] "Chambers, you should start to worry when I stop yelling. That means I have stopped caring."

I have been reading the disciplinary reports of the California Dental Board. I am saddened at the level of bad dentistry and personal stupidity of some dentists. I am heartened that patients, office staff and investigators in the attorney general's office are speaking up about it.

In the Common Good Game used in research, players have an opportunity to increase their payoff (money) by cooperating. This is much like the profession's reputation in dentistry. The smart move for *individuals* is to let others invest and reap the common benefits without becoming involved. The smart move for the *group* is for everyone to invest and share in the common reward.

Under normal circumstances, initial modest investments dry up as players notice that their colleagues are free riding. Everyone bends a little as the cheaters prosper. But when players are allowed to criticize their neighbors, free riding stops and *everyone* does better.

It is easy but wrong to believe human nature is good just because bad acting is not commented on or that undesirable behavior will improve if ignored. The most recent research does clarify, however, that criticizing the deviously selfish does not always work. In groups low on trust or those who see others as competitors, criticism does not lead to improvements.

Spike was right. He cared enough to make me a contributor on the state championship team. Perhaps he did not need to care in public at 90 decibels, but I am glad he cared. ■



Dental Conditions Among Top Causes of Avoidable U.S. Emergency Visits

A recent study published in the *International Journal for Quality in Health Care* found that 3.5 percent of all emergency department visits analyzed were avoidable. Of these, the top three discharge diagnoses were alcohol abuse, dental disorders and mood disorders such as anxiety or depression.

Researchers performed a retrospective analysis of data from the National Hospital Ambulatory Medical Care Survey from 2005 to 2011, which included 424 million visits made to emergency departments in the U.S. between 2005 and 2011 by patients aged 18 to 64. Based on their analysis, study authors Renee Y. Hsai, MD, MSc, and Matthew Niedzwiecki, PhD, both of the department of emergency medicine at the University of California, San Francisco, suggest that avoidable emergency department visits could be reduced by increasing access to dental and mental health facilities.

Their study defines “avoidable” as those cases where there was no requirement of diagnostic or screening services, procedures or medications and the patients were discharged home. It found that 6.8 percent of all avoidable visits were caused by alcohol-related or mood disorders and 3.9 percent were related to disorders of the teeth and jaw.

“Emergency physicians are trained to treat life- and limb-threatening

Chewing Gum Test Detects Bacteria

Patients in the future will benefit from a quick and affordable method using a chewing gum-based diagnostic test to assess if they carry the bacteria that causes inflammatory responses in dental implants. The test was developed by a pharmaceutical research team at the Julius-Maximilians-Universität (JMU) Würzburg in Bavaria, Germany, and featured in the journal *Nature Communication*.

In practice, the diagnostic test works as follows: If there is an inflammation in the oral cavity, a bittering agent is released while chewing the gum. Patients can then visit their dentist who will confirm the diagnosis and treat the disease. This type of early detection aims at preventing serious complications such as bone loss.

“Anyone can use this new diagnostic tool anywhere and anytime without any technical equipment,” said Lorenz Meinel, PhD, head of the JMU Chair for Drug Formulation and Delivery, who developed the new diagnostic tool with Jennifer Ritzer, PhD, and her team.

Dr. Meinel plans to set up a company to launch the chewing gum into the market.

“We hope to be able to diagnose other diseases with our ‘anyone, anywhere, anytime’ diagnostics to identify and address these diseases as early as possible,” Dr. Meinel said.

He assumes that it will take two to three years until the gum is commercially available. Chewing gum rapid tests for other medical applications are currently under development.

Read the article in *Nature Communication* (2017); doi:10.1038/s41467-017-00340-x.



emergencies, making it inefficient for patients with mental health, substance abuse or dental disorders to be treated in this setting,” the authors said.

The study notes that 16.9 percent of all mood disorder-related visits, 10.4 percent of all alcohol-related visits and 4.9 percent of all tooth- and jaw-related visits were avoidable. Despite these significant percentages, the vast majority of diagnoses in these areas were not deemed avoidable so it should not be assumed that all patients with these conditions should

not visit the emergency department.

However, these findings do suggest that policy initiatives could alleviate pressure on U.S. emergency departments by addressing gaps in the provision of dental and mental health care in order to treat this group of emergency department visitors elsewhere at a lower cost, rather than penalizing patients for lack of access.

Read more about this study in the *International Journal for Quality in Health Care* (2017); doi: org/10.1093/intqhc/mzx081.

Mussels Influence Development of New Dental Composite

Inspired by the mechanisms mussels use to adhere to inhospitable surfaces, University of California, Santa Barbara, (UCSB) researchers have developed a new type of dental composite that provides an extra layer of durability to treated teeth. The potential payoff? Longer lasting fillings, crowns, implants and other work. The research is highlighted in the August issue of the journal *Advanced Materials*.

“(The composite) is as hard as a typical dental restoration but less likely to crack,” said corresponding author Kollbe Ahn, PhD, a materials scientist at UCSB’s Marine Science Institute.

One of the primary reasons restorations fall out or crack is brittle failure of the bond with the surrounding tooth. With enough pressure or wear and tear, a crack forms, which then propagates throughout the entire



Credit: Kollbe Ahn

restoration. Or the gap between the tooth and the restoration results in restoration failures, including marginal tooth decay.

So Dr. Ahn and his colleagues looked to nature — mussels, to be exact — to find a way not only to maintain strength and hardness but also to add durability. Having perfected the art of adhering to irregular surfaces under the variable conditions of the intertidal zone, mussels presented the ideal model for more durable dental restoration materials. The byssal threads they use to affix to surfaces allow them to resist the forces that would tear them from their moorings.

Key to this mechanism is what the scientists call dynamic or sacrificial bonding — multiple reversible and weak bonds on the subnanoscopic molecular level that can dissipate energy without compromising the overall adhesion and mechanical properties of the load-bearing material.

This type of bonding occurs in many biological systems, including animal bone and teeth. The mussel’s byssus contain a high number of unique chemical functional groups called catechols, which are used to prime and promote adhesion to wet mineral surfaces. The new study shows that using a catecholic coupling agent instead of the conventional silane coupling agent provides 10 times higher adhesion and a 50 percent increase in toughness compared to current dental restorative resin composites.

Learn more about this study in *Advanced Materials* (2017); doi: 10.1002/adma.201703026.

Skin Color Affects Skin Sensitivity to Heat

Researchers at the Bluestone Center for Clinical Research at the New York University College of Dentistry have identified a molecular mechanism that explains why dark-skinned and light-skinned people respond differently to heat and mechanical stimulation.

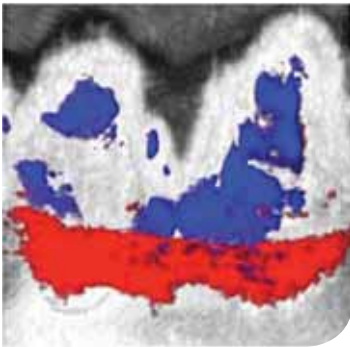
The study published online in *Scientific Reports* demonstrates that dopamine, a small molecule produced by skin melanocytes (cells that determine skin color), contributes to differences in the skin’s responsiveness to heat and mechanical stimuli.

Researchers used publically available data to compare mechanical and heat pain sensitivity in groups of people whose skin color differed. They also studied pigmented and unpigmented rodents based on fur color. Their meta-analysis in rodents and comparison of genomic differences between mouse strains pointed to a gene called *Tyr*, which controls skin pigmentation and dopamine synthesis. After manipulating dopamine levels, researchers found that dopamine causes increased expression of TRPV1 and decreased expression of Piezo2, two proteins that are responsible for heat and mechanical sensitivity.

The research shows that people from different ethnic backgrounds sense temperature and pressure differently. For example, sun exposure in people who live close to the equator leads to melanin build-up, which protects them from UV damage but also makes skin darker. The same skin cell that produces melanin releases dopamine, which will increase skin’s sensitivity to heat. This finding potentially means that in order to adapt to extreme weather conditions, this skin cell has developed a protective mechanism that warns people away from excessive sun exposure.

Learn more about this research in *Scientific Reports* (2017); doi: 10.1038/s41598-017-09682-4.





Photoacoustic/ultrasound image after squid ink oral rinse treatment. Ultrasound image of the teeth is in black and white. The photoacoustic signal from the squid ink contrast agent in the pocket depth is in red and signals from stains on the teeth are in blue.

Credit: Jokerst Bioimaging Lab at UC San Diego

New Dental Imaging Method Uses Squid Ink To Fish for Gum Disease

By combining squid ink with light and ultrasound, a team led by engineers at the University of California, San Diego, has developed a new dental imaging method that is noninvasive, more comprehensive and more accurate than the state of the art.

In a paper published in September in the *Journal of Dental Research*, a team led by Jesse Jokerst, PhD, a nanoengineering professor at UC San Diego and senior author of the study, introduced an innovative method that can image the entire pocket depth around the teeth consistently and accurately without requiring any painful poking and prodding.

"Using the periodontal probe is like examining a dark room with just a flashlight and you can only see one area at a time. With our method, it's like flipping on all the light switches so you can see the entire room all at once," Dr. Jokerst said.

The method begins by rinsing the mouth with a paste made of commercially available food-grade squid ink mixed with water and cornstarch. The rinse serves as a contrast agent for an imaging technique called photoacoustic ultrasound. This involves shining a light signal — usually a short laser pulse — onto a sample, which

Sugar Consumption Pushes Dental Treatment Costs Into the Billions

People worldwide are eating too much sugar, leading to negative consequences for teeth and bank accounts, according to a study published in the *International Journal of Dental Research*. The study found that costs of dental treatment are currently running at around \$172 billion globally.

Researchers from the Martin Luther University Halle-Wittenberg and the Biotechnology Research and Information Network AG, both in Germany, evaluated representative data on the prevalence of caries, periodontitis and tooth loss, corresponding costs of treatment and the disease burden as well as data on sugar consumption in 168 countries for the year 2010. On the basis of this data, they calculated the share of total costs attributable to excessive consumption of sugar. In addition to white household sugar, the researchers also focused their attention on "hidden" sugar that is contained in many processed products, such as soft drinks, ketchup, ice cream, frozen foods, breads and pastries.

For every additional 25 grams of sugar consumed per person and day, which amounts to roughly eight sugar cubes or a glass of sweetened lemonade, the costs of dental treatment in high-income countries increase on average by \$100 per person and year. At \$185 per person per year, the U.S. is in the group of countries with the highest cost of treatment along with Germany (\$281), Switzerland (\$402) and Denmark (\$238). The highest levels of sugar-related dental illness observed by the researchers were in Guatemala, Mauretania and Mexico.

Read more of this study in *International Journal of Dental Research* (2017); doi.org/10.1177/0022034517708315.



heats up and expands generating an acoustic signal that researchers can analyze.

Squid ink naturally contains melanin nanoparticles, which absorb light. During the oral rinse, the melanin nanoparticles get trapped in the pockets between the teeth and gums. When researchers shine a laser light onto the area, the squid ink heats up and quickly swells creating pressure differences in the gum pockets that can be detected using ultrasound. This method enables researchers to create a full map of the pocket depth around each tooth.

Researchers tested their photoacoustic imaging method in a pig model containing a mix of shallow and deep pockets in the gums. While their results closely matched measurements taken using a periodontal probe, they were also consistent across multiple tests.

"It's remarkable how reproducible this technique is compared to the gold standard," Dr. Jokerst said.

Learn more about this study in the *Journal of Dental Research* (2017); doi.org/10.1177/0022034517729820.

Middle-Aged Adults Report Dental Pain, Embarrassment

The dental health of middle-aged Americans faces many problems right now and an uncertain future to come, according to new results from the University of Michigan National Poll on Healthy Aging. The poll was conducted by the U-M Institute for Health Care Policy and Innovation and was based on a nationally

representative sample of 1,066 older adults aged 50–64 who answered a wide range of questions online. Laptops and internet access were provided to those who didn't already have them.

According to the poll, one in three Americans between the ages of 50 and 64 say they're embarrassed by the condition of their teeth. A



slightly larger percentage say dental problems have caused pain, difficulty with eating, missed work or other health problems in the past two years. Forty percent of those polled don't get regular cleanings or other care that can help prevent dental problems.

Insurance coverage appears to have a lot to do with this lack of care. Overall, 28 percent of respondents said they don't have dental coverage. But that percentage was much higher — 56 percent — among those who say they only seek care for serious dental problems.

As for the future, 51 percent of those surveyed said they simply didn't know how they will get dental insurance coverage after they turn 65. Another 13 percent of middle-aged adults expect to count on Medicare or Medicaid to cover their oral care needs after that age.

“Our findings highlight a stark divide among middle-aged Americans in terms of their oral health now and a real uncertainty about how they will get and pay for care as they age,” said associate poll director Erica Solway, PhD. “This is not out of disregard for the importance of preventive dental care — more than three-quarters of the people we polled agree that regular care is important to preventing problems later. But it does highlight opportunities to improve access to care and insurance options after age 65.”

Read more about the poll in the article “Tooth Trouble: 2 in 5 Middle-Aged Adults Don't Get Regular Dental Care” at labblog.uofmhealth.org/rounds.

Household Environment, Not Genetics, Shapes Salivary Microbes

Researchers in the United Kingdom have discovered that the mix of microorganisms that inhabit a saliva is largely determined by the human host's household, according to a study published in the journal *mBio*. The study shows that early environmental influences play a far larger role than human genetics in shaping the salivary microbiome.

The research team, led by Adam P. Roberts, PhD, senior lecturer at the Liverpool School of Tropical Medicine, had access to a unique sample set to study — DNA and saliva from an extended Ashkenazi Jewish family living in various households in four cities on three continents. Because the family members are ultra-orthodox Ashkenazi Jews, they share cultural diets and lifestyles that control for many confounding factors.

Researchers sequenced the bacterial DNA signatures present in saliva samples from 157 family members and 27 unrelated Ashkenazi Jewish controls. Across all samples, they found the core salivary microbiome made up of bacteria from the genera *Streptococcus*, *Rothia*, *Neisseria* and *Prevotella*.

Using statistical methods adopted from ecology, researchers determined which factors are responsible for the most variation at the bacterial species level. When comparing factors such as shared household, city, age and genetic relatedness, the factor that determined who shared the most similar saliva microbes was overwhelmingly household. Specifically, spouses, parents and children younger than 10 living in a household together had the most similar saliva microbiomes.

According to the study, knowing that the shared environment drives the microbiome may give scientists the ability to one day modulate it.

Learn more about this study in *mBio* (2017); doi: 10.1128/mBio.01237-17.





Dental Student Research

Bradley S. Henson, DDS, PhD

GUEST EDITOR

Bradley S. Henson, DDS, PhD, is the assistant dean for research and biomedical sciences and an assistant professor at the Western University of Health Sciences, College of Dental Medicine in Pomona, Calif. In his role as assistant dean, he facilitates student participation in research, supports faculty research development and leads a team to integrate the basic and clinical sciences into an exciting case-based approach to delivering the human systems courses. Dr. Henson received his DDS and PhD degrees from the University of Michigan, School of Dentistry.
Conflict of Interest
Disclosure: None reported.

Whether you graduated from a research-intensive dental school or one with a primary teaching/clinical focus, I think we are all going to agree that research is absolutely central to our identity as dental providers and our future growth as a profession. Research not only enhances the human condition, it also inspires and informs other missions of teaching and service in dental education and clinical practice. I often say that if your interest is in training the strongest clinicians possible, then research and evidence-based practice have to be an integral component of the modern dental curriculum. A thriving and robust research environment provides unique opportunities for dental students to learn critical thinking skills in a setting where they can observe, practice, explore, solve problems and gain mastery as they progress through their research projects.

This issue of the *Journal* showcases the exciting research endeavors of student researchers and their mentors from California dental schools. By many measures — the excellence of their

research faculty and students, the quality and quantity of their research products and the scale of their intramural and extramural research funding — California dental schools have made immense contributions to the collective national and international dental research effort and have provided their students with outstanding experiences in the conduct of research. In fact, upon contacting the California dental schools to solicit papers for this special issue, we received so many high-quality submissions that we decided to publish two issues of the *Journal* dedicated to dental student research. This issue includes a scientific article on low-risk mandibular symphysis grafts and also focuses on better understanding the barriers that limit access to dental care and highlights strategies toward improving oral health in communities. Specifically, the second article evaluates the effectiveness of a dental and nutritional intervention program on the oral health status of children in Vietnam. The third article discusses the impact of asthmatic therapy on the oral health of Special Olympics athletes. ■

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Determination of a Low-Risk Mandibular Symphysis Graft Donor Site

Ho-Hyun (Brian) Sun, DMD, MS; Jeffrey A. Elo, DDS, MS; Jason Rogers, DDS; and Chan M. Park, DDS, MD

ABSTRACT While osseous harvests in orthopedics are typically guided by established anatomic as well as radiologic dimensions, easy geometric incision guidelines are not yet common for the harvest of the symphysis graft in dentistry. A radiographic survey was undertaken to determine the proper anatomic dimensions of a minimal-risk donor site that could help minimize the risk of damaging vital structures in the vast majority of block graft harvests of the anterior mandibular region.

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Conflict of Interest
Disclosure: None reported.

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Conflict of Interest
Disclosure: None reported.

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Conflict of Interest
Disclosure: None reported.

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Conflict of Interest
Disclosure: None reported.

Onlay bone graft augmentation and guided tissue regeneration are critical components of preprosthetic dental implant surgery. The presence of adequate alveolar bone height and width is considered the most important factor in predicting the success, restorability and survivability of an implant, and current protocols have been developed to mitigate the long-term effects of gradual alveolar bone volume loss.¹ Proper understanding of the wide variety of grafting options is the key to successfully planned implant dentistry. This provides general dentists with a better understanding of autogenous bone harvest and the variety of techniques available to provide the best outcomes for the patient.¹ Treatment options include local autogenous cortical/corticocancellous grafts or prepackaged allogeneic cortical/corticocancellous grafts. Autogenous are preferable because of their ideal mixture of osteoconductive and osteoinductive compounds within the graft.¹⁻³

Unfortunately, many patients with the greatest implant needs suffer from severe horizontal (and vertical) atrophic defects that often benefit from treatment with solid cortical bone (block) onlay grafts. And while distal donor sites such as the iliac crest offer an abundant harvest, an affordable and less invasive surgical option may be preferred. The mandibular ramus and symphysis serve as particularly attractive donor regions for such harvests.⁴ In particular, the symphysis graft may be considered a safe and easily accessible site. Despite its occasional association with temporary paresthesia, its position in the anterior mandible allows not only for ease of visualization but has led to fewer iatrogenic trauma to the muscles of mastication that is associated with ramus harvests.⁵ In addition, the symphysis graft avoids complications associated with the inferior alveolar nerve and the facial artery, which courses in close proximity to the ramus donor site. This and the absence of well-vascularized musculature suggest a lower risk of uncontrolled intraoperative bleeding when using a symphyseal harvest.⁶

TABLE

Comprehensive List of Measurements and Standard Deviations for All 25 Patients

Patient ID	Age	MF(L) to Inf	MF(R) to Inf	MF(L) to Mid	MF(R) to Mid	CI(L) to Inf	CI(R) to Inf	CI(L) to Mid	CI(R) to Mid	LI(L) to Inf
NM	61	10.41	17.84	22.16	22.62	22.79	21.47	1.34	2.3	20.2
JPR	60	16.11	16.53	23.17	23.15	25.82	25.61	2.07	2.48	22.1
LH	58	14.62	13.17	20.19	20.6	23.05	22.44	1.24	2.5	19.97
DT	52	15.08	14.87	23.13	24.13	29.33	28.92	0.83	2.07	27.47
JO	50	19.85	17.91	23.93	20.58	25.11	25.52	2.1	2.1	23.47
SA	47	15.7	14.46	19.42	18.2	20.45	18.8	1.7	2.51	20.24
JF	45	15.85	16.06	22.65	22.23	23.67	24.29	2.5	0.82	22.03
LM	45	10.87	11.51	19.63	21.7	14.92	14.92	1.7	1.8	14.07
TP	43	16.47	16.88	23.52	24	23.26	23.88	1.24	2.1	23.05
CL	40	15.08	13.84	21.9	21.5	26.23	25.82	2.07	2.07	22.52
GC	38	15.49	14.05	21.48	23.96	25.41	24.99	0.85	1.65	24.79
EJ	37	15.7	16.73	23.55	23.27	19.21	20.04	0.85	3.74	18.59
JL	35	14.47	15.32	21.67	16.57	22.73	22.7	1.75	2	21.24
RA	33	14.2	11.73	22.64	23.05	17.91	18.32	1.65	2.88	16.06
TT	32	17.5	14.62	22.66	20.6	28.2	28.41	1.3	2.06	26.14
HS	28	17.4	16.8	24.19	28.39	25.5	24.6	1.66	3.28	22.2
BS	27	17.91	14.71	18.76	22.63	23.88	22.82	0.43	1.28	20.68
JL	26	18.06	18.28	18.71	19.97	24.01	26.56	1.34	1.27	24.22
SS	26	14.1	15.6	22.67	23.49	20.7	21.3	1.05	1.3	21.6
BB	21	13.38	15.44	25.94	24.76	22.44	22.23	2.88	2.91	19.76
EM	17	15.72	15.09	23.79	22.11	17.42	16.36	2.55	2.26	16.94
FS	16	16.41	14.5	20.46	21.74	18.33	17.91	2.13	2.41	17.48
MG	16	14.25	14.05	23.13	23.55	18.8	19.42	2.43	2.89	18.8
AE	15	14.41	14.61	23.47	25.13	19.76	19.14	0	3.29	19.35
PA	15	16.26	17.08	21.82	20.65	19.56	19.97	1.65	2.47	18.73
Average	35	15.412	15.267	22.186	22.343	22.34	22.258	1.572	2.258	20.868
SD	14.6	2.063	1.756	1.81	2.358	3.56	3.652	0.692	0.692	3.116

MF(L): Left mental foramen; CI(L): Left central incisor; LI(L): Left lateral incisor; CA(L): Left canine; Mid: Mandibular midline; MF(R): Right mental foramen; CI(R): Right central incisor; CA(R): Right canine; LR(R): Right lateral incisor; Inf: Inferior border of the mandible. All distances are measured in millimeters (mm).

The purpose of this study is to provide an anatomic description for a low-risk harvest of the symphysis graft that remains a viable alternative for preprosthetic alveolar augmentation. While the ready access and position of the symphysis — away from major vasculature and muscles of mastication — affords it a relative sense of ease, the symphysis nonetheless remains in proximity to important sensory structures such as the mental foramina.

A recent survey of the MEDLINE literature database revealed a relative lack of easily traceable geometric blueprints regarding the location and dimension of such a harvest site. Though appropriate radiographic imaging and measurements are critical to overcome patient-to-patient variations, a clearly established outline contributes to the safety of future harvests by providing a mental picture of an appropriate incision line for the surgeon.

Materials and Methods

Study Design

The study was conducted as a cross-sectional investigation of 25 patients. The cone beam computed tomogram (CBCT) images of 14 male and 11 female patients were acquired from a busy, urban-centered, university-based clinic with a diverse patient pool. The patients were selected without bias using the

	LI(R) to Inf	LI(L) to Mid	LI(R) to Mid	CA(L) to Inf	CA(R) to Inf	CA(L) to Mid	CA(R) to Mid
	20.18	5.59	5.49	10.41	17.85	11.93	11.47
	24.37	6.21	7.85	18.8	19.62	12.81	14.96
	21.2	4.16	5.05	18.12	18.11	9.89	10.2
	26.44	3.74	5.79	23.96	22.93	10.34	12.09
	23.05	5.78	6.6	19.76	20.17	12.93	10.83
	18.8	5.78	6.62	16.32	16.11	13.23	13.23
	21.61	6.19	4.12	17.09	15.85	13.59	11.52
	13.64	5.9	6.83	11.08	12.79	11.51	11.51
	23.67	6.19	7.46	20.79	18.53	11.94	17
	22.1	7.04	5.84	15.29	15.08	14.46	14.87
	23.34	2.48	6.21	22.1	23.34	9.91	14.47
	19	4.96	6.61	15.08	19.98	10.25	10.34
	20.82	5.95	6.5	17	23.04	11.47	12.75
	17.7	4.56	5.83	16.67	15.03	11.12	10.71
	26.35	4.14	4.96	23.67	22.03	12.35	13.17
	21.3	5.28	8.22	17.4	16.8	10.77	15.94
	22.17	4.69	6.39	17.07	17.07	10.24	15.35
	23.58	6.39	6.37	21.03	17.64	12.33	14.02
	21.6	6.33	6.3	16.2	15.6	19.16	18.09
	22.04	6.23	8.24	17.7	17.08	14.02	18.54
	16.63	5.78	5.52	14.88	15.29	23.79	13.62
	17.69	7.26	8.1	12.38	12.58	11.58	12.43
	17.97	8.3	7.07	13.84	13.43	19.94	19.83
	19.14	4.12	7.42	16.88	16.06	11.53	14.41
	18.32	5.76	7.41	16.26	16.67	18.11	17.31
	20.908	5.552	6.512	17.191	17.547	13.168	13.946
	3.04	1.242	1.062	3.441	3.067	3.497	2.704

RANDOM.ORG random number generator (Randomness and Integrity Services Ltd., Dublin) and presented with an average age of 35 years and a standard deviation of 14.6 years. The patients were divided into five groups according to their age ranges of second decade, third decade, fourth decade, fifth decade and sixth decade or greater since birth. An equal distribution of patients

was taken from each age range.

Patients who had fewer than 12 teeth in the mandible (six anterior and six posterior) or any tooth that was overlapped more than 30 percent of its overall width in the panoramic view of the CBCT image were excluded. Those with existing implants in the anterior region, supernumerary dentition and periapical pathology were also excluded.

Data Collection and Analyses

Using the CBCT images, the positions of all of the sensory structures including the anterior teeth apices and the mental foramina were noted. The distances of the mental foramina and the apices of the mandibular canines, lateral incisors and central incisors to the mandibular midline as well as to the lower border were also taken. The average values of each of these distances and their standard deviations (SD) were calculated using Excel spreadsheet software (Microsoft Corp., Redmond, Wash.). An initial low-risk site (ILRS) was mapped near the inferior border of the mandible such that all points within it were approximately two SDs or more inferior to the sensory structures — this was done to help ensure that 2.5 percent or less of the patients had roots or foramina included in the ILRS. The ILRS was further decreased in size horizontally to ensure that all of the points within the modified low-risk site (LRS) were also at least two SDs anterior to the sensory structures as well. This two-step reduction was done vertically and horizontally to ensure that only 2.5 percent of all teeth and mental nerves (for an overall likelihood of 0.0625 percent or 1.25 patients per 2,000 harvests) would be affected by the finalized LRS.

All distances were rounded down to the nearest 0.5 mm to further reduce the likelihood of overestimation. In instances where the measurements in the left side of the jaw differed from that of the right side, the shorter measurements were used. A trapezoidal shape was chosen to produce the largest possible area within the measurement limits of the LRS (**FIGURE 1**). Irregular, nongeometric and nonsymmetric shapes were not considered because of the difficulty of reproducing them in the surgical field.

Results

The average distances from the inferior border of the mandible to the mental foramina (MF) was 15.267 mm with SD 1.756, to the central incisor apices (CI) was 22.258 mm with SD

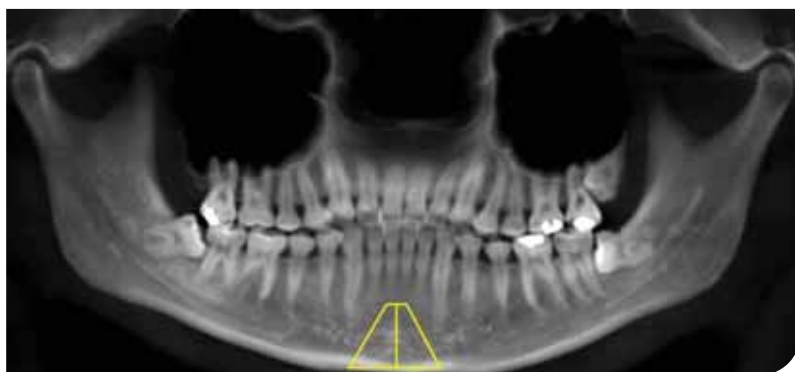


FIGURE 1. Anatomical representation of a theoretical low-risk site on a panoramic image obtained from a cone beam CT.

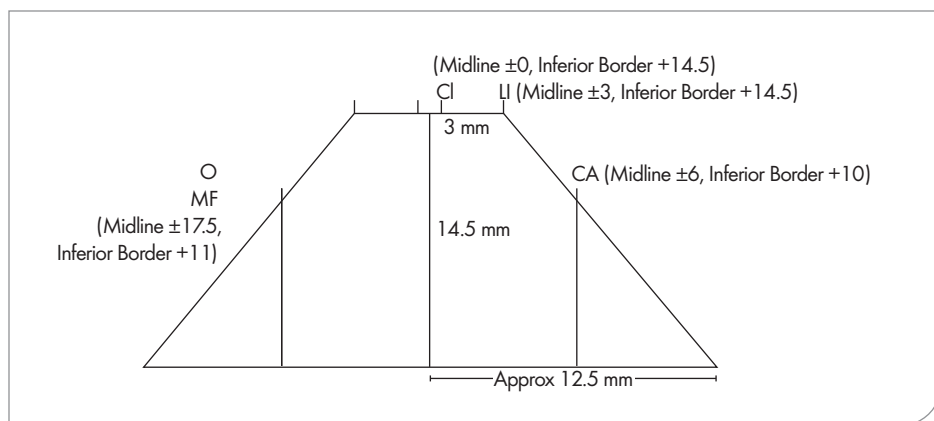


FIGURE 2. Calculating the dimensions of the low-risk site trapezoid. The average distance to the roots of both central incisors (CI) and lateral incisors (LI) was reduced by two standard deviations and rounded down to the nearest 0.5 mm. The low-risk points for the central incisors were 0 mm away from the midline and 14.5 mm superior to the inferior border. For the lateral incisors, they were 3 mm lateral to the midline and 14.5 mm superior to the inferior border. For the canines, they were 6 mm lateral to the midline and 10 mm superior to the inferior border. The lines were charted in a Cartesian plane and connected to produce a symmetrical low-risk site.

3.652, to the lateral incisor apices (LI) was 20.868 mm with SD 3.116 and to the canine apices (CA) was 17.191 mm with SD 3.441. The average distances from the mandibular midline to the MF was 22.186 mm with SD 1.81, to the CI was 1.572 mm with SD 0.692, to the LI was 5.552 mm with SD 1.242 and to the CA was 13.168 mm with SD 3.497 (TABLE). Overall, the isolateral LRS trapezoid was found centered at the mandibular midline with a shorter base length of 6 mm and longer base length of 25 mm. The longer base remained at the inferior border of the mandible while the shorter base was drawn 14.5 mm superiorly (FIGURE 2).

Discussion

Appropriate buccolingual width (thickness) and height of the alveolar bone serve as two of the most critical components in the successful placement of dental implants.⁷ Many patients present with atrophic horizontal (buccolingual) or vertical alveolar ridge defects either because of disease, trauma or physiologic recession of bone measured at approximately 50 percent of the total volume within the first year of tooth loss.⁸ To this end, autogenous block grafts have become an increasingly popular treatment modality in

preprosthetic surgical augmentation that demonstrates a greater than 95 percent rate of success over 10 years.³

The establishment of a sizable LRS demonstrates not only that the symphysis is an easily accessible site of autogenous block graft harvest, but also that it produces a healthy amount of bone usable for most cases. In fact, some studies have attested to the viability of using the symphysis bone in reconstructing extraoral structures such as the orbital floor.⁹ Harvests from the LRS remain a viable alternative also because of the lack of major vasculature and muscles required for everyday mastication. While there are conflicting reports of the association between symphysis grafts and paresthesia, most investigations agree on the largely temporary nature of such sensory disturbances if they are present.^{5,10} Overall, the level of pain experienced during a symphysis harvest is also reportedly similar to those experienced during other grafting procedures.¹⁰

Conclusion

In conjunction with appropriate radiographic imagery, the LRS could contribute to safer harvests of block grafts from the readily accessible mandibular symphysis region. The current study is not meant to be a reiteration of the 5 mm principle of avoiding vital structures but rather a contribution to it, building on its principles to create a standardized shape that can be retraced on a patient's chin to produce a safe cortical harvest. These grafts could then greatly benefit patients who require more substantial alveolar osseous structures prior to dental implant placement.

Recent surveys of different ethnic groups indicate that the cortical thicknesses of the mandibular alveolus range between approximately 1 mm–3 mm depending on the location along the alveolar arch but regardless of the facial type of the patient.^{11,12} These values generally coincided with the data from our group of patients, though the exact thickness proved to be difficult to predict depending on the exact location of the cortex along the contours of the mandible. Still, the established range could be valuable for use in conjunction with the LRS to customize the volume of bone harvested for each individual case. A future study measuring the clinically harvestable volume of bone in a cohort of patients may also be prudent. ■

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Improving Early Childhood Oral Health in Vietnam: Results of a Two-Year Intervention Study

Ivy Vuong, BS; Susan Ivey, MD, MHSA; and Karen Sokal-Gutierrez, MD, MPH

ABSTRACT A three-year oral health and nutrition intervention project comprised of health education, fluoride varnish application, dental screenings and focus groups reached 586 children in 2011 from five primary schools in Ho-Chi Minh City and Da Nang, Vietnam. We investigated the effectiveness of the intervention longitudinally on nutrition, mouth pain and decayed/missing/filled teeth (dmft) scores in children aged 2 to 6 from 2011–2013. Children’s average dmft score decreased while overweight status skyrocketed over three years.

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Conflict of Interest Disclosure: None reported.

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Conflict of Interest Disclosure: None reported.

Early childhood caries (ECC) and malnutrition/obesity are global health pandemics that adversely affect children’s health, particularly in developing countries. ECC is the most prevalent childhood disease worldwide, more prevalent than childhood obesity, diabetes or asthma.^{1,2} In Vietnam in 2011, three out of four children under the age of 6 were found to have dental caries. Of those children, 4.2 had stunting malnutrition and 19.8 percent were overweight.³

Early childhood caries arise from a complex combination of socioeconomic factors, cariogenic diet and inadequate access to dental care. The recent and rapid Westernization and urbanization of Vietnam has introduced processed carbohydrate-dense snacks and sweetened drinks into Vietnamese children’s diets, driving an increase in dental caries and obesity.^{1,4,5}

The impact of ECC in Vietnam is severe. When left untreated, caries lead to cavitation and the destruction of tooth structure, chronic infection, mouth pain and sensitivity, all of which can severely impact a child’s quality of life and ability to eat, sleep, play and learn in school.⁶

ECC has been shown to be preventable with interventions such as nutrition and oral hygiene education, toothbrushing with fluoride toothpaste, fluoride varnish applications, regular dental screening starting around the first birthday and dental treatment as needed.⁷

While ECC prevention studies have been conducted in other Southeast Asian countries such as Thailand, Laos and the Philippines, there has been limited research published on ECC or the relationship between children’s oral health and nutritional status in Vietnam.^{8–10}

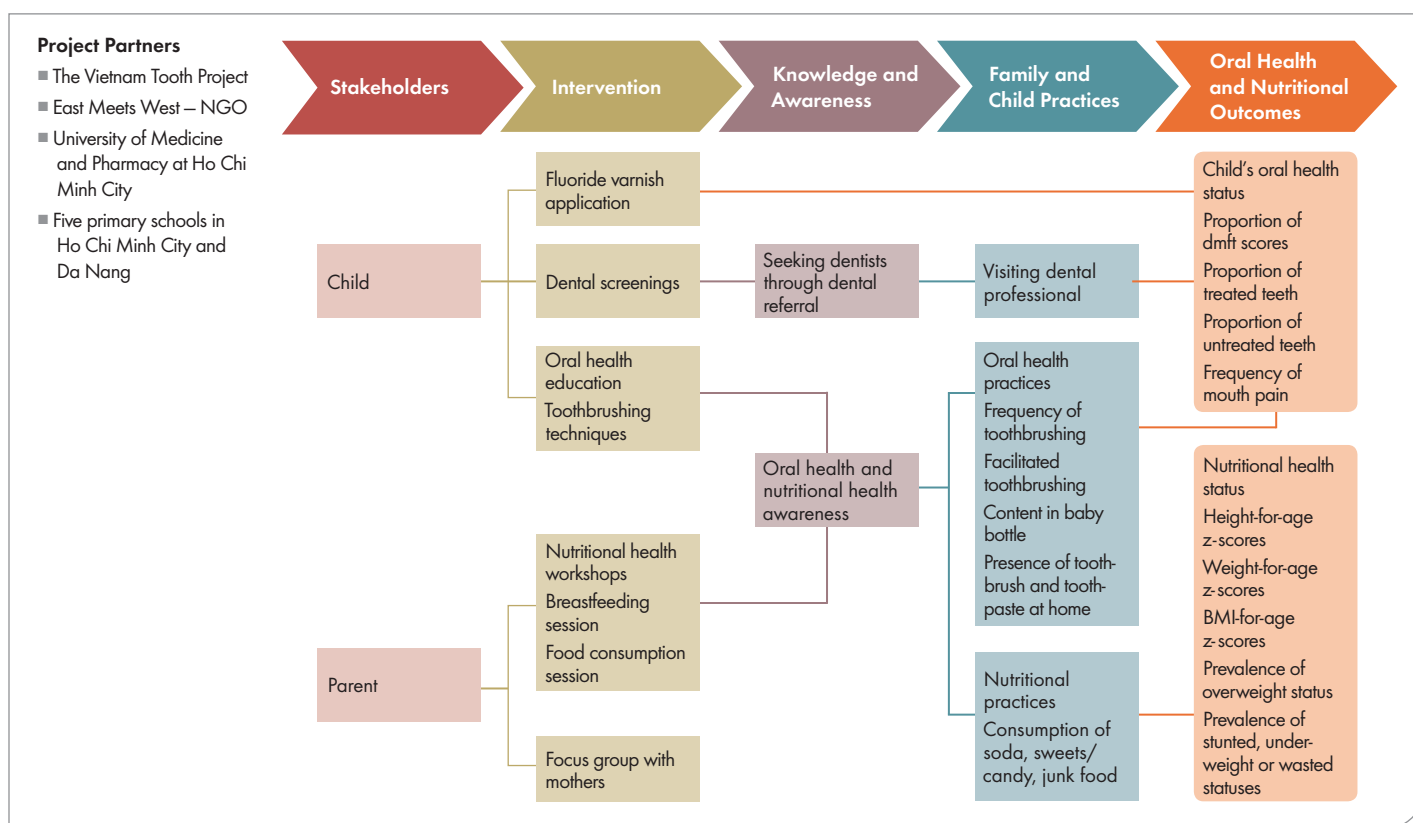


FIGURE 1. Vietnam Tooth Project's intervention flowchart.

The purpose of this study was to complete a descriptive evaluation of changes over time of the Vietnam Tooth Project (VTP) intervention on the oral health and nutrition of a convenience sample of preschool children aged 2–6 in urban/suburban Ho Chi Minh City and Da Nang, Vietnam. The intervention consisted of oral health screenings, fluoride varnish applications and oral health and nutrition education delivered through preschools twice a year for two years. Data were collected by parent survey and child exams at baseline and two annual follow-up data collection visits (2011–2013). Our hypothesis was that parental awareness of healthy food consumption and oral hygiene practices would increase and children's caries levels and mouth pain reports by age should be slowed or reduced compared to the historical control.

Methods

Study Design

This was a quasi-experimental evaluation of an intervention study with baseline and two-year longitudinal follow-up conducted in Ho Chi Minh City and Da Nang, Vietnam, from 2011–2013. Approval was obtained from the University of California, Berkeley, Committee for Protection of Human Subjects, with reliance on this IRB by UCSF and University of Medicine and Pharmacy, Ho Chi Minh City (UMPHCMC). After parental informed consent, identification numbers were assigned to participating families at baseline and used to track the longitudinal cohort for the next two years (FIGURE 1).

Study Population

Through a partnership with UMPHMC in Ho Chi Minh City and the East Meets West Foundation in Da Nang, our intervention recruited children aged 2–6 and their parents from five urban/suburban preschools — three schools in Ho Chi Minh City (southern Vietnam) and two schools in the Da Nang area (central Vietnam). Data were collected on 586 children at baseline in 2011, 239 children in 2012 and 142 children in 2013 (FIGURE 2).

Intervention

The preschool and kindergarten children received the following intervention:

- Nutrition and oral hygiene education through interactive exercises conducted by school and health personnel, college students and other volunteers each summer.

TABLE 1

Child and Parent Demographics

Category	Baseline (Year One)			First Follow-Up (Year Two)			Second Follow-Up (Year Three)		
	Frequency	Percent or SD	Sample	Frequency	Percent or SD	Sample	Frequency	Percent or SD	Sample
Children demographics									
Parent-child pairs			586			239			142
Gender			573			236			141
Male	293	51.1		116	49.2		62	44	
Female	280	48.9		120	50.8		79	56	
Age	4.13	± 0.89	586	4.62	± 0.55	238	5.49	± 0.63	134
2-<3 years old	65	11		/	/		/	/	
3-<4 years old	201	34		37	15.5		7	4.9	
4-<5 years old	207	35		132	55.2		28	19.6	
5-<6 years old	97	16.4		69	28.9		73	51	
6-<7 years old	14	2.4		/	/		33	23.1	
Parents demographics									
Age, years	33.1	± 5.05	563	34.5	± 4.93	224	35.99	± 4.68	133
Years of formal education	12.81	± 3.69	494	13.97	± 3.75	220	13.38	± 3.10	132
Survey respondent is mother	550	95	579	158	71.8	220	88	66.16	133
Number of children in the family	1.58	± 0.65	578	1.67	± 0.65	224	1.69	± 0.62	137

- Toothbrushes and toothpaste for the family.
- Applications of fluoride varnish twice annually.
- Dental screening by dentists twice annually with referral to dental treatment as needed.

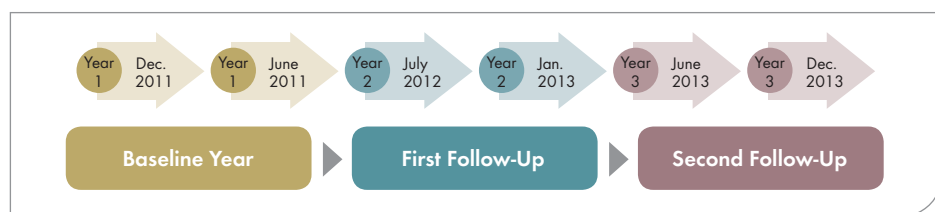


FIGURE 2. Vietnam Tooth Project's intervention timeline.

Data Collection

Baseline and annual follow-up data included the following:

- **Parent Written Survey**
The primary caregiver completed a 50-question survey about family/child demographics, nutrition and oral health knowledge, attitudes, practices and experiences. The survey was adapted from the WHO Oral Health Survey for cultural and language appropriateness and ease of administration.

- **Child Dental Screening Examination**
Dental screening examinations were conducted by trained, licensed and calibrated Vietnamese dental professionals by visual inspection with use of a headlight or natural lighting. The dental exam recorded the status of each tooth by the universal numbering system for primary teeth, documenting the presence of cavitated decayed, missing (due to caries) and filled teeth, as well as

- unrupted and healthy teeth. In Da Nang only, depth of decay in teeth was also recorded as cavitated into dentin, enamel or pulp by visual inspection.
- **Child Anthropometric Measurement**
Children's height and weight were measured, without shoes, by trained volunteers using a stadiometer and scale. These values were later coded to z-scores as outlined by the World Health Organization (WHO) criteria and using WHO software.

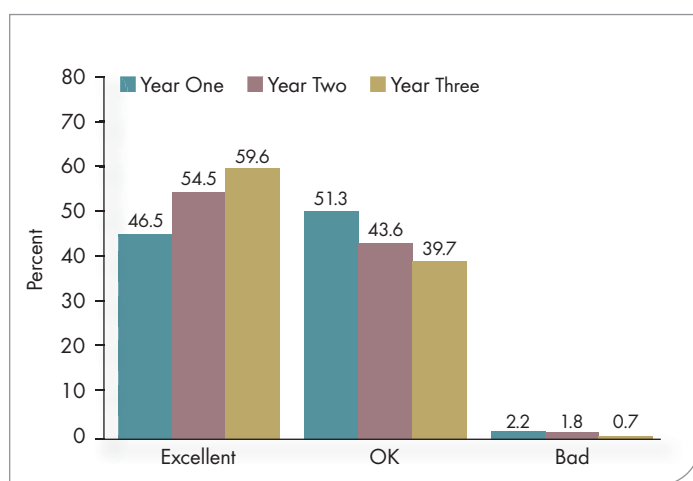


FIGURE 3. Parents' perception of child's health.

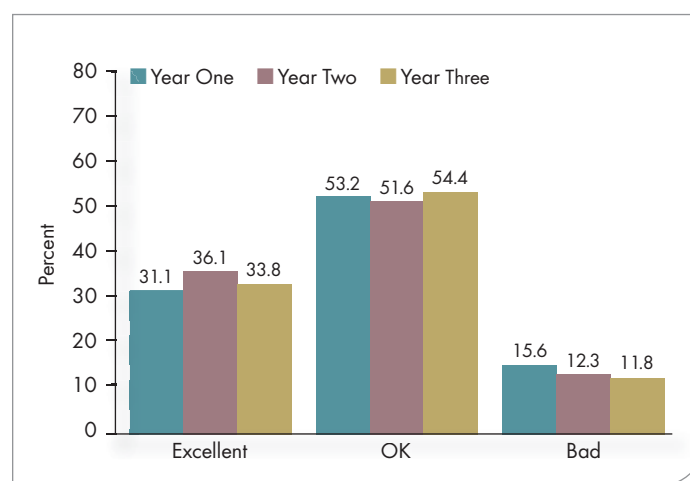


FIGURE 4. Parents' perception of child's teeth.

Data Analysis

Data were entered into Microsoft Excel. The three annual datasets from 2011, 2012 and 2013 were linked by a family ID and merged to yield a longitudinal cohort dataset that was imported into SPSS Statistics 23.0 (IBM, Armonk, New York). Analysis was conducted using SPSS for descriptive frequencies and means and statistical associations as indicated by variable type (e.g., chi square, paired or unpaired t-test). Each of the general outcome categories was measured with mathematically different scaling, requiring a different statistical method to model the changes and test statistical significance of the year-to-year changes. For decayed, missing and filled teeth (dmft) scores, we utilized tests for interval-scaled measurements. For mouth pain levels, we utilized the chi square for nominal-scaled measurements. For parental awareness, we utilized tests for nominal-scaled measurements.

Descriptive statistics and frequencies were run to determine proportions to describe each group per year, specifically means and standard deviations of survey responses per question. We employed various statistical tests to look at bivariate relationships. Specifically, chi-square

tests (nominal measurements) and paired t-tests (interval measurements) were used to compare the same children between years one and three. Unpaired t-tests were used to compare the 4-year-olds from year one to the 4-year-olds from year three. Pearson's chi-square test was used specifically to look at how decay into the pulp relates to reported measures of mouth pain in year one and year three for those children from the Da Nang sites. A p-value less than 0.05 was used to determine the significance of each analysis.

Results

Descriptive

Demographic Characteristics of Children and Families

Mothers were the predominant caregivers responding to the survey at baseline (95 percent), one-year follow-up (71.8 percent) and two-year follow-up (66.2 percent), with increasing responses from grandparents and fathers each year. At baseline, mothers had a mean age of 33 years, an average of 13 years of education, one to two children and four to five people living in the household. Families lived an average of a five-minute walk to a store that sold junk food (TABLE 1).

Parents' Knowledge and Attitudes Regarding Child Oral Health

The caregiver was asked to rate their child's overall health and their child's dental health as either excellent, medium or bad. At baseline and at each follow-up year, parents were more likely to rate their child's dental health as worse (i.e., higher prevalence of "bad") than the child's overall health. However, from baseline year one to years two and three follow-up, the "bad" ratings for children's oral health decreased in prevalence and the "excellent" ratings for overall health increased in prevalence. Nevertheless, in year three, 11.8 percent of parents classified their child's teeth as "bad," indicating a large and still unmet need for dental care (FIGURES 3 and 4)

Parents were also surveyed regarding their knowledge about factors that contribute to ECC. Approximately two-thirds of parents knew that giving their children sweets and not brushing their teeth could contribute to dental caries. In contrast, less than 10 percent of parents knew that juice/soda and baby bottles contributed to caries in primary teeth. At follow-up, the perception that sweets caused dental caries had decreased rather than increased (FIGURE 5).

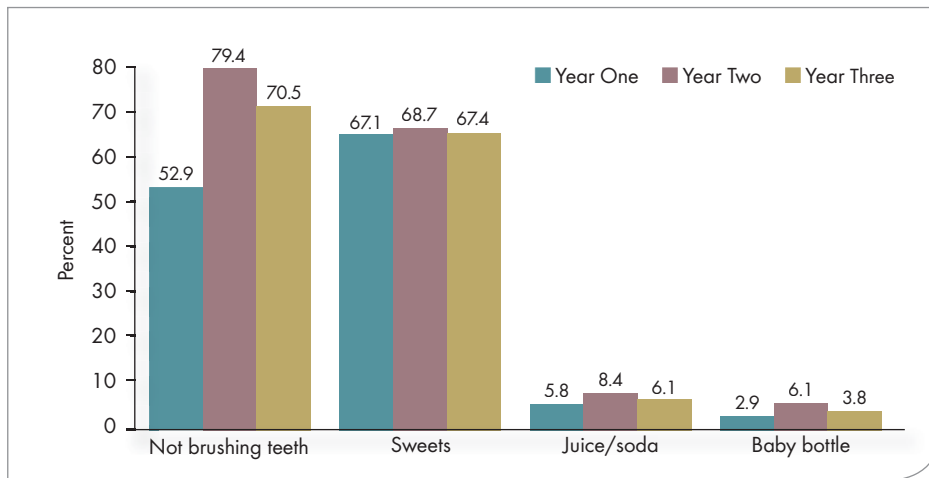


FIGURE 5. Parents' perception: factors that contribute to caries in primary teeth.

Nutrition and Oral Health Practices

Most mothers (95 percent) reported that they breastfed their babies, however most also reported bottle-feeding (83 percent). Mothers reported the primary contents of the baby bottle as formula, milk or water. However, over the two years of the study, an increasing proportion of caregivers put natural juices (increasing from 4.5 percent to 5 percent to 9 percent) or soda in the baby bottle (increasing from 0.3 percent to 0.9 percent to 2.0 percent) (**FIGURE 6**).

Similarly, over the two years of the study, there was an increase in the proportion of parents who reported that

their children consumed soda, sweets and salty snacks daily while never or weekly consumption decreased. In the baseline year, 63.7 percent of parents reported that their child consumed soda "never or rarely." At the two-year follow up, only 43.8 percent of parents reported "never or rarely" soda consumption. Similarly, daily soda consumption increased from 5.8 percent at baseline to 10.4 percent (**TABLE 2**).

The intervention also evaluated the presence of toothbrush/toothpaste at home. In year one, 98.8 percent of parents reported that their household had toothbrushes and 95.6 percent reported

that their household had toothpaste. By years two and three, 100 percent of the cohort reported that they had both toothbrushes and toothpaste in their households. While the majority of parents reported "frequently" helping their child with toothbrushing, this proportion decreased over the course of the study from 63.2 percent in year one to 61.1 percent in year two to 52.1 percent in year three. While the mean age is larger in year three, age stratification showed no significant trends.

Child dental visits increased dramatically over the course of the study from 45 percent in year one to 55 percent in year two to 79 percent in year three (**FIGURE 7**).

Child Dental Status

At baseline, there was a high prevalence and severity of early childhood caries. The prevalence of caries increased from 57 percent at age 2 to 100 percent at age 6 (**TABLE 3**); and the average dmft score increased from 2.75 at age 2 to 12.5 at age 6 (**FIGURE 8**). At age 6, most children had deep caries and 100 percent experienced mouth pain.

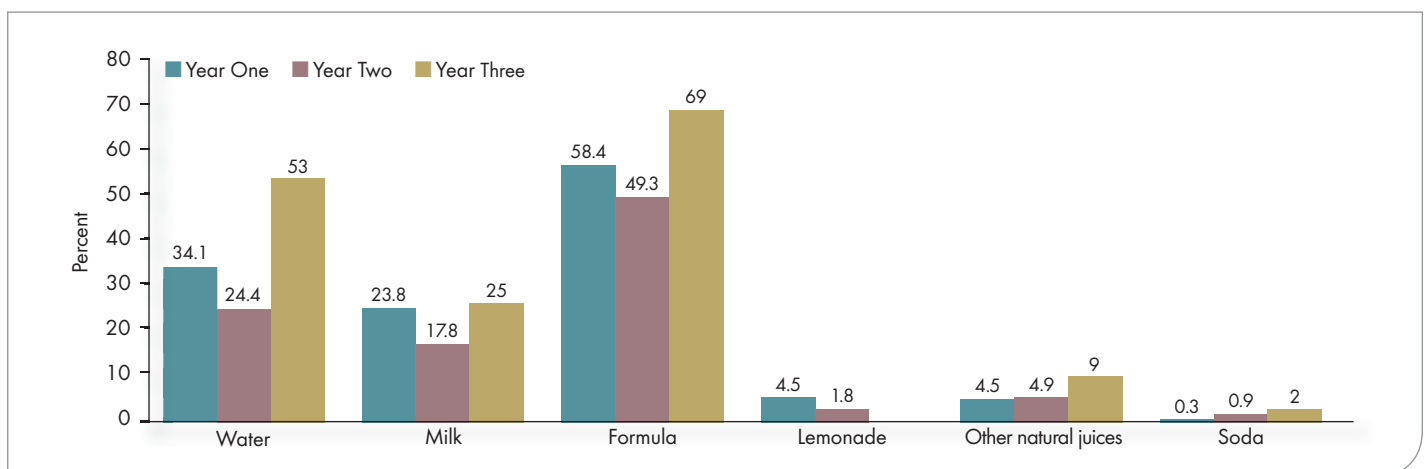


FIGURE 6. Content in baby bottle.

TABLE 2

Changes in Soda, Sugary Food and Junk Food Consumption

Category	Baseline (Year One)			First Follow-Up (Year Two)			Second Follow-Up (Year Three)		
	Frequency	Percent or SD	Sample	Frequency	Percent or SD	Sample	Frequency	Percent or SD	Sample
Soda consumption			449			223			137
Never/rarely	286	63.7		110	49.3		60	43.8	
Weekly	137	30.5		104	46.6		62	45.2	
Daily	26	5.8		9	4		15	10.4	
Sweets/candy consumption			469			221			138
Never/rarely	206	43.9		69	31.3		48	34.8	
Weekly	207	44.1		118	53.4		73	52.9	
Daily	56	11.9		34	15.4		17	12.3	
Junk food consumption			485			220			138
Never/rarely	198	40.8		33	15		30	21.7	
Weekly	234	48.2		89	40.4		67	48.6	
Daily	53	10.1		98	44.5		41	29.7	

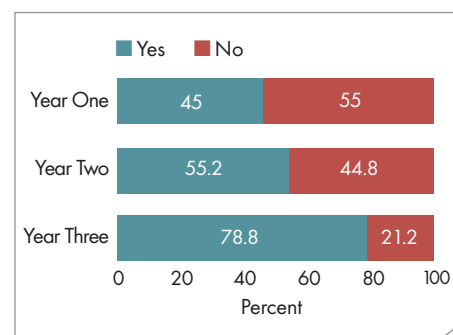
Bivariate Findings

Our initial comparison was just to examine dmft scores between year one and year three of the intervention for the same children. With 142 children present in baseline and at the two-year follow-up, the mean dmft score of these youths increased from 4.48 to 5.65 ($p = 0.001$).

Because dental caries is a cumulative disease process that tends to increase in prevalence and severity by age, assessing the impact of the intervention on children's caries experience requires comparison of outcomes for children at the same age across intervention years. Since the children who started the intervention at the youngest age were 2 years old at baseline year one and 4 years old at year three, we compared results for 4-year-old children across study years. The prevalence of caries in 4-year-olds decreased from 84 percent in year one to 78 percent in year two to 43 percent in year three ($p = 0.005$, Pearson's chi-square) (FIGURE 9). Likewise, the severity of caries by average dmft score in 4-year-old children decreased from 6.40 in year one ($p = 0.001$) to 6.26 in year two ($p = 0.001$) to 4.48 in year three ($p = 0.085$) (FIGURE 8). The children who were aged 3 at the start of

the intervention and aged 5 at follow-up showed reduction in the prevalence of caries by age — the prevalence of caries in 5-year-olds decreased from 86 percent in year one to 77 percent in year three ($p = 0.042$, Pearson's chi-square); however, the severity of caries as measured by average dmft score in 5-year-old children decreased not significantly from 7.4 in year one to 6.3 in year two to 6.0 in year three ($p = 0.737$). Additionally, the dmft scores of 6-year-olds in year one decreased from 12.5 to 5.12 at year three ($p = 0.001$) (FIGURES 8 and 9).

In the baseline year, 65.5 percent of youths who had deep decay expressed mouth pain ($p=0.05$, Pearson's chi-square). By the two-year follow-up, 80.8 percent of youths who had deeper decay expressed mouth pain ($p=0.044$, Pearson's chi-square). Comparing mouth pain experience by age across the intervention years reveals no benefit for the 4- and 5-year-old children, but there is a suggestion of reduced mouth pain for 6-year-olds who exhibited deeper decay, which went from 100 percent mouth pain in year one to 100 percent in year two to 65 percent in year three ($p=0.199$, Pearson's chi-square – nonsignificant trend).

**FIGURE 7.** Child dental visits.**Discussion****Impact of Intervention on Dental Caries Experience**

This population of children from urban/suburban Vietnam experienced a high prevalence and severity of dental caries at baseline and two-year follow-up. However, the intervention was associated with modest improvements in oral health experience for 4- and 5-year-olds when comparing children seen in the follow-up to children of the same age at baseline (i.e., historical controls). It appears that the children who entered the intervention at the youngest age experienced the greatest benefit.

Because caregivers' oral health

TABLE 3

Child Oral Health Outcomes

	Frequency	% or SD	Sample	Frequency	% or SD	Sample	Frequency	% or SD	Sample
Has any tooth decay (yes)									
2-<3 years old	37	57%	65						
3-<4 years old	130	65%	201	28	76%	37			
4-<5 years old	173	84%	206	103	78%	132	3	43%	7
5-<6 years old	83	86%	96	57	83%	69	50	77%	65
6-<7 years old	14	100%	14				39	67%	58
dmft average	5.94	± 5.42	582	6.1	± 5.32	238	5.65	± 5.38	142
Average number of decayed teeth	5.7	± 5.23	582	5.9	± 5.2	239	5.08	± 5.05	142
Untreated teeth: proportion of d teeth in dmft index	3304	95.6	3457	1400	96	1452	721	89.8	803
Treated teeth: proportion of m+f in dmft	153	4.43	3457	52	4	1452	82	10.2	803
Severity of dental caries			582			238			142
d = 0 (no caries)	143	24.6		49	20.6		42	27.5	
d = 1-5 (low severity)	172	29.6		77	32.4		39	29.6	
d > 5 (high severity)	267	45.9		112	47.1		61	43	

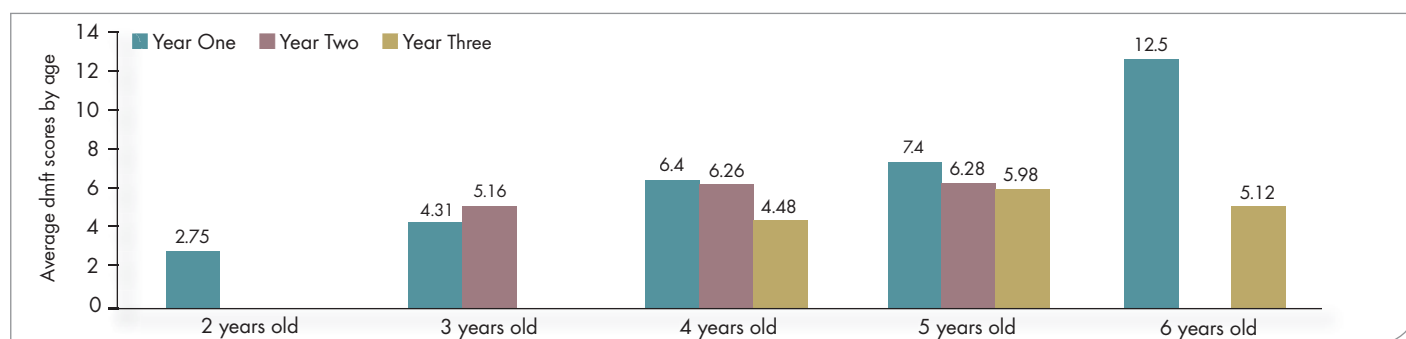


FIGURE 8. Childhood average dmft scores by age.

and nutrition knowledge and practices did not appear to improve over time, the oral health improvements were likely due to the application of fluoride varnish to children's teeth twice a year and possibly to the implementation of additional daily toothbrushing with fluoride toothpaste at school.

Impact of Intervention on Oral Health and Nutrition Knowledge and Practices

There was no evidence that parents' oral health and nutrition knowledge or practices improved in association with this intervention. While there was a relatively high level of knowledge that sweet snacks and not brushing teeth contributed to caries, few parents knew that the baby

bottle and sweet drinks could contribute to caries. In fact, the proportion of parents giving their children sweet drinks in the baby bottle, as well as junk food snacks and soda, increased over the intervention years. This may be due to the widespread advertising of, accessibility to and low price of junk food and sweetened drinks.

The reported ownership of toothbrushes and toothpaste was high at baseline and increased to 100 percent over the study years. While most parents reported helping their children brush their teeth, the proportion decreased across the study years. Although the American Dental Association and American Academy of Pediatric Dentistry recommend that parents help brush their children's teeth until age 8 ½,

these parents may have assumed that their preschool-age children had been taught at school to brush their teeth and were therefore able to brush their teeth without assistance. Intervention on oral hygiene practices should stress the importance of parent-facilitated toothbrushing.

There was evidence of increased dental treatment for children associated with the intervention. The proportion of children reported to have had a dental visit nearly doubled across the study years. In addition, although most of the tooth decay remained untreated, the proportion of treated tooth decay (i.e., extracted and filled teeth as a proportion of dmft) doubled from about 5 percent to 10 percent (TABLE 3). However, the

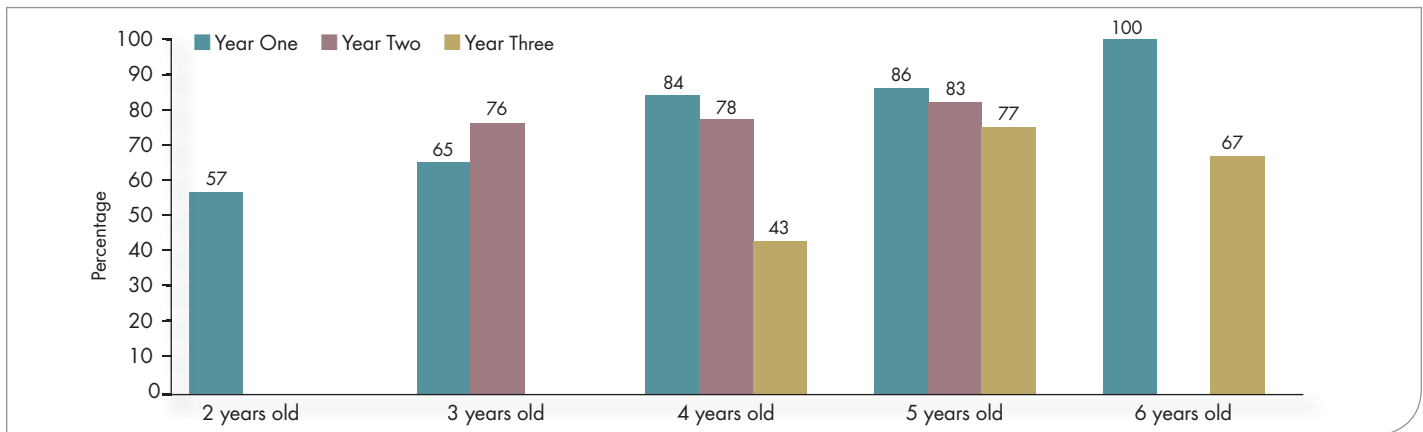


FIGURE 9. Childhood caries experience by age (decayed only).

proportion of children suffering from untreated decay, abscesses and mouth pain remained unacceptably high.

School-based interventions can be effective in providing children the opportunity for daily toothbrushing and periodic health education and medical/dental screening. However, this intervention had limited contact with parents because most mothers and fathers were in the workforce and visited the school only briefly to drop off and pick up their children. The decline in the proportion of mothers completing the survey each year may have reflected their increasing participation in the workforce and fathers' and grandparents' increasing participation in child care making it difficult to have consistent contact with the same caregiver over an extended period of time. Health interventions should make special efforts to involve all family caregivers as much as possible.

Impact of the Intervention on Nutritional Outcomes

This population of children had a high prevalence of overweight/obesity with doubling prevalence from 20 percent to 42 percent over the two years of the study. To prevent both dental caries and overweight/obesity, the intervention should place more emphasis on limiting children's consumption of junk food, sweets and sugary drinks, as well as promoting exercise.

Limitations and Strengths

A limitation of this study was lost to follow-up. While all of the children in the schools received the intervention, only 25 percent of the baseline families participated in data collection over the entire two-year period. Most of the children lost to follow-up were children who were aged 5 and 6 at baseline and thus had graduated from preschool at follow-up. However, an analysis showed that families who were lost to follow-up had similar characteristics for parents' age and education. Additional analysis of these preliminary results may yield further understanding of factors that can strengthen future interventions.

Strengths of this study include strong local partnerships and demonstration of the feasibility of school-based implementation of the oral health intervention.

Conclusions

In urban/suburban Vietnam in a preschool-age population with a high prevalence and severity of ECC and overweight/obesity, this school-based oral health intervention — including oral health and nutrition education, toothbrushing, fluoride varnish applications, dental screening and referral to dental treatment — was associated with modest reductions in the prevalence and severity of ECC by age. Further research and intervention should focus on earlier ECC prevention beginning during pregnancy and infant-toddler years with a strong focus on limiting

children's consumption of sugary snacks and drinks and ensuring access to effective treatment for all children with ECC. ■

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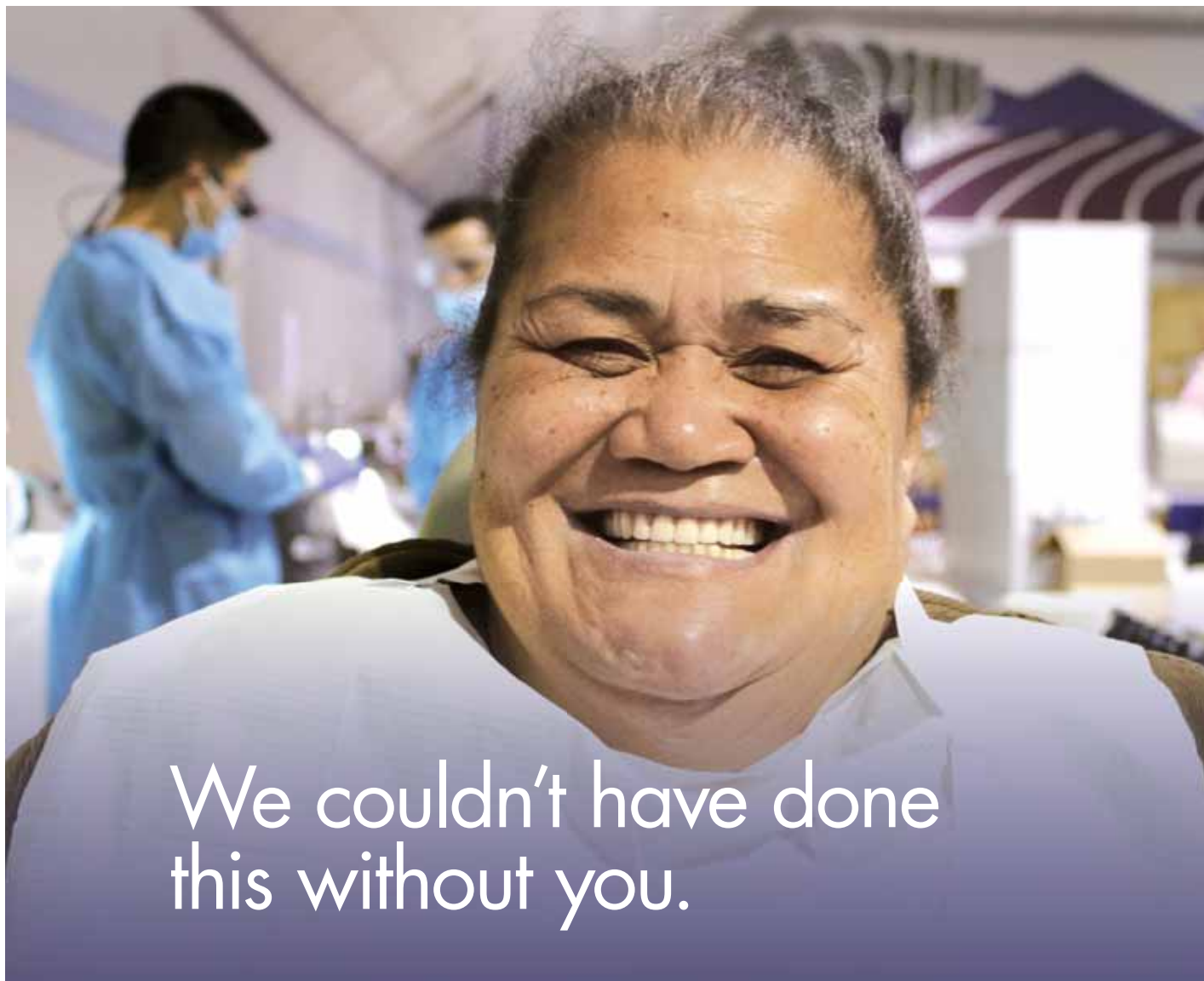
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Impact of Asthmatic Therapy and Oral Health in Special Olympics Athletes: An Interprofessional Study

Marc A. Bernardo, MPH; Allison B. Igtanloc, BA; Molly S. Sadowsky, MPH; and Marisa K. Watanabe, DDS, MS

ABSTRACT This study takes an interprofessional approach to examine the relationship between asthmatic therapy and oral health among athletes participating in the 2015 Special Olympics World Games. Of the athletes who reported having asthma and used an inhaler, there was no significant correlation of increased poor oral hygiene. This study highlights the positive impact of the Special Olympics Healthy Athletes programs in providing health care awareness, preventive care and referral services for Special Olympics athletes globally.

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Conflict of Interest
Disclosure: None reported.

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Conflict of Interest
Disclosure: None reported.

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Conflict of Interest
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People with special health care needs (PSHCN) are those who have or are at risk for chronic developmental, behavioral, physical or emotional conditions and require advanced health care services.¹ A national survey conducted in 2009–2010 by the U.S. Department of Health and Human Services and the U.S. Department of Health Resources and Services Administration reported that more than 15 percent of children and adolescents in the U.S. have special health care needs, which include reliance on medication or therapies, special education services or assistive devices or equipment.² This accounted for at least one child with special health care needs in more than 21 percent of U.S. households. Of the nonprimary health care services, oral health is often unmet among these individuals.¹

The complexity of services delivered to PSHCN is robust and health care providers need to be educated and clinically trained, if possible, in caring for this population. Providing health care for this underserved population will require increased attention, medical, behavioral and environmental awareness, knowledge and possible special accommodations. Such recommendations and considerations combined with minimal interactive and clinical training contribute to reasons for a limited workforce that is able to provide care to PSHCN, which further propagates the barriers to access of care.³ In a study of parental perceptions of oral health among children with special health care needs (CSHCN), there was a significantly higher proportion of dental problems as opposed to children without special health care needs. More

parents of CSHCNs reported that their child had not received preventive dental care — with only invasive, costly, nonpreventive care delivered.⁴

Another difficult barrier is finding and accessing a dentist willing to treat these PSHCN. For example, as of 2015 in Oakland County, Michigan, a study reported that there were 140,160 individuals registered with special health care needs. Only 36 dentists within the county were listed as being able to treat PSCHN.⁵ Hence, within this county, there is only one dentist to provide much needed oral health care to 3,893 PSCHN. This is but one representation showing the disparity of access to care that this population faces, which contributes additionally to increased severity of oral health outcomes.

Introduction

To address the oral health disparity in PSCHN, the Special Olympics Healthy Athletes program was designed to identify athletes with intellectual disabilities who are in need of medical and/or dental attention by providing screening programs at Special Olympics events.⁶ Special Olympics is an international nonprofit organization that was founded in the United States in 1968.⁶ The purpose of Healthy Athletes is to improve the health and fitness of the athletes through competitive sports and an array of health-related programs.⁷ In 1997, Healthy Athletes was recognized as an official Special Olympics initiative that provided health care services for participating athletes worldwide.⁶ As part of this effort, seven programs, which include Fit Feet (podiatry), FUNfitness (physical therapy), Health Promotion (better health and well-being), Healthy Hearing (audiology), MedFest (physical exam), Opening Eyes (vision) and Special Smiles (dentistry) have since

been developed to directly address the unmet health care needs and extensive risk factors for the athletes. These Healthy Athletes screenings are conducted by volunteer health care professionals who provide health education and screenings for hearing, vision, oral hygiene, foot morphology and function, balance, aerobic fitness, bone density, body mass index and blood pressure.⁷

As part of the overall health education process, the athletes, with coaches and family present, are educated on healthy lifestyles and provided

The purpose of Healthy Athletes is to improve the health and fitness of the athletes through competitive sports and an array of health-related programs.

preventive treatments, which include but not limited to nutritional guidance, screenings for diseases and fittings for mouthguards. If warranted, referrals are made to physicians, dentists, podiatrists, optometrists and/or physical therapists in the athletes' communities for follow-up care. In partnership with the Special Olympics program, the Western University of Health Sciences, College of Dental Medicine (WesternU CDM) utilized the data from the 2015 Special Olympics World Games in Los Angeles to evaluate any relationship between health field-specific diseases and therapeutic treatments among the athletes and the effectiveness of the Healthy Athletes interprofessional program.

During the World Games, the Special Olympics Special Smiles program

evaluated the oral health status of athletes by collecting region-specific data through the use of standardized forms, oral examinations and in-person interviews.⁸ The format of these strategies was developed between the Special Smiles program and the Division of Oral Health at the Centers for Disease Control and Prevention in Atlanta. The chief objective was to improve the access and delivery of dental care for this underserved population through noninvasive oral health screenings, along with referrals and preventive dental products for competing athletes.⁸

Athletes who participated in the World Games were required to complete a medical form prior to competition. This form was comprised of two parts: a health history section completed by the athlete or their parent/guardian and a sports physical exam completed by a licensed health professional (physician, physician's assistant or an advanced registered nurse practitioner equivalent). Ideally, the athlete would complete the medical exam in his or her home country. Athletes unable to obtain physicals in their home countries or athletes who submitted incomplete or questionable medical forms were directed to the Healthy Athletes MedFest program at the World Games.

The MedFest program provided free, comprehensive physicals in order to confirm that the athletes met the necessary physical conditions to participate in the World Games.⁹ In addition to the physical exams, MedFest recorded the participants' health histories via the medical form, which was composed of a health history and a physical exam section. Both sections of the medical form encompassed a broad array of categories pertaining to health, such as previous injuries and medical diagnoses.⁸ With the help of volunteer licensed physicians, physician assistants,

nurses and unlicensed medical students, MedFest provided basic physical health exams to those athletes who lacked readily available access to health care.⁹

Among the surveyed categories of medical diagnoses, asthma was of particular interest because of its recommended treatment with controller inhalers, which have direct implications in the formation of dental caries in the oral cavity.⁸ Asthma is a common and chronic respiratory condition that involves inflammation and narrowing of the airways. It is an obstructive lung disease that can present with shortness of breath, inability to exercise, chest tightness, wheezing and cough. A multitude of allergic and nonallergic triggers can elicit symptoms of the disease in childhood as well as adulthood. A strong genetic predisposition exists for the development of allergic asthma, especially in individuals with a family history of atopy.¹⁰ Immunoglobulin E, mast cells and leukotrienes are the main mediators of the hyperactive immune response in affected individuals.¹⁰ Pathologically, asthma causes hyperinflation of the lungs, limiting the ability of affected individuals to exhale completely. This can be confirmed by a significantly decreased forced expiratory volume in one second (FEV1) as well as a decreased forced vital capacity (FVC) on spirometry testing.¹¹ The FEV1/FVC ratio is significant; a ratio of <80 percent indicates a diagnosis of obstructive lung disease and can guide the potential diagnosis of asthma.¹¹ Asthma can be a debilitating and fatal disease if left untreated. However, anti-asthmatic therapy can adequately control the symptoms of the disease so that patients may lead a normal life.

First-line treatment recommendations for asthma include respiratory inhalers, which include bronchodilators (beta-2 agonists and anticholinergics) and inhaled

corticosteroids.¹² Respiratory inhalers ensure a more direct distribution to the hyperactive lung parenchyma and airways, while simultaneously avoiding the serious systemic side effects that can occur with these classes of medications. Inhaled medications can directly affect dentition and the oral mucosa, thereby increasing susceptibility to the development of dental caries.⁸ Inhaled bronchodilators have been linked to decreased salivary flow rate, oral candidiasis and xerostomia, which are all extrinsic factors that can lead to dental caries.⁸ In addition to oral candidiasis

Asthma was of particular interest because of its recommended treatment with controller inhalers, which have direct implications in the formation of dental caries.

and xerostomia, inhaled corticosteroids have been associated with a direct increase in dental caries.⁸ The long-term use of anti-asthmatic therapy can be projected to overall precipitate direct and indirect increases in dental caries and an ultimate decline in oral health.

Purpose

The purpose of this study was to evaluate the connection between asthmatic inhaler use and oral hygiene condition in athletes at the World Games. This study further examined the importance of interprofessional relationships among the Special Olympics Healthy Athletes programs that would benefit from the effects of asthmatic therapy on periodontal disease and dental caries.

Materials and Methods

This study was designed as a retrospective analysis of the World Games. The Special Olympics research and evaluation department provided the dataset to WesternU CDM. The data were received after IRB completion (IRB #17IRB019-CDM) and the data access compliance agreement was completed.

Data from the medical forms, MedFest, Special Smiles and Health Promotion were provided by the Special Olympics Health Data administration team and supported by Steven Perlman, DDS, MScD, DHL (Hon), the global clinical director and founder of Special Olympics Special Smiles. Retrospective analysis was conducted on de-identified athletes who were assessed by the Healthy Athletes program for correlations between medical conditions and oral health conditions.

The subject population included athletes who competed at the World Games and had undergone medical evaluation prior to competition or medical, oral health and/or healthy lifestyle living assessments by the MedFest, Special Smiles and Health Promotion programs, respectively. Considering the diversity of athletes the World Games attracts, inclusion criteria for data analysis was not limited to age, gender, disability, ethnic background or competition sport. During the program assessments, athletes who specified being diagnosed with asthma and had been prescribed the use of inhalers for treatment in their medical forms were included in the study while athletes with incomplete documentation were excluded from this study.

Three sets of data were used to obtain results for this study. Special Olympics medical forms and the MedFest de-identified dataset supplied information on represented Special Olympics regions, gender, sport, asthma diagnosis, use of inhaler and oral hygiene status. Special

Olympics regions are defined as groups of countries represented by athletes at the World Games by geographic area. Regions represented at this World Games included Special Olympics Africa, Special Olympics Asia Pacific, Special Olympics East Asia, Special Olympics Europe Eurasia, Special Olympics Latin America, Special Olympics Middle East North Africa and Special Olympics North America. Information gathered and analyzed from Health Promotion data included frequency of different drinks such as water and sports drinks as well as smoking experience, all of which have an influence on oral health and the development of dental caries. Special Smiles provided data on untreated decay and treatment urgencies for participating athletes. All three Healthy Athlete forms (the medical form and MedFest form, Health Promotion and Special Smiles) are provided in **FIGURES 1–3**, respectively, found on cda.org/nov17. Despite the vast amount of information the databases provided, the study was limited on matched data between the respected Healthy Athlete programs. Matching data are a statistical technique, which enables evaluation of athletes through each silo of Healthy Athletes. This method enables comparisons to be made between different data sets. In regards to matched data, athlete medical forms and MedFest reported data on asthma status, inhaler use and oral hygiene status support this study.

From the provided Special Olympics medical forms and MedFest dataset, athletes from the seven Special Olympics regions were categorized based on information provided on the exam assessment form. This included asthma condition, use of inhaler therapy and oral hygiene conditions. Athletes with missing information were excluded from the analysis. Athletes with asthma were evaluated based upon use of inhaler

therapy and recorded oral hygiene status. Inhaler therapy was dichotomized into “yes” or “no.” Oral hygiene conditions were categorized as “good,” “fair” or “poor.” According to MedFest’s *A Training Manual for Clinical Directors*, oral hygiene is one of the most commonly overlooked problems for these athletes. The recommendation is that any deviation from “good” oral hygiene (no or minimal plaque/no inflamed gums) should be referred to Special Smiles if available. If Special Smiles is not present, then MedFest providers refer the athlete to a dental clinic.¹³

Matching data are a statistical technique, which enables evaluation of athletes through each silo of Healthy Athletes.

Special Olympics Health Promotion data included environmental factors that could lead to an increased caries risk. Similar to nutritional guidance discussed with the athletes during Special Smiles, Health Promotion contains a survey of food and beverage habits such as typical drinks when thirsty, frequency of sweetened beverages, sources of calcium from consumption of fruits and vegetables and frequency of snack foods and fast food. In addition to nutritional guidance, Health Promotion surveyed the athletes in tobacco use, frequency of tobacco use and secondhand smoke including the athlete’s reaction when a person is smoking within his/her vicinity (i.e., ask them to stop, leave the room, smoke, do not do anything or other).

Prior to Special Smiles dental screening, the athlete’s dental history was recorded, which included frequency of brushing and pain inside the mouth. Both pieces of information served as platforms for oral hygiene and dietary instruction along with determining if treatment/dental need was urgent. The dental screening consisted of documenting the following: edentulism, untreated decay, filled teeth, missing teeth, sealants, injury, fluorosis, gingival signs and treatment urgency. Per Special Olympics protocol, untreated caries was documented as at least one area of cavitation that would accommodate a 0.5 mm diameter (or larger) bur or ball burnisher. All primary and permanent dentition were assessed, except third molars and partially erupted teeth. The oral health providers evaluated the athletes for “filled teeth” that may contain secondary decay. If decay was present, the provider marked “yes” for filled teeth as well as untreated decay. If a filling was absent but no decay was present, the oral health provider recorded “filled teeth” but marked “no” for untreated decay. In regards to missing teeth, the oral health providers noted only for anteriors and molars. Current or healing injuries observed intraorally were also recorded along with whether the injury was treated. Furthermore, the oral health provider performing the dental screening would determine whether a mouthguard was recommended for the athlete based on sports played and if the mouthguard was delivered to the athlete. To assist with preventing overexposure to fluoride, the oral health providers recorded “yes” or “no” for the presence of fluorosis and then determined if fluoride varnish was recommended and performed for the athlete.¹⁴

To complete the Special Smiles screening, a Special Smiles Athlete Report form was documented for the

TABLE 1

Frequency of Unique Athletes With Asthma by Region, Special Olympics World Games, Los Angeles, 2015

Rank	Special Olympics region	Frequency
1	North America	61
2	Europe/Eurasia	59
3	Latin America	27
4	Asia Pacific	12

TABLE 2

Oral Health Analysis for Athletes With Asthma Who Use an Inhaler, Special Olympics World Games, Los Angeles, 2015

Asthma condition	Oral health condition		
	Good	Fair	Poor
Yes	71 (93%)	4 (6%)	1 (1%)

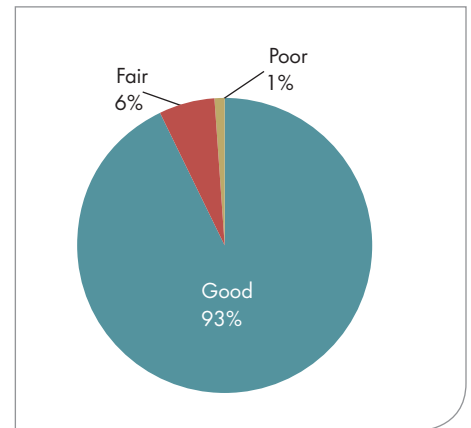


FIGURE 4. Oral hygiene with inhaler use among athletes. Proportions of oral health outcomes among athletes who used an anti-asthmatic inhalant therapy during the 2015 Special Olympics World Games in Los Angeles.

athlete. The Special Smiles Athlete Report form noted if the athlete was recommended for urgent care, non-urgent and/or maintenance. Urgent care was defined as the athlete having pain, oral pathology, abscess or draining fistulas or rampant decay. Non-urgent would include routine dental treatment such as restorative, surgical or periodontal without the presence of pain or an acute infection. Maintenance was a recommendation for routine exams and periodontal maintenance. Any additional information or descriptions regarding the athlete's oral health was summarized in the Special Smiles Athlete Report form. If the oral health provider noted that the athlete lacked a permanent dental home or if the athlete needed urgent or dental treatment, a copy of the Special Smiles Athlete Report was provided to the athlete and Special Olympics for follow-up. On the back end, Special Olympics followed up with the athletes who did not have a dental home or were recorded for urgent care.

A nonparametric, Fischer's exact test was used to assess if there was any significant correlation between asthmatic inhaler use and oral hygiene among the athletes. The Special Smiles and Health Promotion data sets were evaluated

separately based on frequency analysis of studied variables: untreated decay (Special Smiles) and smoking tobacco and beverage consumption (Health Promotion). Statistical analysis to determine correlations between medical conditions and oral health hygiene of the screened athletes was performed using R version 3.3.3 (2017-03-06).

Results

There were 6,231 athletes who completed medical forms conducted either by medical providers in their home countries or by MedFest at the World Games. Of the 6,231 athletes, 234 (4 percent) reported being diagnosed with asthma. Those athletes with asthma represent four (57 percent) of the seven geographical regions of the World Games (TABLE 1). Of the 234 athletes diagnosed with asthma, 112 (48 percent) documented use of an inhaler. For athletes diagnosed with asthma who currently used an inhaler, physical exam results indicated oral hygiene status as 93 percent good, 6 percent fair and 1 percent poor (TABLE 2). Correlation between inhaler use and increased probability of dental caries due to poor oral hygiene was not statistically significant (Fisher's exact test: $p=0.7699$) (FIGURE 4).

Furthermore, there were 2,424 total athletes screened by Special Smiles at the World Games. An analysis of the oral health exams provided by the Special Smiles program indicated Special Olympics Europe Eurasia 346 (44 percent) of 783, Special Olympics Asia Pacific 192 (48 percent) of 399 and Special Olympics Latin America 139 (37 percent) of 376 had the highest frequencies of untreated caries. By percentage, Special Olympics North America ranked sixth with an untreated caries prevalence of 120 (40 percent) of 299 (TABLE 3).

Discussion

Previous studies have shown that the use of inhalers can lead to oral manifestations, which include a possible increased caries risk of children between ages 3 and 7 in newly erupted permanent molars after the use of a combination of inhaled corticosteroids and inhaled beta-2-agonist, as well as increased periodontal risk.^{15,16} Despite the indirect effects of bronchodilators and direct effect of corticosteroids (such as xerostomia) and its impact on caries risk due to lowering the pH of saliva, the analysis of World Games athletes diagnosed with asthma and reported inhaler use showed no significant decline in oral hygiene.

Although medical forms and MedFest data reported inhaler use, the specific type of inhaler, a bronchodilator or corticosteroid, was not specified. The inhaler classification would be significant in the determination of medication and oral health education for the athletes in order to improve oral health and reduce the risk of dental caries. Inhaled bronchodilators are often prescribed for individuals with acute asthma and can be a combination of a long-acting beta-agonist bronchodilator and an inhaled steroid.¹⁷ Inhaled corticosteroids are the first-line therapy for chronic asthma. Due to the long-term control of this intervention, individuals are at a greater risk for the oropharyngeal side effects.¹⁸ In contrast to corticosteroids, bronchodilators have no direct increased risk of dental caries.¹⁹ The preliminary data infers that athletes may be utilizing higher frequencies of bronchodilators as opposed to corticosteroids, which could contribute to the low amount of dental caries among Special Olympics regions noted in **TABLE 1**.

Along with prescribed class of inhaler treatment, asthma severity and medication compliance play an important role in the frequency of inhaler use. Individuals who experience less severe and infrequent symptoms were instructed to use the inhaler on an “as needed” basis, particularly with the use of bronchodilators (with or without the corticosteroid). The frequency and dosage of the medication has a directly proportional relationship with the oral side effects for an individual. Moreover, medication noncompliance leads to decreased exposure to the side effects of inhalers.²⁰ The lower frequencies of steroid inhaler may be one of the contributing factors to the lower incidence of caries experienced among athletes represented in **TABLE 1**.

TABLE 3

Prevalence of Untreated Decay by Region, Special Olympics World Games, Los Angeles, 2015

Region	Frequency	Total athletes per region	Percent
Middle-East North Africa	94	163	58%
Africa	131	233	56%
East Asia	86	171	50%
Asia Pacific	192	399	48%
Europe/Eurasia	346	783	44%
North America	120	299	40%
Latin America	139	376	37%

Additionally, recommended palliative therapy plays a role in decreasing the risk of dental caries. Palliative care to address xerostomic effects of inhaler use includes frequent sipping of water, increased intake of moist, sugar-free diet and avoiding alcohol or foods with strong flavoring.²¹ Of the 2,104 athletes screened by the Health Promotions program at the World Games, frequencies of type of liquid consumed include water 1,677 (79.71 percent), sports drinks 52 (2.47 percent), soft drinks 210 (9.98 percent), fruit juices 159 (7.56 percent) and energy drinks six (0.29 percent). Of the 409 athletes from Special Olympics North America who reported information on beverages consumed, 329 (80 percent) primarily consumed water, as opposed to 469 (74.56 percent) of the 629 athletes from Special Olympics Europe Eurasia. The high rate of water consumption potentially explains the low amount of caries experienced by Special Smiles screened athletes referenced in **TABLE 3**.

In general, the effectiveness of the Healthy Athletes screening program for asthma and various other systemic issues is a major contributor to the oral health outcomes (e.g., untreated decay, pain, oral hygiene, periodontal disease) of athletes screened by Special Smiles. For dental professionals who communicate the connection between asthmatic inhaler use and dental caries

to athletes with asthma, the athletes gain information about their condition and such services provide the education to change at-home oral health care. Special Olympics North America ranks sixth out of the seven regions represented at the World Games in dental caries prevalence by percentage within the Special Smiles screened athletes (**TABLE 3**). The delivery of continuous regional and local Special Olympics exams and preventive measures throughout the North American region may contribute to the effectiveness of the Healthy Athletes and Special Smiles programs in regards to good oral hygiene and lowered incidence of caries observed in this study. With more effective interprofessional collaboration between the Healthy Athlete programs and Special Smiles, more profound and optimal physical and oral health outcomes (good oral hygiene, low percentage of untreated decay and recorded pain) can potentially occur for athletes treated with asthmatic therapies.

Furthermore, the Health Promotion program promotes better living and well-being practices among the athletes.⁷ One part of the program involves assessment of smoking tobacco among the athletes as studies show that smoking tobacco is a common trigger for asthmatic responses.²² Moreover, in a systematic review, it has been reported that individuals who smoke tobacco are at an increased risk of dental caries.²³ Data

from the World Games indicated that Special Olympics Europe Eurasia had the highest frequency of athletes who smoked at 157 (12 percent). This region also experienced the highest frequency of dental caries at 346 (44 percent). This comparison suggests how external factors such as environment and social cultural norms can lead to increased risk of dental caries among athletes.²⁴ Unfortunately, due to the unmatched data from the other medical and dental disciplines, no direct conclusion can be made on a correlation between smoking, the effect on asthma or the effect on dental caries for athletes participating in the World Games.

Based on the preliminary observations between data from the World Games, Health Promotion and Special Smiles, it can be inferred that interprofessional collaboration among the different participating Healthy Athletes programs, such as medical, dental and health promotion, amplifies a more comprehensive approach to the treatment and maintenance of asthma therapy and oral health for the athletes. Dentistry and medicine are inherently in a constant state of interplay with one another; the health of the oral cavity can reflect the systemic balance or imbalance of the rest of the body, especially in the case of asthma. Oral candidiasis, for example, can reflect systemic immunosuppression in an athlete with asthma, which warrants further testing and examination.²⁵ Oral candidiasis may additionally imply a disruption of the oral flora due to behavioral factors, such as failing to rinse the mouth after inhaler use.²³ Expanded awareness of this innate connection between oral health and systemic and/or behavioral complications helps create more efficient health care

teams that are able to more quickly recognize asthma therapeutic-related oral manifestations in the athletes. This in turn has the potential to lead to greater rates of addressing complications of asthma and asthmatic therapy, thereby substantiating a healthier population of athletes.

Moreover, due to inhaled corticosteroids' direct associations with oral candidiasis and dental caries, oral health for the athletes can be further promoted via medical providers who understand the importance

The health of the oral cavity can reflect the systemic balance or imbalance of the rest of the body, especially in the case of asthma.

of explaining the correct usage of corticosteroid inhalers to the athletes. By beginning with medical providers who can initiate and emphasize the importance of mouth rinsing after inhaler use or asthmatic therapy, poor oral hygiene and dental caries can be prevented.²² Moreover, immediate teeth brushing after inhaler use can lead to enamel damage and effective communication of this fact can significantly improve dental caries risk in the athletes.²² The American Academy of Developmental Medicine and Dentistry (AADMD), which aims to bridge the gap in health care for "individuals with neurodevelopmental disorders and intellectual abilities," is an ally and resource for athletes and PSHCN.²⁶ As an organization

established in 2002 that promotes interprofessional collaboration between medical and dental professionals for PSHCN, the AADMD can act as a vehicle in collaboration with Special Smiles, MedFest and Health Promotion, for which medical and dental providers are trained to more effectively explain correct asthmatic medication usage to the athletes to prevent oral health complications.²⁶

In addition, it is optimal for Special Olympics athletes with asthma to have their symptoms under control. Uncontrolled asthma can have deleterious physical and emotional consequences when participating in the World Games. Effectively addressing this issue can be achieved by ensuring the athletes have adequate inhaler competence. Poor technique has been found in an average of 50 percent of patients with asthma.²⁷ Each class of inhaler has specific instructions for correct usage and simple handling errors have significant impacts on the extent of medication delivered to the lungs.²⁷ Health Promotion has the opportunity to ensure that athletes with asthma are using their inhalers properly, thereby safeguarding that each athlete is receiving the correct dosage of medication that adequately controls their symptoms. By receiving similar information from dental providers at Special Smiles, education can be further reinforced and athletes and their caregivers are more likely to remember correct inhaler usage. By aiming to decrease handling errors of asthmatic therapies such as inhalers, asthmatic symptoms can be better controlled in the athletes. Thus, asthma is less likely to interfere with participation in the World Games and the interprofessional reinforcement helps prevent the onset of dental caries.

From a larger perspective, in order to maintain the health of the athletes, barriers to medical and dental care access must be considered. From a global perspective, location and transportation are barriers for health care access, as evidenced in particular by the percentage of athletes with untreated decay in Special Olympics regions with low numbers of dentists and insufficient available transportation (TABLE 3). Additionally, dental professionals must be available and willing to provide comprehensive care to these individuals with complex needs.²⁸ Finding trained dentists who are cognizant of these unique needs is one of the greatest barriers to dental care access for the athletes and PSHCN.²⁸

To address the barriers aforementioned is essential to expand readily available health care for the athletes. One way to expand the dental workforce's competency and comfort in providing care for the athletes and PSHCN is through raising the standards that the Commission on Dental Accreditation sets for dental programs throughout the country. A 2001 national survey of practicing dentists indicated "only one in four respondents had hands-on experience with [PSHCN] in dental school."²⁹ By implementing requirements at dental programs that will ensure adequate exposure to the unique health care needs of PSHCN, graduating dentists will have at least a minimal familiarity with working and interacting with this patient population. For those who are already in dental practice, continuing education courses can facilitate heightened awareness of these unique health care demands. Through these efforts, an increasingly effective delivery and maintenance of health care for the athletes and PSHCN can be achieved.

Hence, Special Smiles, MedFest and Health Promotion are three programs that provide valuable dental, medical and wellness education to athletes biennially at the World Games and locally around the world daily. The interaction and influence of these Healthy Athletes programs with the athletes can improve both asthmatic outcomes and oral health outcomes. Most important, there is potential for improved asthmatic control of symptoms for the athletes via a combined effort. By improving interprofessional communication and participation among the health care professionals in all three programs, dental and medical issues faced by the athletes and PSHCN with asthma can be more effectively addressed. Special Smiles, MedFest and Health Promotion can synergistically confront asthmatic medication usage and compliance issues that particularly reflect the specific needs of the athletes. Opportunities to partake in state, regional and local events together can help further fuel interprofessional teamwork and thus more comprehensive health care for the athletes.

Conclusion

The Healthy Athletes program has developed a robust comprehensive alternative to address the lack of access to care for Special Olympics athletes and Special Olympics ambassadors with special health care needs. Of the athletes who reported having asthma and use of inhaler therapy, there was no significant correlation of an increased prevalence in oral health outcomes such as poor oral hygiene. This study also suggests that it takes an interprofessional collaboration approach to ensure the health care needs are effectively met and to enable optimal health outcomes for Special Olympics athletes.

Limitations

Despite the vast amount of information available from the Special Olympics Healthy Athletes database, this study was limited on matched data among the different health programs. Unmatched data prevents any evaluation of specific athletes through each silo, limiting correlation analyses of particular cohorts screened by the Healthy Athletes program. Additionally, self-report response bias pertaining to beverage consumption and tobacco in Health Promotion surveys also applies.

Future Opportunities

In consideration of the database the Healthy Athletes program provided, multidisciplinary matched data would be highly valuable in providing future opportunities to study health correlations among the athletes. The ability to follow athletes and track findings from medical forms, MedFest, Special Smiles and Health Promotion can provide a vast amount of information on how nutrition and environmental factors affect medical and oral health. ■

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LOS ANGELES COUNTY

BEVERLY HILLS - Modern designed Periodontal practice in multi story elite medical professional bldg. Has 3 eq ops & 2 plmbd not eq. In a 1,410 sq ft ste. **Property ID #5157**

CARSON— Long established GP in a small shopping center. Grossed \$234K in 2016. Has 5 eq ops. Retiring seller work 3 days/wk. **Property ID #5181.**

DOWNNEY—Turn-Key GP in single shopping center. Has 4 eq ops in a 1,500 sq ft office + garage. Grossed \$199K in 2016. **Property ID #5179.**

LA MIRADA - GP established circa 1963 located in a 2 story med prof bldg. Consists of 5 eq ops. Grossed approx. \$408K in 2016. **Property ID #5119.**

LA VERNE—COMING SOON

LOS ANGELES - Price Adjustment! GP w/ 40 years of goodwill. In a 10 story medical/dental bldg. Has 4 eq ops with views to the mountains. PPO/Cash/Medical/CAP. Grossed \$670K in 2016. Net of \$166K. **Property ID #5107.**

LOS ANGELES - GP established in 1968 in a 6 story bldg. NO HMO. Has 4 eq ops in a 1,211 sq ft suite. Grossed approx. \$531K in 2016. **Property ID #5163.**

MOTEBELLO—Grossed approx. \$1.1M in 2016, located in a free standing bldg w/ 5 eq ops. Established in 2002. **Property ID #5168**

PASADENA - Located in the heart of Pasadena w/ 60 years of goodwill. Grossed approx. \$616K in 2016. Has 3 eqs ops in a 1,150 sq ft suite. **Property ID #5147.**

SANTA MONICA— Turn-Key practice located in a 3 story Med/Dent bldg. Established in 1975. Has 3 equip ops in a 827 sq ft suite. **Grossed \$169K IN 2016. Property ID #5175.**

VALENCIA — GP + Spec office with 9 eq ops in a busy single shopping center. **Grossed \$1.6M in 2016. Property ID #5171.**

WALNUT PARK - Established in 1968 GP in free standing bldg. **Option to buy bldg.** Grossed \$531K in 2016. Net \$166K. Has 4 eq ops. **Property ID #5176.**

KERN, VENTURA, & SAN LUIS OBISPO COUNTIES

SIMI VALLEY— GP + Bldgs. Well established practice 4 eq ops & 2 plmbd not eq ops. **Net of \$92K.** Extra income generating from rent. **Property ID #5185.**

ORANGE COUNTY

ANAHEIM— Established in 1960's this practice is on a single story bldg w/ 4 eq ops. **Grossed \$735K in 2016. Net \$308K. Property ID #5187.**

BREA— Beautiful well established practice located on a corner location. Has 8 equipped ops and 3 chairs in open bay. **Grossed \$1.5M.** On a busy major street of the city. **Property ID #5190.**

BREA— GP + Bldg. Well established practice w/ 4 eq ops & 2 plmbd not eq. PPO & Cash Only. **Grossed \$683K in 2016. Property ID #5197.**

COSTA MESA - GP w/ 5 eq ops and 3 chairs in open bay in a busy retail shopping center. Established in 2005. 4 day/wk practice. **Grossed approx. \$656K in 2016. Property ID #5121.**

FOUNTAIN VALLEY—GP in busy strip mall. Has approx. 27 years of goodwill. **Grossed \$344K in 2016. Net of \$136K. Property ID #5165.**

LAGUNA HILLS— With over 30 yrs of goodwill this GP is located in a 2 story med bldg. Has 5 eq ops in a 1,600 sq ft suite. **Grossed approx. \$304K for 2016. Property ID #5127.**

MISSION VIEJO (TURN-KEY) Modern designed GP located in a 2 story med/dent bldg. Has 3 eq / 3 plmbd for expansion. **Property ID #5138.**

TUSTIN—COMING SOON

WESTMINSTER— GP established in 1983 in a 2 story building. Has 3 eq ops in 1,300 sq ft suite. Next to residential area on a busy street. **Grossed \$183K IN 2016. Net \$61K. Property ID # 5194.**

SAN DIEGO COUNTY

EL CENTRO (GP) — Located in a single story bldg. **Building is for sale.** 5 equipped operatories. **Grossed \$347K for 2016. Property ID #5023.**

ESCONDIDO—Perio practice w/ 40 yrs of gdwill in a single story bldg. Has 4 eq ops. **Grossed \$683K in 2016. Property ID #5173.**

LA JOLLA— Beautiful practice—LH & Equip Only!

OCEANSIDE—Well established practice near the ocean in a 2 story bldg. Has 3 eq ops w/ 2 hygiene ops. Lots of foot traffic. **Grossed \$422K in 2016. Property ID 5191.**

RIVERSIDE & SAN BERNARDINO COUNTIES

BANNING—LH & Equipment only! Consists of 3 eq ops in a 925 st ft suite. **Property ID #5184.**

BEAUMONT—GP + Real Estate. Modern GP w/ 6 eq ops in 2,400 sq ft office. Could be two suites. **Grossed \$960K in 2016. Property ID #5182.**

CHINO—Real Estate Only! This a rare opportunity to purchase a condo located in a single story strip mall. Has been a dental practice for 40 years. **Property ID 5076.**

DESERT HOT SPRIGNS—COMING SOON

FONTANA— GP + Real Estate!! Premier office with 50 years of goodwill. In a 3,000 sq ft bldg with 8 eq ops. Has the latest technology. **Grossed approx. \$2.3M in 2016. Net of \$968K. Property ID #5140.**

CORONA— GP w/ over 30 years of goodwill in single story medical bldg. Near new developments. Has 3 eq ops. Buyer's net \$157K. \$35K/mo. **Property ID #5133.**

HEMET GP + Condo Suite Has over 40 years of goodwill to officer. Icon in the community. Located in a single story tri-plex condo bldg. Has 4 eq ops. No Denti-cal. Net of \$143k. **Property ID #5152.**

PALM SPRINGS — General practice with 3 equipped ops located in a free standing bldg. Established in 2005. Suite is approx. 1,200. Seller work 5 days/wk. **BUYER'S NET OF \$153K. Property ID #4487.**

RANCHO CUCAMONGA— GP established in 2004 in busy shopping center. Consists of 3 eq ops in a 1,200 sq ft suite. **Grossed \$747K in 2016. Net \$251K. Property ID #5169.**

RIVERSIDE—GP + Real Estate!! Established in 1975 in free standing historic bldg. Has 4 eq ops in a 2,000 sq ft office. Projecting approx. \$284K for 2016. **Property ID #5146.**

TEMECULA—Modern designed practice w/ 3 eq ops. Projecting approx. \$1.2M. **Net of \$444K. Property ID #5155.**

UPLAND—Pediatric dental practice located in a medical bldg with 40 years of goodwill. Consists of 4 chairs in open with Alpha-Dent software. **Grossed \$271K in 2016. Property ID #5188.**

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A Royal Dilemma: What Should Be Done About Patients Who Want To Take Their Crowns Elsewhere?

TDIC Risk Management Staff

You take time to build relationships with your patients and plan long-term treatment success. But what happens when a patient has “a better idea” of what should happen midtreatment? Though many patients desire a sense of control in their dental care and want to exercise choice, the trouble happens when a patient attempts to dictate clinical decisions. The Risk Management team at The Dentists Insurance Company has seen a recent trend in the number of patients who are requesting their restorations simply be handed over to them. These cases involve everything from patients taking their crowns to another practice for delivery to contacting the lab directly.

While it's hard to understand why a patient would make such a choice, it's important to have a response ready in case your practice encounters this scenario. It can be disappointing to have a patient not follow through with your planned treatment, but more than that, your practice and the patient are both put at risk if the patient does not complete the treatment in progress.

One case reported to Risk Management involved a patient of record who had been receiving care at the office for several years. When he arrived to his appointment for the delivery of two lower right crowns, he requested that the dentist hand him the crowns rather than cement them as planned. The patient's stated reason was that he was going to have another dentist, who was a family friend, deliver them.

While it's hard to understand why a patient would make such a choice, it's important to have a response ready in case your practice encounters this scenario.

The Risk Management analyst advised the dentist to assert the office policy regarding releasing restorations to patients. When a treating dentist preps a tooth and works with a lab for fabrication of a crown, another dentist who has not been involved in the treatment is unlikely to be comfortable taking over that case. The patient could end up in a provisional for an extended period and increase the likelihood of an adverse outcome, requiring additional treatment and cost.

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In another situation brought to Risk Management's attention, a patient called the dental office and requested to pick up her crown — for a tooth that had been prepped almost *nine months* earlier. The patient had been concerned that the tooth had remained symptomatic following root canal therapy. She lost trust in the treating dentist and put off returning for the crown delivery. The patient made the office aware she had already secured another dentist who would cement the crown. The office prudently warned her that the crown would be unlikely to fit correctly due to the amount of time that had passed.

The analyst advised the office not to release the crown to the patient. Oftentimes, patients feel that the crowns belong to them because they paid for them; however, it is in everyone's best interest that planned treatment be completed in a timely manner. So, what should a practice do when faced with these requests?

- *Establish an office policy outlining that incomplete restorations cannot be released to a patient.*

The bottom line is that no uncomfortable interaction is worth the risk of handing a restoration

to a patient. If the patient remains adamant, consider offering a refund instead of releasing the restoration.

- *Make the patient aware of the consequences of not completing treatment as recommended.*

Continuity of care by the treating dentist avoids complication, miscommunication and potential harm to the patient's oral health.

- *Document the patient's noncompliance in his or her chart.*

TDIC's online Risk Management resource library includes failed appointment and noncompliance forms that can be used with patients who don't follow the treating dentist's recommendations.

No matter how accommodating your practice would like to be, releasing any restoration directly to the patient creates risk. Instead, try to determine why the patient is leaving the practice and address the underlying issue. If the patient remains unwavering in his or her desire to complete treatment elsewhere, consider offering a full or partial refund but still refrain from releasing the restoration. Then, send a dismissal letter to the patient acknowledging his or her decision to terminate care midtreatment. Contact TDIC's Risk Management Advice Line at 800.733.0633 for guidance on refund and dismissal protocol unique to your practice's situation. ■

TDIC's Risk Management Advice Line at 800.733.0633 is staffed with trained analysts who can provide guidance on refunds and dismissal protocols and other questions related to a dental practice.

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4151 MARIN COUNTY GP

Well established and respected, quality general practice located in desirable Marin County location. Office has convenient ample parking, overlooking a beautiful park like setting adjacent to a peaceful creek. Office contains 5 ops in ~1,300 sq. ft. Gross receipts average \$1.2M annually with 3 doctor days/week.

4162 PETALUMA GP

Retiring Seller looking to transition a stable and loyal patient base. Averaging 10-15 new patients per month with 2 dedicated days of hygiene and approx. 3 doctor days per week. 2016 Gross Receipts \$304K+. Asking \$150K for practice. 7 ops (5 fully equipped) in 2,400 sq. ft. Single story, stand alone dental building available to purchase, or Seller will supply long-term lease with a Right of First Refusal to buy the building.

4145 ROSEVILLE GP

Well-established GP offering 27+ years of goodwill. Owner relocating out of the area. General & Cosmetic Practice with 6 fully equipped ops. Lots of upgraded/newer equipment. Opportunity to purchase single story 2,700 sq. ft. stand-alone professional bldg. Asking price for the Practice \$395K.

4129 PETALUMA GP

GP located in stunning 1,856 sq. ft. seller owned facility. State-of-the-art office includes 6 ops, staff lounge, reception area, private office, business office, lab area, sterilization area, consult room, separate storage area, bathroom plus private bathroom. Asking \$525K.

4191 SONOMA COUNTY ENDO

Seller retiring from 38 year endodontic practice located in attractive ground floor office (remodeled in 2011) with updated modern equipment and cabinetry. Close to several regular referral sources. Doctor sees an average of 7-8 patients per day. 5 year average Gross Receipts \$700K+. Asking \$447K.

4177 SAN JOSE PROSTHO

Implant, cosmetic and prosthodontic practice, established 25+ yrs in desirable West San Jose area close to several amenities and referral sources. Ideal for the restorative general dentist inspired by cosmetic and implant dentistry, or a prosthodontist. 3 fully equipped ops in 1,100 square ft. Bright and modern treatment rooms in well established professional medical building. Lots of on-site parking, EZ freeway access. 3 yr. average GR \$1.2M+ with adjusted average net of \$500K+ Asking \$813K.

4133 NAPA GP

Napa County GP in newly furnished, fully equipped 2 op facility with digital x-ray. 4 doctor day/week with 3 hygiene days. Average annual Gross Receipts \$420K+. Seller willing to help for a smooth transition. Asking \$331K.

4193 SAN BRUNO GP

Well established practice in prime, high-traffic location. 670 sq. ft. office with (3) fully-equipped operatories set up for rear delivery. Approx. 650-700 active patients with an average of 5 new patients per month. Approx. 3.5 doctor days per week. 2016 Gross receipts \$516K+. Average adjusted overhead 56%. Seller transitioning into retirement. Asking \$378K.

4190 SAN JOSE GP

Excellent location on west side of SJ in the Blossom Hill area. Easy access to Hwy 85 & 87 and light rail. Offering 17+ years of goodwill. Beautifully appointed 3 op office in 950 sq. ft. Plentiful on-site parking. 730 active patients with 1.5 days of hygiene. Average two years gross receipts \$389K with adjusted net of \$154K.

4178 SONOMA COUNTY PERIO

Seller retiring from 21 year practice with trained, seasoned staff. 2,122 sq. ft. ground floor office with 2 entrances. 6 fully equipped ops. Majority of equipment purchased in 2002. 4 doctor-days & 3 hygiene days per week. Average gross receipts \$1M+. Asking \$677K.

4123 CAMPBELL GP

Seller transitioning 32 year general practice with an emphasis on Restorative and Preventative care. Well-trained and loyal staff. Approximately 37% hygiene production. 3.5 doctor days per week & 3 hygiene days per week. Average gross receipts \$625K+ with average adjusted overhead of 62%. Asking \$464K.

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NORTHERN CALIFORNIA

CHICO: 7 Ops, Digital, Dextrix, Pano. Practice has been established 60+ years with 2 long-term owners. 6 days Hyg/wk. GR \$757K. #CA402

CLEARLAKE: 4 Ops in 1,600 sq. ft. with Dextrix, Dexis, Laser, Microscope, Pano, \$650K in GR. Est. in 2001, retiring. #CA457

CONTRA COSTA COUNTY: 4 Op Endo office w/Digital X-ray, Microscopes, and PBS Endo in approx. 1,200 sq. ft. 2014 GR \$672K. #CA284

EASTERN CONTRA COSTA: New Listing! 3 Ops, 1300 sq. ft., w/room to expand. Intraoral Camera, Laser, Dexis Digital X-ray, Softdent PMS. 2016 GR \$274K w/52% adj. net. #CA454

EL DORADO COUNTY: 1,200 sq. ft., 3 Ops, with Pano, EZ 2000 software. 2015 GR \$342K on 3 day week. #CA390

ELK GROVE -FACILITY ONLY: Fully furnished 5 ops total (4 furnished). Signage on Elk Grove Bl., fast growing area, ready to move in, separate pano #CA411

GREATER EL DORADO HILLS: 1,500 + sf office, 4 Ops, Dextrix software, 2 Schick digital x-ray sensors, new server & CPUs. Bldg avail. Seller Retiring. #CA407

GREATER SACRAMENTO: Oral Surgery office w 5 Ops, 2,282 sq. ft. suite. Digital X-rays and Pano. 2016 GR of \$798K. Doctor is retiring. #CA438

GREATER SACRAMENTO: New Listing! Approx. 2,000 sf, 6 ops, Intraoral Camera, Digital X-ray, Laser, CEREC, & EagleSoft. 2016 GR \$934,829. #CA455

GREATER SACRAMENTO: New Listing! 1,200 sf w/4 Ops, Intraoral Camera, Dexis Digital X-ray, Dextrix. 2016 GR \$435K, 3 day work week #CA456

GREATER SACRAMENTO: New Listing! Ortho. 2,140 sf, w/4 bays. Equip. w/ intra-oral camera, non-digital Pan/Ceph, Laser, and OrthoTrac software. 2016 GR \$640,000. #CA458

OAKLAND: 12 ops in 5000 sq. ft. modern office. GR of \$1,500,000 with PPO, HMO and FFS patients. #CA360

OAKLAND: 2015 GR \$355K on 4 day work/wk. Approx. 1000 sf, 3 Ops, Dexis Digital X-Ray, Carestream PMS. Owner retiring. #CA396

SACRAMENTO: 1,150 sf office w/4 Ops, Intra-Oral, Dexis digi x-ray, Carestream. Est. 30+ yrs, 2016 GR \$535K. #CA424

SACRAMENTO: 1,000 sq. ft. office w/2 Equip. Ops, 2 add'l Plumbed. DentalMate software. 2015 GR \$110,427 #CA332

SACRAMENTO: 1,200 sq. ft. w/ 3 Ops, Intra-Oral camera & Patient Base software. Practice established 40+ years, owner retiring. #CA408

SACRAMENTO: 1,567 sq. ft. w/4 equipped Ops, 1 add'l plumbed., 4 day week. Intra-Oral Camera, Digital X-Ray, Pano, Carestream software. 2016 GR \$680K #CA441

SAN FRANCISCO: Financial District office, 5 Ops, room for 6th, 1760 sq. ft. 2015 GR \$1.2 mil, Adj. Net. \$480,000. #CA357

SAN FRANCISCO: Periodontal Practice & Condo Unit. 1,160 sq. ft. w/4 Op, 2014 GR \$714K w/\$363K Adj. Net. #CA274

SAN RAMON-FACILITY: 4 Op facility w/high-end Pelton & Crane Equipment, Digital X-Ray, Digital Pan, I.O. Cameras, 1654 sq. ft. corner suite. #CA370

SAN RAMON: General Dentistry, emphasis on Children, 5 treatment chairs, 1700 sq. ft. 2016 GR \$440K, min work week due to illness. Dextrix PMS, Paperless Charts, Digital Sensor, Digital Pan. #CA439

SONOMA COUNTY: New Listing! 2016 GR \$680K, 3 days/week. 3 Ops, 960 sq. ft., Condo for sale or lease. Pano X-ray, Intra-Oral Camera, Soft Tissue Laser, Datacon PMS. Owner retiring. #CA463

WINE COUNTRY: Perio, 2016 GR \$1,997,000 w/\$978,000 adj. net in 3,000 sq. ft. office space. Building for sale. #CA418

STOCKTON: 7 Ops, 2,052 sq. ft., great lease and options to renew. GR \$750,000 with PPO, HMO and FFS patients. #CA361

VACAVILLE: 1,342 sq. ft., 4 Ops, intra-oral camera, Genex digital x-ray, Pano, Laser, Dextrix, etc. 2015 GR \$911,000, 4 day/week. #CA389

CENTRAL CALIFORNIA

FRESNO: GP. GR past 3 years averaging \$1.5M. 4 days of hygiene. Owner is retiring. Priced for an expedient sale. Delta PPO but no HMOs. #CA445

MODESTO: New Listing! 1,110 sq. ft., 3 Ops, Dextrix software, Dexis Digital X-Ray, Fiber Optics, Laser. 2016 GR of \$706K 4 day/week. #CA451

SANTA CRUZ: Approx. 1000 sq. ft. office w/4 Ops, established for over 55 years. 2016 GR of \$383K w/adj. net of \$186K on 3 day work week. #CA427

SOUTHERN CALIFORNIA

BAKERSFIELD: New Listing! 6 Ops, 5 Equipped, located in duplex building with signage. 2016 GR \$509K with room to grow. Most specialty work is referred out. PPO/ Denti-Cal. #CA459

BURBANK: New Listing! Beautiful practice for quick sale. Long-term staff, over 28 years of goodwill. 3 Ops with 3 days of hygiene, digital X-rays. Great Burbank building close to downtown. 2016 GR \$477K. #CA464

CENTRAL ORANGE COUNTY: 4 Ops, Intra-Oral Camera, Pano, and 3 days of Hygiene per week. 50+ years of goodwill with retiring seller plus previous owner. #CA442

COASTAL ORANGE COUNTY: Perio. 5 ops, 1 add'l plumbed. 30 yrs goodwill. Great loc. Digi software and Pano. 2016 GR of \$389K 3 day work wk. #CA417

FULLERTON: New Listing! 5 Ops, 3 Equipped in shopping center, PracticeWorks, CEREC, Digital, 4 days of Hyg/wk. GR \$663K with \$235K Adj. Net. #CA453

LOS ANGELES: Price Reduced! Perio Practice, 5 Ops, 34 Yrs. of Goodwill. Dextrix, Digital, Laser, great referral base, 2016 GR \$712K, Adj. Net \$304K. #CA173

LA QUINTA: 8 Ops in busy shopping center, 25 years of Goodwill. Last year's GR \$1.64M. State-of-the-art, Digital. Seller Retiring. #CA425

LAGUNA BEACH: New Listing! 4 Ops, 3 Equipped, beautiful location. Dextrix G4, Dexis Digital X-rays, paperless. 2016 GR of \$344K and 2017 on track to increase significantly. #CA443

LANCASTER: 9 Ops in free-standing bldg. EagleSoft, Digital, Microscope, CBCT machine, and Digital Pano. 2016 GR of \$593K and \$166K Adj. Net. #CA437

LOS ANGELES: 5 Ops, 4 Equipped. LA's West side. Main st loc great visibility. Open Dental, Digital X-rays. 2016 GR of \$461K w/ \$185K Adj. Net. #CA415

ORANGE COUNTY: 4 Ops, 40+ years goodwill, OpenDental, Digital X-rays. 2016 GR \$533K with \$179K Adj. Net. #CA440

PALM DESERT: 8 Ops, 3200 sq. ft., 2016 GR \$1.1M, Digital x-rays, nice location, bldg has signage. Owner + 3 Associates work in the practice. #CA426

PALM DESERT: 9 Ops, 8 Equipped. High-end build-out w/ Dextrix, Digital X-rays, Pano, and Lasers. Selling doctor works 4 days/wk. GR \$1.3MM and Adj. Net \$388K. #CA401

PALM SPRINGS FACILITY ONLY: 4 Ops, 3 Equipped. Seller is here only 12 hrs./wk. Some patients included in the asking price. PracticeWeb, digital x-rays. #CA429

PALM SPRINGS: 4 Ops, 30 years of goodwill. Good location, Doctor wants to remain and work part time if possible, 2015 GR \$549K. #CA351

RIALTO: 5 Ops in free-standing historic bldg. 50+ years of Goodwill. Building also for sale. Dextrix, 2016 GR \$253K. #CA421

SAN PEDRO: New Listing! 4 Ops, EagleSoft, Digital, 6 year old equipment. Bright and spacious build-out, modern design. 2016 GR \$519K. #CA449

SANTA ANA: New Listing! 4 Ops in a shopping center on a busy corner with signage. PPO/Denti-Cal practice. 2016 GR \$434K with \$199K Adj. Net. #CA460

SANTA BARBARA: Creekside location, 4 Ops in 1500 sq. ft., est. for 40+ years. 7 days Hygiene/week, long-term staff. FFS. GR of \$955K on 4 day week. #CA291

SANTA CLARITA VALLEY: New Listing! General/Multi-Specialty Practice. 8 Ops, 5 chair Ortho bay. Great visibility. 100 NP/mo. PPO/ HMO w large CAP check. #CA435

SOUTH BAY, LOS ANGELES AREA: New Listing! 4 Ops, 3 Equipped, Easy Dental, Digi X-rays, Pano, & CBCT. Est. 60+ yrs w/7 days Hyg/wk. GR \$1M+ & 270K Adj. Net. #CA461

SOUTH PASADENA AREA: 5 Ops, 4 equipped with 23 yrs Goodwill. Digital x-rays. Great location #CA436

TEMECULA: 5 Ops, 4 Equipped, PracticeWeb, Digital, Pano. 2016 GR \$548K w/\$241K Adj. Net on 3 day wk. #CA430

UPLAND: New Listing! 3 Ops (possible 4th Op used as an office) in a shopping center with 30 years in business. 2016 GR of \$324K. #CA450

UPLAND: New Listing! 4 Ops, Dextrix, Digital, Laser, Digital Pano in prof. bldg w/3 days hyg./week. 2016 GR \$863K w/\$501K Adj. Net. #CA446

UPLAND: Facility Only - 4 Ops, 2 Equipped, All Brand New Equipment, OpenDental w/4 workstations, hand instruments, equipment, some patients. #CA434

VAN NUYS: Multi-Specialty Practice with 6 Ops in retail center. Digital x-rays, paperless. PPO/HMO/Denti-Cal. 2016 GR of \$1.09M with \$384K Adj. Net. #CA431

WESTERN SAN FERNANDO VALLEY: Pedit Practice in upscale location, 4 Ops, EagleSoft, Intra-Oral Camera, Pano. 9 years Goodwill. #CA399

YUCCA VALLEY: 5 Ops, retiring seller works a 4 day week with 27 years of Goodwill. Office condo also for sale. 2016 GR of \$586K #CA423

SAN DIEGO

INLAND NORTH COUNTY, SAN DIEGO: 5 Op General/Prosth. Practice. EagleSoft, Digital, 2D Digital Pano, E4D. Great location, 26 years Goodwill. 2016 GR \$802K with \$316K Adj. Net. #CA432

NORTH COUNTY, SAN DIEGO: 5 Ops, Dextrix, Digital, Pano, PPO Practice, Excellent and Convenient Location. 2016 GR of \$635K, \$242K Adj. Net. #CA428

SAN DIEGO: 3 Ops, EagleSoft, Digital, Paperless, Laser. 6 day work week - room to grow! 2016 GR \$322K. #CA404

OUT OF CALIFORNIA

CENTRAL OAHU, HAWAII: New Listing! Family-oriented rural Practice with 3 Ops, Digitized X-Rays, Pano, and Innova. Retiring seller, PPO, Medicaid. 2016 GR of \$923K with \$322K Adj. Net. #HI109

CENTRAL OREGON COAST: New Listing! 1,080 sq. ft. office, 3 Ops, equipped, Digital x-ray and Daisy software. Building Available. Owner retiring. #OR106

HONOLULU, HAWAII: 5 Ops in the Pearl City/Waipahu area, Dextrix, Pano, Dexis, Laser, Excellent Location, Highly-profitable, Rare opportunity. #HI108

HONOLULU, HAWAII: 4 Ops plumbed, 2 equipped, Dextrix, Excellent location with ample parking, retiring dentist, priced for quick sale. #HI106

MAUI, HAWAII: 3 Ops, Innova, Planmeca Panoramic x-ray, excellent location and patient base, dentist retiring, seller is motivated. GR \$475K. #HI107

Vaccinations — What Are Employers' Obligations

CDA Practice Support Staff

Dentist employers are required by the Cal/OSHA Blood-Borne Pathogens regulation to make available the hepatitis B vaccination series and post-vaccination follow-up to any employee who is potentially exposed to blood or saliva in the workplace. An employer may not require a potential employee to have the vaccination series as a condition of employment because the law requires an employer to provide it. The vaccination must be made available within 10 working days of initial assignment to a task with potential exposure to blood or saliva.

A new employee may refuse the vaccination series and the refusal must be documented on a form using specific language. Document the reason for refusal if it is provided. Possible reasons can include: a) the employee has already had the series; b) antibody testing has revealed the employee is immune; or c) the vaccination is medically contraindicated for the employee.

If an employee changes his or her mind and wants the vaccination series, an employer is obliged to provide for the series at that time, as well as the required post-vaccination follow-up. Post-vaccination follow-up includes serologic testing (done one to two months after the last dose in the series), a second series of shots if test results are negative and another serologic test. If final test results are negative, a dentist employer should refer the employee to a health care provider for further testing and counseling. For more information refer to "Hepatitis B and Healthcare Personnel" issued by the Immunization Action Coalition at immunize.org/catg.d/p2109.pdf.

Local public health departments and Cal/OSHA can require employers to

An employer may not require a potential employee to have the vaccination series as a condition of employment because the law requires an employer to provide it.

offer certain vaccinations to employees. In recent years some health departments have included dental settings in mandatory orders for health care facilities to require staff who work in patient care areas to get flu shots or to wear masks while at work. A dental practice should check its local public health department at the start of flu season and periodically to learn of any such order. Without a public health order, it is optional for a dental practice to offer its staff annual flu shots.



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A dental practice should be aware of active communicable diseases in its community, especially aerosol transmissible diseases (ATD) such as whooping cough and measles. The state and local public health departments will have advisories for health care providers. Additionally, Cal/OSHA's ATD regulation requires certain employers offer the influenza, measles, mumps, rubella, Tdap and chickenpox vaccinations to occupationally exposed employees. Dental practices are exempt from this Cal/OSHA requirement if they meet the conditions for exemption established in the regulation.

To be exempt, dental practices must comply with all of the following conditions:

- The dental practice does not perform dental procedures on patients with aerosol ATDs or who are suspected ATD cases. (A common occurrence in a dental practice is the presentation of a patient with influenza. The patient should be rescheduled in this case and can be treated once the patient no longer presents a possible ATD exposure risk.)
- The dental practice's Injury and Illness Prevention Plan includes a written procedure for screening patients for ATDs that is consistent with current CDC guidelines for infection control in dental settings and this procedure is followed before performing any dental procedure on a patient to determine whether the patient may present an ATD exposure risk.
- Employees have been trained in the screening procedure. (This can be easily incorporated into existing infection control or Cal/OSHA training and does not require a separate class dedicated to ATDs.)

CONTINUES ON 634



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6131 SAN RAFAEL Part-time practice. 2016 collected \$243,000. Profits totaled \$146,000. 2017 trending \$265,000. No Delta Premier hit here! 3-Ops. Owner lives out of area.

6129 PROSTHODONTIC PRACTICE – SAN MATEO 2016 collected \$775,000 on 3.5 day week. Beautiful 5-Op office. Excellent candidate for acquisition by nearby practice. Seller shall work back to assist in orderly transition. Acquire here or move into nearby practice. Choice is yours.

6128 LOS GATOS AREA Capitation & PPO. 3-Adec equipped Ops, Pano, Digital charting. Collects \$420,000+ year. Available Profits of \$190,000 in 2016.

6127 SAN RAFAEL'S NORTHGATE Collected \$210,000 in 2016 on part-time schedule. Available Profits of \$106,000.

6125 OAKLAND'S LAKESHORE VILLAGE Collections average \$735,000/year. High end. Hip code. Vibrant shopping village. 10+ new patients per month. Digital and paperless.

6124 SAN RAMON 100% Out-of-Network. 5-Ops. 6-days of Hygiene. \$700,000 per year performer.

6122 SANTA CLARA - STARBUCKS "LIKE" LOCATION! Best exposure in beautiful strip center. Office just remodeled. 5-Ops. 2017 trending \$1+ Million in Collections on 4-days. Perfect platform to operate 6-days a week. Will do \$2 Million with right Business Plan.

6121 NAPA VALLEY FAMILY PRACTICE Highly respected community asset. Collections over 10 years have averaged \$1.28 Million per year. Beautiful facility. Condo optional purchase.

6120 OAKLAND'S PIEDMONT AREA Highly coveted area. Right off Highway 13. 3-days of Hygiene. 4-Ops with 5th available. 2016 collected \$650,000+.

6119 NORTH BAY ORTHO Desirable family community. Best technology, cone beam and paperless. Owner works part-time. Revenue streams averaged \$1,000,000/year in past. Strong profits. Does no marketing to local Dental Community.

6118 SAN FRANCISCO'S EAST BAY Forty percent partnership in well positioned and branded practice. 2016 collected \$2.53 Million. 2017 trending \$3.2+ Million in collections. Full complement of specialties. 6-month Trial Association wherein interested Candidate shall see ability to make \$400,000+ per year.

6117 NEWMAN 2016 collected \$650,000 with great Profits. PPO practice. Highly regarded with little competition.

6114 LINCOLN \$1.1+ Million per performer. Profits tracking \$425,000+. Beautiful and expensive facility leases for \$1.60 sq.ft. PPO Practice.

6107 EUREKA 100% Out-of-Network with insurance industry. 2016 collected \$930,000+ on Doctor's 20-hour week. Doctor's schedule booked 3-months out. 7+ days of Hygiene. Highly respected. Condo is optional purchase.

6089 MOUNT SHASTA Small town living renowned for outdoor lifestyle. 3-day week collected \$250,000. Very strong bottom line. Digital including Pano.

ENDODONTIC PRACTICE Central California Beach City. Established 20+ years. Grosses \$1,200,000 and Nets \$800,000. **ANAHEIM** Korean clientele. Part-time grossing \$200,000+. 3-Ops, some ortho. Rent \$2,300. Close to Harbor Freeway exit. Full Price \$110,000.

ANTELOPE VALLEY / SANTA CLARITA VALLEY Two separate Million Dollar Opportunities. Absentee Owners.

BELLFLOWER Female owned Hispanic practice. Part-time. Low overhead opportunity.

DIAMOND BAR Absentee Owned. Grosses \$500,000. Gorgeous high identity shopping center. State-of-art facility. Million Dollar potential. 5-Ops. Chinese / Korean / Hispanic.

EAST LOS ANGELES Part time senior female grossing \$20-to-\$35,000 per month. Established many years. Low overhead. Full time will do \$600,000.

INLAND EMPIRE Long time Union Patient Practice. Part-time Seller works 3 days. Grossing \$650,000. Patients are here to go to 6-days. Great union benefits.

INLAND EMPIRE Shopping center. Great Lease. 3-Ops in 1,650 sq.ft. Absentee Owner. Grosses \$30,000 per month. Working Seller used to do \$50,000 per month. 20-to-30 new patients per month. Full Price \$285,000.

INTERSTATE 405 & ARTESIA Established many years. 2-Ops. Full Price \$150,000.

IRVINE LOCATION 6-Ops, Beautiful state-of-the-art office. Full Price \$150,000.

IRVINE Professional Building. Chinese clientele. Grosses \$500,000-to-600,000. 6-Ops in 2,000 sq.ft. Rent \$5,000/month. Seller here 2 days per week.

IRVINE Lady DDS Grossing \$1.2 Million. Professional Building. 5-Ops. Only Dentist in building. Full Price \$885,000

LA PUENTE Established 20-years. Small shopping center. 3-Ops. Full Price \$150,000

LAKE ELSINORE Great second location for DDS working part-time. 6-Ops. Rent \$2,700. Grossing \$500,000-to-\$600,000. Some HMO.

NEVADA DENTURE PRACTICE Add Implants. Will do \$2 Million. 4,000 sq.ft. rents for \$4,000. Full Price \$850,000.

NEWPORT BEACH'S FASHION ISLAND Grossing \$400,000-to-\$500,000. Great platform to expand.

ORANGE COUNTY BEACH CITY Location, location, location! Previous Gross One Million. Facility only. 6-Ops with computerized monitors, TV's and Dentrux. Full Price \$150,000.

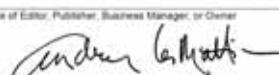
ORANGE COUNTY BEACH HMO Absentee owned. Grosses \$1.6 Million. High identity shopping center. 10-Ops. Full Price \$1.3 Million.

PEDO Chinese / Hispanic. Grosses \$450,000. 4-Ops, low rent. Digitized office. Lots of options to grow to Million Dollar practice.

REDLANDS Great Location. Rent \$1,100/month. 3-ops. Nice patient base. Full Price \$150,000.

WEST LOS ANGELES High Identity Location. 3-Ops. Room to grow. Free parking. Grossing \$450,000. Full Price \$500,000.

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CONTINUED FROM 632

- Aerosol-generating dental procedures are not performed on a patient identified through the screening procedure as presenting a possible ATD exposure risk unless a licensed physician determines that the patient does not currently have an ATD.

A dental practice that does not meet the conditions for exemption from the ATD regulation is required to comply with the regulatory requirements, including the requirement to offer and provide vaccinations to employees. Additional information on the ATD regulation can be found on the CDA Practice Support website.

The Immunization Action Coalition also has an informational sheet on recommended vaccinations for health care workers at immunize.org/catg.d/p2017.pdf. Recommended vaccinations include:

- MMR (measles, mumps, rubella) for workers born in 1957 or later without serologic evidence of immunity or prior vaccination.
- Varicella (chickenpox) for workers who have no serologic proof of immunity, prior vaccination or diagnosis or verification of a history of varicella or herpes zoster (shingles).
- Tdap (tetanus, diphtheria, pertussis) for workers who have not received Tdap previously. Schedule Tdap boosters every 10 years thereafter. ■

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

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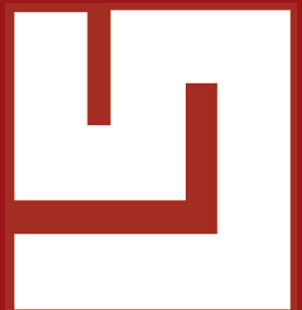
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BAY AREA

AC-566 SAN FRANCISCO: Spectacular views of Washington Square. 3 ops + 2 add'l, 1400sf \$170k

AC-624 SAN FRANCISCO: Wonderful patients, solid income in great stand-alone bldg \$475k

AC-640 SAN FRANCISCO: On 23rd Floor of prestigious bldg, 2 ops in 700sf. Seasoned Staff. Seller Retiring \$175k

AC-649 SAN FRANCISCO Facility: Richmond District, 3 ops+1 add'l, Equipment less than 5yrs old \$120k

AG-562 SAN FRANCISCO: Strategically located with huge growth potential. 2 ops + 1 add'l, 600sf \$175k

AG-645 SAN FRANCISCO: Low Overhead, compact practice ready for expansion or relocation. Retail/Commercial area. 2nd Floor \$99k

AG-669 SAN FRANCISCO: RARE opportunity in the heart of the city! 2 ops LOW OVERHEAD! \$88k

AN-513 REDWOOD CITY: Practice of your dreams! 900sf w/ 4 ops + 2 add'l \$350k

AN-686 SAN FRANCISCO: Office designed w/ patient flow & maximum office efficiency. 1000sf w/ 4 ops \$825k

AN-712 SAN FRANCISCO: Easy accessibility, exceptional visibility, free parking & **extremely low rent!** 1000sf w/ 2 ops + 2 add'l \$89.5k

AN-752 SAN FRANCISCO Facility: Opportunities like this one are few and far between! 1007sf w/ 4ops. \$125k

BC-681 WALNUT CREEK: Remodeled office located in semi-rural community, 1000sf w/ 4 ops \$432k

BC-682 CONCORD: Located in desirable, bustling community w/ seasoned, caring staff. 836sf w/ 3 ops \$224k

BC-710 WALNUT CREEK: Desirable location in stand-alone, single-story bldg. 1313sf w/ 3 ops \$150k / RE \$850k

BC-741 DANVILLE (FACILITY): Move in Ready facility to build the practice of your dreams! ~ 1600sf w/ 3 fully equipped ops \$195k

BAY AREA CONTINUED

BG-724 RICHMOND: Spacious office w/ enormous growth potential! 2000sf w/ 4 ops Practice \$138k / Real Estate \$700k

BG-731 LAFAYETTE: Well-educated, health conscious patient base. 1,000 sf w/ 3 ops 35+ years goodwill \$229k

BN-504 RICHMOND: Established Practice & Real Estate! 1450sf w/ 2 ops + 2 add'l \$100k / RE \$700k

BN-736 BERKELEY: Step into this quality practice and you'll know you belong here! 906sf w/3 ops. \$495k

BG-734 ANTIOCH: The perfect place to work, live and play! Located in desirable professional neighborhood. 1,323 sf w/ 4 ops. \$315k

CC-661 SAN RAFAEL: Starter practice in beautiful location w/ like-new equipment. 3 ops, 900sf \$190k

CC-719 SAN RAFAEL: Panoramic views of Mt. Tamalpais from each operatory window, 4 ops, 1,550sf \$260k

CC-720 SONOMA COUNTY: Well-established practice w/stable pts base. Excellent signage, 3 ops, 940sf w/ newer high-end Equip \$375k

CG-616 NAPA: State-of-the-Art practice. Seller moving out of state! \$425k

CG-735 ROHNERT PARK: Collections over \$600k, Net Profit over \$230k and expertly located near major anchor tenants! \$370k

DC-480 SILICON VALLEY: Multi-Specialty practice. 14+ ops in 7500sf. Owner financing available \$1.075M

DC-671 SAN JOSE: Starter practice. Desirable area. 6 npts/mo, 3 ops in 900sf \$150k

DC-692 DUBLIN Facility: Modern digital office. 5 ops 1800sf \$210k w/ Cone Beam Unit or \$165k without

DC-738 WATSONVILLE: 6ops in beautiful remodeled 2,600sf office, visibly located in attractive shopping complex \$480k

DG-635 CASTRO VALLEY: Excellent location & stellar reputation! Solo Group Practice \$650k

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BAY AREA CONTINUED

DG-726 SAN JOSE: Busy, Vibrant Practice. Collections over \$1.1M on a relaxed 4 day work week. ~2850sf w/7 ops **\$885k**

DN-665 SANTA CRUZ AREA: Loyal, stable, multi-generational patient base. FFS. 1460sf w/ 4 ops **\$540k**

DN-693 SAN JOSE Facility: Attractive & spacious! Faces one of the city's major thoroughfares. 1080sf w/4 ops **\$95k**

DN-713 CASTRO VALLEY Lease: Well maintained, attractive, "Move-In Ready" dental office. 1500sf w/ 5ops **Call for details!**

DG-723 SAN JOSE: The practice exceeds \$1.2mil in collections annually! 1,450 sf w/ 5ops. **\$850k**

NORTHERN CALIFORNIA

EC-729 GREATER SACRAMENTO AREA: Seller retiring! FFS Practice and Real Estate Available!

EG-716 ELK GROVE: Remarkable potential for growth w/ attention to marketing & increased office hours! 1200sf w/3 ops **\$270k**

EG-722 ROSEVILLE: On track to collect \$1.5M in 2017 with increased profit compared to last year! Price Reduced even though collections are increasing! 1919sf w/ 4 ops **\$1.05M**

EG-727 SACRAMENTO: Steady Income from HMO. Increase office hours & begin advertising to watch the collections skyrocket! 1100sf w/3 ops **\$220k**

EG-744 SACRAMENTO: Well established, highly esteemed Sacramento Practice 1320sf w/ 3 ops **\$250k**

EN-628 ORANGEVALE: Great place to work, play & live. HMO 1310sf w/ 4 ops + 1 add'l **\$375k**

EN-654 CITRUS HEIGHTS: Well established & loaded with 30+ years of goodwill! 1300sf, 3 ops + 2 add'l. **\$150k**

EN-660 ROSEVILLE: Highly-esteemed, well-respected, fee-for-service practice w/ loyal patient base. 2950sf w/ 5 ops **\$995k**

EN-664 SACRAMENTO Facility: Great corner location, excellent visibility & easy access! 2300sf w/ 4 ops **\$55k**

EN-702 SACRAMENTO: Long-established practice w/ emphasis on preventative dentistry! 1600sf w 4 ops + 1add'l. **\$450k**

EN-708 SACRAMENTO: Family-oriented practice with appreciative & loyal patient base. 1600sf w 4 ops + 1add'l. **\$150k**

EN-747 CITRUS HEIGHTS Facility: Be the only dental office in this attractive, popular Retail Shopping Center! 2200sf w/5 ops + 6 add'l. **\$150k**

EN-749 LINCOLN: Come sink your roots down and enjoy a fantastic lifestyle which can't be beat! 1877sf w/4 ops + 1 add'l. **\$320k**

FC-650 FORT BRAGG: Family-oriented practice. 5 ops in 2000sf, 6 npts/mo **\$350k for the Practice & \$400k for the Real Estate**

NORTHERN CALIFORNIA CONTINUED

FC-677 FORT BRAGG: Beautiful, FFS Practice, 4 ops +1 add'l, in 2375sf, Gross \$1M+/yr **\$500k**

GC-472 ORLAND: Live & practice in charming small town community. 1000sf w/ 2 ops. Seller Retiring **\$160k**

GG-454 PARADISE: 2550sf w/ 9 ops. 40 yrs goodwill! Amazing Opportunity! **\$525k**

GN-606 BUTTE COUNTY: Hesitate & you'll miss out on this *one-of-a-kind* opportunity! 1700sf w/ 4 ops **\$125k**

GN-656 NO. TEHAMA CO: Great Location! Ideal place to work, live & raise a family! 2468sf w/ 5 ops **\$275k**

GN-667 OROVILLE: Great place to work & play! Constant growth attracting an influx of residents! 1000sf w/ 3 ops **\$195k**

GN-668 BUTTE COUNTY: Remodeled in 2010! Well-maintained, long-established professional complex. 1200sf w/ 2 ops **\$95k**

GN-717 YUBA CITY: Seller Retiring. All reasonable offers considered. **Building available for purchase!** 2400sf w/ 5 ops **\$475k**

GN-746 YUBA CITY: State-of-the-Art Equipped! **Includes the latest technology in CBCT Imaging.** Real Estate also available! 1600sf w/ 3 ops +1 add'l. **Practice \$480k/ Real Estate TBD.**

HG-732 GRASS VALLEY: Seller retiring. Well established practice. 1250sf w/ 3 ops. Real Estate also available. **\$215k**

HN-280 NORTHEAST CA: Only Practice in Town! 900sf w/ 2 ops **\$60k**

HN-618 SIERRA FOOTHILLS: Seller Retiring! Huge opportunity for growth by increasing office hours! 750sf w/ 2 ops **\$95k**

HN-740 SHASTA CO: Warm, caring atmosphere that is magnified by the exceptional, long-term staff. 2400+sf w/ 5 ops + 1 add'l **\$475k**

CENTRAL VALLEY & SOUTHERN CALIFORNIA

IC-468 SAN JOAQUIN VALLEY: High-end restorative practice! 6 ops in 2500+sf office. Call for Details! **\$425k**

IG-687 TURLOCK: Established quality practice - remarkable opportunity! 2000sf w/ 5 ops **\$298k**

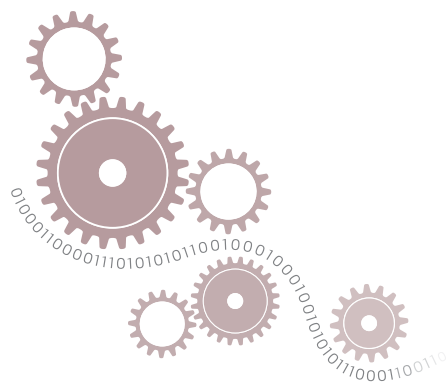
KC-678 LOMPOC & SANTA MARIA: Live & practice along the central coast. Plenty of room for growth, Call for Details! **\$240k**

SPECIALTY PRACTICES

AC-748 SAN FRANCISCO Perio: Practice in this prestigious building in desirable central location. 3 ops, 980sf **\$800k**

IC-543 CENTRAL VALLEY Ortho: 1650sf w/ 5 chairs in open bay & plumbed for 2 add'l. Strong referrals and PT base **\$125k**

"ASK THE BROKER" CAN NOW BE FOUND AT WWW.WESTERNPRACTICESALES.COM



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

Sonicare DiamondClean Smart Toothbrush (\$229–\$329, Philips)

Literature supports that most electric toothbrushes are more effective in reducing plaque and gingivitis than traditional manual toothbrushing alone. However, depending on the type of electric toothbrush used by the patient, its efficacy can vary because professional instruction and feedback for hygiene techniques are only available in the dental office. Incorporating the latest evolutions in mobile and electric toothbrush technology, Philips developed the Sonicare DiamondClean Smart series, an entirely new class of smart toothbrushes that provides patients with the guidance needed to maintain optimal oral health at home.

This toothbrush is packed with technology and features an accompanying mobile app available on iOS and Android. It automatically connects with the app on mobile devices via Bluetooth; no pairing is required, but users must sign up for a Philips account. Once connected, patients can select various goals to accomplish such as plaque removal, fresh breath, gum health, whitening or their own custom goal. Notifications are sent as reminders for users to meet their goals. For example, brushing twice a day for optimal plaque removal. Oral health providers normally recommend that patients brush for two minutes twice a day, but how well patients brush during those two minutes is difficult to track. This toothbrush helps patients improve the quality of their brushing with sensors that track pressure, location and scrubbing. When patients activate the brush at the touch of the power button, the app instantly displays a set of teeth and provides real-time feedback and coaching on where they are brushing, spots missed and whether correct brushing motion and pressure are applied. The app also keeps track of tongue scrubbing, flossing and oral rinse habits. Progress reports of this data can be sent directly to a dental professional so that providers can know the quality of the home oral care of their patients. Badges are awarded to patients for meeting various goals to motivate patients toward better oral health.

The toothbrush is also equipped with features that patients can use with or without the app. Various brush heads (sold separately) optimized for different oral health care goals are equipped with specific radio-frequency identification tags that the toothbrush

automatically identifies and subsequently adjusts for the proper mode and intensity. Users can opt for the default settings for their specific brush head or select their settings with the mode/intensity button. The toothbrush also tracks the number of times a brush head has been used and will remind patients with an indicator light or notification to replace it at the appropriate interval. The pressure sensor also has an indicator light at the base of the toothbrush so that patients can get feedback while looking at their mirror when brushing. The toothbrush charges inductively with a glass base plugged into a wall socket or through a convenient travel case (specific models) plugged into a powered USB port.

Oral health care providers have been advocating the use of electric toothbrushes for many years. With the latest toothbrush and mobile technology advancements featured in the Philips DiamondClean Smart series toothbrushes, patients receive professional oral hygiene instructions at home every time they brush their teeth and providers can track their progress toward optimal oral health.

— Hubert Chan, DDS

Smartphone Apps May Help Reduce Depression

Those suffering from depression may get legitimate help from smartphone apps, according to new research led by researchers in Australia. The Australia National Institute of Complementary Medicine, along with Harvard Medical School, The University of Manchester and the Black Dog Institute in Australia, found that smartphone apps lower depressive symptoms significantly. For the study, 22 different “smartphone-delivered mental health interventions” were examined in 18 controlled trials. The study included more than 3,400 people between 18 and 59 years old suffering from mild to moderate depression and other mental health conditions. The researchers suggested that app methods may work best for those with mild to moderate depression. And although this shows promise, researchers also suggested that utilizing apps by themselves shows no better treatment than actual therapy nor does it decrease the need for antidepressant medications. For more information, visit onlinelibrary.wiley.com.

— Blake Ellington, Tech Trends editor

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