A History of Water Fluoridation in California: Lessons Learned
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A History of Water Fluoridation in California: Lessons Learned
This article examines the history, and lessons learned, of water fluoridation in California tracing referenda and decisions by administrative bodies.
Ernest Newbrun, DMD, PhD

Review of Safety, Frequency and Intervals of Preventive Fluoride Varnish Application for Children
This paper’s objective is to provide the rationale and guidance around the safety of frequent applications of fluoride varnish when provided in multiple (dental, medical and community) settings.
Lisa H. Berens, DDS, MPH; Mimansa Cholera, BDS, MPH; Deborah Elam, MS, CAE; Susan A. Fisher-Owens, MD, MPH; Margaret Fisher, RDAHP; Stuart A. Gansky, DrPH, MS; Irene V. Hilton, DDS, MPH; Kara Lugtu, MPH; Robert Isman, DDS, MPH; Elaine Musselman, PhD, RN; Howard Pollick, BDS, MPH; and Ling Zhan, DDS, PhD

The Pain Assessment Practices of Pediatric Dentists
This survey of active members of the American Academy of Pediatric Dentistry investigates the pain assessment beliefs of pediatric dentists in order to understand if those beliefs allow the dentist to decide how much pain a child is experiencing during procedures involving tissue trauma.
Dennis Paul Nutter, DDS; Shahin Goddousi, MS; Sahand Soltani, DDS; and Colleen Gillen Azen, MS

Comparative Evaluation of Fracture Strength of Maxillary Denture Base in Different Arch Shape and Palatal Vault Configuration by Three Different Processing Techniques
This manuscript investigates and compares the fracture strength of complete maxillary denture base in different arch shape and palatal vault configuration by three different processing techniques.
Sushil Kar, MDS; Arvind Tripathi, MDS; and Sayida Khan, BDS

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Toothbrushes and Concentration Camps

Brian K. Shue, DDS, CDE

The recent surge of adult and child migrants seeking asylum at our U.S. southern border overwhelmed U.S. Customs and Border Protection (CBP) and resulted in overcrowded detention facilities. Much debate ensued over the separation of families, the lengths of stays, facility conditions and the root cause of this surge.

Politicians were not the only ones who raised concern. The Office of Inspector General, Department of Homeland Security reported CBP did not follow its own detention standards. CBP held migrant children (called “unaccompanied alien children” (UAC)) longer than permitted and did not provide clean clothes, hot meals, showers and other basic necessities. This is despite a 1997 federal court ruling that ordered that “safe and sanitary” conditions are required for children in detention.

To complicate matters, the Ninth Circuit Court of Appeals asked an attorney from the U.S. Justice Department if it was required to provide items to UAC like toothbrushes, toothpaste, soap and blankets. In an effort to avoid adding specifics to the 1997 ruling, the attorney answered: “Those things may be …” Providing basic hygiene for children “should be,” not “may be,” important in any situation. So the court rightfully and soundly corrected the attorney. And later, the Ninth Circuit Court of Appeals returned with a ruling that stated that basic hygienic necessities required for care of these unaccompanied migrant children “are without doubt essential to the children’s safety” and include items such as soap and toothpaste.

It just makes sense. There should be no argument against this, regardless of any previous or current ruling, in a great country like ours.

Through this chain of events, politicians and the press escalated their rhetoric. For example, U.S Rep. Alexandria Ocasio-Cortez (D-New York) offered her opinion on the border patrol’s migrant detention centers: “The U.S. is running concentration camps on our southern border, and that is exactly what they are.”

Concentration camps? Let that comment sink in.

It is one thing to point out how these children in migrant detention centers did not receive the required proper care and sanitary conditions while under temporary custody. But to call them concentration camps? In general, she and others may not fully understand the conditions that existed behind the use of that term. To see my point, take a look at the lives of two dentists: Frank Taniguchi and Benjamin Jacobs.

Frank Kazuichi Taniguchi, DDS, belonged to the San Diego County Dental Society and practiced in El Centro, Calif. — my hometown — just miles from the U.S. southern border. His life changed when 2,400 Americans were killed in Japan’s surprise attack on Pearl Harbor and the U.S. Pacific Naval Fleet, which jolted our devastated country right into World War II. President Franklin Delano Roosevelt enacted Executive Order 9066, which led to the forced incarceration of more than 110,000 Americans of Japanese descent on the West Coast without due process, even though almost two-thirds were U.S. citizens.

Because of this mass incarceration, an estimated 80 Japanese-American dentists in California lost their practices, including Dr. Taniguchi, as well as about 20 dentists from Washington and Oregon. Dental students were imprisoned too.

Dr. Taniguchi and his wife, both U.S. citizens, arrived at the Poston Relocation Center in the remote Arizona desert with only the permitted two luggage items per person. They were prisoner numbers 21271A and 21271B, respectively. They lived in a sparse 20 feet by 20 feet section of a barrack unprotected from the harsh desert elements, with only paper dividing their living space from others. They ate at a central mess hall. Restrooms were in a separate barrack down the block with rows of toilets with no stalls, near the communal showers. Privacy did not exist. Even though Poston did not have much barbed wire fencing because of its remote location, other camps did, along with sentry posts and machine guns to reinforce the fact that no one could leave.

Dr. Taniguchi was appointed chairman of the three Poston dental clinics from the start, which by 1943 had 15 Japanese-American dentists who served the dental needs of their 15,000 fellow prisoners. The dentists were only able to extract teeth and provide pain relief in the beginning because of a lack of instruments, supplies and even local anesthetic.

That was a concentration camp.

The U.S. government called them “relocation centers.” But President Roosevelt didn’t use euphemisms and called them concentration camps. So did President Harry S. Truman.
Roosevelt didn’t use euphemisms and called them concentration camps. So did President Harry S. Truman.¹

Why is it important to discuss this? “I think that many people … do not know that the U.S. once had concentration camps,” said 2003–2004 ADA President Gene Sekiguchi, DDS, who also served as CDA’s president in 1996–1997 and the San Gabriel Valley Dental Society president in 1987. During World War II when Dr. Sekiguchi was a toddler, he was incarcerated with his mom and baby sister (all U.S. citizens) in the Heart Mountain, Wyoming, concentration camp. Dr. Sekiguchi said: “There is barely any mention of these camps in our history books. For example, when I talked to a young group from Arkansas, only one person knew about the camps. The others were not aware and somewhat ignorant of the (existence of the) camps.”²

Let’s look at another example. In World War II, Nazi Germany occupied Poland and forced first-year dental student Benjamin Jacobs (Bronk Jakubowicz) and other Jewish men into labor camps in 1941. He was allowed to pack two bundles and took his set of dental instruments at his mom’s insistence. It would save his life, as he wrote in his memoir.³

Even with his minimal dental experience, the Nazis chose Jacobs to provide dental care in the camps to his fellow prisoners. “The inmates’ main problem was bleeding gums, a result of vitamin deficiency and the complete absence of toothbrushes and dentifrice,” Jacobs said. He provided extractions and pain relief, which was of little consolation in the camp’s hellish environment of pain and suffering.

Then he and thousands of other prisoners were packed in locked cattle cars and transported by train for three days. They arrived exhausted and half dead. An unnatural stench and a smoke-filled air greeted them as they arrived at their destination: Auschwitz. An SS guard flung Jacobs’ dental instruments to the ground, to be lost forever. The prisoners were lined up in front of Auschwitz where Dr. Josef Mengele judged their health and either passed a sentence of hard labor or immediate death. It was the Holocaust. Jacobs was given life.

Jacobs was prisoner 141129, which was tattooed deeply into his bleeding arm. Jacobs struggled to survive, while torture and murder occurred around him. “My strength was slipping. There was not much flesh or muscle left on my body. Each day I feared the next,” he said. The Nazis transferred him to Fürstengrube, one of many branches of Auschwitz, which held 1,500 prisoners. A guard recognized him as “the dentist” from a former location, and he was sent to work on prisoners in the camp’s dental clinic. But he noticed there was no equipment or supplies. The next day it was completely stocked; the Nazis simply raided an unlucky dental office nearby. Life was still a nightmare for him; his office manager physically tortured him every single morning for months.

Jacobs also became the dentist for the Nazi guards. A Nazi dentist later joined him. But when this dentist found there was no gold to provide crown and bridgework for the Nazi guards, he commanded Jacobs to do the unimaginable. Jacob painfully described the horror as he opened the door of the morgue and saw the fresh and decayed bodies piled on the floor. In order to survive, but with a heavy sadness, he pulled all the gold work from their mouths. There would be a never-ending supply of gold. Another Nazi dentist told Jacobs matter-of-factly that there were 10 dentists in the main Auschwitz camp doing this same thing.

That was a concentration camp. Politicians and others will continue to decry that the CBP operates concentration camps. That is incorrect. Look at the lives of Dr. Taniguchi and Jacobs. There is no comparison.

Postscript: Dr. Frank Taniguchi would become a captain in the U.S. Army with the most-decorated all-Japanese-American 442nd Regimental Combat Team and was the only Japanese-American dentist to serve in Europe during World War II. He returned to California and practiced in Orange County. He died in 1990. Dr. Benjamin Jacobs survived the Holocaust and continued to work as a dentist in Poland. He later moved to the U.S. and practiced in Boston. He died in 2004.

REFERENCES

Brian K. Shue, DDS, CDE, is the dental director of a federally qualified health center. He is a certified dental editor, president-elect of the American Association of Dental Editors and Journalists and editor of the San Diego County Dental Society.

ERRATA
Errors were made in name spelling and academic degrees in the Community/Education Dental Student section on page 560 in the September 2019 issue. The winners were Alexandra Barsotti, MS, BS, and Reisa Rara, BS. The Journal of the California Dental Association apologizes for the errors.
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Daily Soft Drinks Linked to Early Death Risk

A global study by scientists from the World Health Organization of more than 450,000 adults in 10 countries found that daily consumption of all types of soft drinks was linked with a higher chance of dying young.

The research, published in JAMA Internal Medicine, is the largest study to examine links between soft drink consumption and mortality. Previous smaller studies have suggested a link but have not found such dramatic differences.

Researchers found that those who consumed two or more 250 ml glasses of diet drink a day had a 26% increased risk of dying within the next 16 years. And deaths from cardiovascular disease went up 52%.

“The striking observation in our study was that we found positive associations for both sugar-sweetened and artificially sweetened soft drinks with risk of all-cause deaths,” said study leader Neil Murphy, PhD.

He said it is unclear exactly why this is but pointed to previous studies that suggest the artificial sweeteners in diet drinks may induce glucose intolerance and trigger high blood insulin levels.

Similar studies in the past have been criticized because some experts said people who drink diet products are more likely to be unhealthy to start with. But the new study found the link between diet drinks and death rates persisted among those of a healthy weight.

The study also raised concerns about policies that drive people from sugary drinks to diet drinks. Reformulation of sugar-sweetened soft drinks, in which sugar is replaced with low- or no-calorie sweeteners, is being driven by consumer awareness and fiscal instruments, such as taxes, according to the study. But while artificially sweetened soft drinks have few or no calories, their long-term physiological and health implications have been largely unknown.

“Additional studies are now needed to examine the long-term health consequences of specific artificial sweeteners that are commonly used in soft drinks, such as aspartame and acesulfame potassium,” Dr. Murphy said.

Experts such as Jeremy Pearson, PhD, associate medical director at the British Heart Foundation, said it would be “prudent” to cut out all soft drinks and to drink water instead.

“We’re all too familiar with the fact that sugary drinks are not only bad for our teeth, but the excess calories can also make us put on weight, increasing our risk of a heart attack or stroke,” he said. “Where you can, stick with water and unsweetened tea or coffee and keep soft drinks as a treat.”

Learn more about this study in JAMA Internal Medicine (2019); doi:10.1001/jamainternmed.2019.2478.
U.K. Study Says Snack Tax May Fight Obesity Better Than Soda Tax

Taxing high sugar snacks may be more effective at reducing obesity than taxing sugary drinks, according to a new study published in the BMJ. The modeling study demonstrated that a snack tax on food—which would increase prices by 20%—would be twice as effective as the same price rise on sugary drinks.

While sugar-sweetened beverages often make up a substantial part of sugar intake and as such have been a major focus of policy to date worldwide, in the U.K. high-sugar snacks make a greater contribution to intakes of free sugars than sugar-sweetened beverages. The U.K. introduced its Soft Drinks Industry Levy in April 2018, and since then, calls have been made to extend the tax to sugary foods.

The study conducted by researchers from the London School of Hygiene and Tropical Medicine and the universities of Oxford, Cambridge and Exeter examined food purchases made by 36,324 U.K. households and National Diet and Nutrition Survey data for 2,544 adults. The results estimated the change in weight and prevalence of obesity over one year, with data grouped by household income and body mass index (BMI).

Researchers say the results suggest that for all income groups combined increasing the price of cookies, cakes, chocolates and sweets by 20% would reduce annual average energy intake by around 8,900 calories, leading to an average weight loss of about 2 pounds over one year. In contrast, a similar price increase on sugary drinks would result in an average weight loss of just one-half pound over one year. The model also suggests the impact would be highest in low-income households with higher rates of obesity.

Read more of this study in the BMJ (2019); doi.org/10.1136/bmj.l4786.

Poor Oral Health in Older Chinese Americans Linked to Cognitive Decline

Two recent studies took a closer look at the relationship between poor oral health and the psychological well-being of older adults. The studies, published in the Journal of the American Geriatrics Society, reviewed the links between poor oral health and cognitive decline and the effects of perceived stress and social support on dry mouth among older Chinese Americans.

More than 2,700 Chinese Americans, aged 60 and older, were part of the studies. In the first study, nearly 50% of participants self-reported experiencing tooth symptoms. Researchers found that those who reported tooth symptoms experienced declines in cognition and episodic memory, which are often precursors to dementia. In the second study, 25.5% reported dry mouth, which is reportedly triggered by stress and leads to poorer overall oral health. The relationship between dry mouth and medications was not taken into account in this study.

“Minorities have less access to preventive dental care that is further exacerbated by language barriers and low socioeconomic status,” said XinQi Dong, MD, director of Rutgers University’s Institute for Health, Health Care Policy and Aging Research. “Older Chinese Americans are at particular risk for experiencing oral health symptoms due to lack of dental insurance or not visiting a dental clinic regularly.”

To help preserve the health and well-being of older adults, efforts must be made to increase social support to alleviate stress and the resulting dry mouth issues reported by participants, Dr. Dong said.

“Examining current oral health practices among older Chinese Americans is crucial for developing culturally tailored interventions to promote oral health and ultimately mitigate cognitive decline,” said Darina Petrovsky, PhD, RN, co-author of the study and a postdoctoral research fellow at the University of Pennsylvania School of Nursing.

Researchers emphasize the importance of examining immigrant oral health outcomes later in life to understand the specific type of outcomes of different cultural groups.

“The studies further serve as a call to action for policymakers to develop programs aimed at improving oral health preventative and dental care services in this high-risk population,” said Dr. Dong.

Read more of this study in the Journal of the American Geriatrics Society (2019); doi.org/10.1111/jgs.15748.
Periodontal Disease Bacteria Love Colon and Dirt Microbes

Research led by the Georgia Institute of Technology found that common mouth bacteria responsible for acute periodontitis fared better overall when paired with bacteria and other microbes that live anywhere but the mouth, including some commonly found in the colon or in dirt. Bacteria from the oral microbiome, by contrast, generally shared food and assistance more stingily with gum infector Aggregatibacter actinomycetemcomitans (Aa).

The study was conducted by Georgia Tech’s School of Biological Sciences and published in the Proceedings of the National Academy of Sciences.

Like many bacteria known for infections they can cause, Aa often live peacefully in the mouth and certain circumstances turn them into infectors. The researchers and their sponsors at the National Institutes of Health wanted to know more about how Aa interacts with other microbes to gain insights that may eventually help fight acute periodontitis and other ailments.

Researchers manipulated and tracked nearly all of Aa’s roughly 2,100 genes using an emergent gene tagging technology while pairing Aa with 25 other microbes — about half from the mouth and half from other body areas or the environment.

The findings are surprising because bacteria in a microbiome have evolved intricate interactions making it seem logical that those interactions would stand out as uniquely generous, according to the study. Some mouth microbes even have special docking sites to bind to their partners, and much previous research has tightly focused on their cooperations. But this new study went much further.

“We asked a bigger question: How do microbes interact with bugs they co-evolved with as opposed to how they would interact with microbes they had hardly ever seen. We thought they would not interact well with the other bugs, but it was the opposite,” said Marvin Whiteley, PhD, a professor in Georgia Tech’s School of Biological Sciences and the study’s principal investigator.

Athletes Have High Rate of Oral Disease

Top athletes are more likely to have poor oral health despite brushing their teeth twice a day, according to a recent study. The findings, published in the British Dental Journal, surveyed the dental check-ups of 352 Olympic and professional athletes across 11 sports, including cycling, swimming, rugby, football and hockey.

Along with measuring their tooth decay, gum health and acid erosion, researchers asked the athletes what they did to keep their mouth, teeth and gums healthy. Ninety-four percent of participants reported brushing their teeth at least twice a day and 44% reported regularly flossing — more frequently than the general population where 75% reported brushing twice daily and 21% for flossing.

The dental check-ups revealed that nearly half of participants had untreated tooth decay, the large majority showed early sings of gum inflammation and almost a third reported that their oral health had a negative impact on their training and performance.

“We found that a majority of the athletes in our survey already have good oral health-related habits in as much as they brush their teeth twice a day, visit the dentist regularly, don’t smoke and have a healthy general diet,” said researcher Julie Gallagher, a PhD student at the University College London Eastman Dental Institute Centre for Oral Health and Performance. “However, they use sports drinks, energy gels and bars frequently during training and competition.”

Researchers contribute the high levels of tooth decay and acid erosion found during the check-ups to the sugar found in these products.

This study builds on previous findings that suggest elite athletes may also face an elevated risk of oral disease from a dry mouth during intensive training. Read more in the British Dental Journal (2019); dx.doi.org/10.1038/s41415-019-0617-8.
A History of Water Fluoridation in California: Lessons Learned

Ernest Newbrun, DMD, PhD

Abstract

Water fluoridation is the most effective measure in preventing caries. This article examines the history, and lessons learned, of water fluoridation in California tracing referenda and decisions by administrative bodies. Progress was slow until a breakthrough when Assembly Bill 733, the fluoridated drinking water act, became law in 1995, thanks to the courage and persistence of then Assemblymember Jackie Speier (D-Burlingame). More recently, administrative bodies have exerted their authority to direct water agencies to fluoridate, thereby avoiding expensive and divisive referenda.

When Americans think of California, they conjure up images of Hollywood, the Golden Gate Bridge or even Silicon Valley. The most populous state in the U.S., California has an economy ranking fifth in the world, raised automobile emission standards earlier than other states and on health issues was one of the leaders in banning smoking in work areas and public places. Yet when it came to community water fluoridation, one of the 10 great public health measures of the 20th century, California sadly lagged behind most other states until quite recently. This is the story of the fight for fluoridation in California.

Early History of Water Fluoridation in California

From 1945 to 1947, four independent clinical trials were undertaken in North America to determine if adding fluoride to public water supplies to an optimum level (then 1.00 ppm) would reduce the prevalence and severity of dental caries similarly to naturally occurring fluoride (Table 1). These trials were planned to run for 15 years, but after 6.5 years, the caries prevalence in 4- to 6-year-olds residing in test cities was already about half of that in the control nonfluoridated cities. Accordingly, two of the control cities, Muskegon, Mich., and Oak Park, Ill., did not wait for these trials to finish and started fluoridating. California was in the vanguard; in the spring of 1951, the San Francisco Board of Supervisors unanimously...
requested that the water department take steps to fluoridate San Francisco water. The supervisors approved an enabling ordinance and an appropriation of $40,000 of water department funds. In the fall of 1951, a declaration of policy regarding communal water fluoridation (CWF) was put before the voters, who voted to fluoridate the water (56% in favor and 44% opposed). The San Francisco Water District and Antioch in Contra Costa County were the first in California to do so, starting in August 1952. Zachary Stadt, DMD, MPH, the dental health director of Contra Costa County, compared the caries prevalence in Antioch school children before fluoridation in 1952 to 10 years later in 1962 (TABLE 2). The dental findings showed greatly reduced tooth decay — a 55% reduction in the mean number of decayed, extracted and filled deciduous teeth (deft) in 5-year-olds and 84% reduction in the mean number of decayed, missing and filled permanent teeth (DMFT) due to caries in 6-year-olds and 60% to 64% in 8- and 10-year-olds.4

TABLE 1
North American Clinical Trials To Test Efficacy of Controlled Water Fluoridation in Children Aged 12–14

<table>
<thead>
<tr>
<th>City/state</th>
<th>Fluoride status</th>
<th>Year</th>
<th>DMFT/child</th>
<th>Percentage difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grand Rapids, Michigan</td>
<td>No F</td>
<td>1945</td>
<td>9.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>1959</td>
<td>4.26</td>
<td>55.5</td>
</tr>
<tr>
<td>Evanston, Illinois</td>
<td>No F</td>
<td>1946</td>
<td>9.03</td>
<td></td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>1959</td>
<td>4.66</td>
<td>48.8</td>
</tr>
<tr>
<td>Sarnia, Ontario</td>
<td>No F</td>
<td>1959</td>
<td>7.46</td>
<td></td>
</tr>
<tr>
<td>Branford, Ontario</td>
<td>F</td>
<td>1959</td>
<td>3.23</td>
<td>56.7</td>
</tr>
<tr>
<td>Kingston, New York</td>
<td>No F</td>
<td>1959</td>
<td>12.46</td>
<td></td>
</tr>
<tr>
<td>Newburgh, New York</td>
<td>F</td>
<td>1959</td>
<td>3.73</td>
<td>70.1</td>
</tr>
</tbody>
</table>


TABLE 2
10 Years’ Dental Caries Experience of Children in Antioch, Calif., 1952–1962

<table>
<thead>
<tr>
<th>Age</th>
<th>Year</th>
<th>Deft or DMFT</th>
<th>Percentage reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>1952</td>
<td>4.13</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>1952</td>
<td>1.04</td>
<td>84%</td>
</tr>
<tr>
<td>8</td>
<td>1952</td>
<td>0.17</td>
<td>64%</td>
</tr>
<tr>
<td>10</td>
<td>1952</td>
<td>1.13</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>1952</td>
<td>6.79</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>1952</td>
<td>3.60</td>
<td>47%</td>
</tr>
</tbody>
</table>

TABLE 3
California Water Systems Fluoridating in the 1950s*

<table>
<thead>
<tr>
<th>Water system</th>
<th>County</th>
<th>Starting date</th>
<th>Population served</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antioch</td>
<td>Contra Costa</td>
<td>August 1952</td>
<td>64,442</td>
</tr>
<tr>
<td>California Water Service</td>
<td>Butte</td>
<td>April 1958</td>
<td>1,130</td>
</tr>
<tr>
<td>Citizens Utility Co.</td>
<td>Sacramento</td>
<td>December 1956</td>
<td>18,232</td>
</tr>
<tr>
<td>Fresno Co. Waterworks 19</td>
<td>Fresno</td>
<td>September 1954</td>
<td>2,006</td>
</tr>
<tr>
<td>Gridley</td>
<td>Butte</td>
<td>May 1954</td>
<td>4,631</td>
</tr>
<tr>
<td>Hayward WS</td>
<td>Alameda</td>
<td>March 1958</td>
<td>115,203</td>
</tr>
<tr>
<td>Healdsburg</td>
<td>Sonoma</td>
<td>November 1953</td>
<td>9,454</td>
</tr>
<tr>
<td>Morgan Hill</td>
<td>Santa Clara</td>
<td>November 1956</td>
<td>25,180</td>
</tr>
<tr>
<td>Palo Alto</td>
<td>Santa Clara</td>
<td>May 1956</td>
<td>56,000</td>
</tr>
<tr>
<td>Placerville</td>
<td>El Dorado</td>
<td>October 1956</td>
<td>7,500</td>
</tr>
<tr>
<td>Pleasanton</td>
<td>Alameda</td>
<td>March 1954</td>
<td>51,900</td>
</tr>
<tr>
<td>San Francisco WD</td>
<td>San Francisco and San Mateo</td>
<td>August 1952</td>
<td>871,844</td>
</tr>
<tr>
<td>San Luis Obispo</td>
<td>San Luis Obispo</td>
<td>August 1954</td>
<td>42,136</td>
</tr>
<tr>
<td>Vallejo</td>
<td>Solano</td>
<td>November 1954</td>
<td>121,600</td>
</tr>
</tbody>
</table>


Among the other communities in California that fluoridated in the 1950s were Hayward, Healdsburg, Morgan Hill, Palo Alto, Pleasanton and Vallejo — all in Northern California (TABLE 3). In the 1950s and early 1960s, there were 36 referenda in California on CWF, in which 11 communities voted favorably while 25 others rejected fluoridation.6 The reason opponents were more successful in these referenda might have been in part because the health benefits, documented by statistics, were not as emotionally compelling as the opponents’ inaccurate portrayal of fluoride as poison at only 1.0 ppm. Furthermore, the children who would gain the most from this public health measure were not entitled to vote. Another reason was that the main proponents of water fluoridation were health professionals (dentists, physicians and public health workers) who were inexperienced in politics. The general public was mostly indifferent on the issue and politicians preferred not to get involved.

In April 1952, the Sonoma County cities of Cloverdale, Santa Rosa and Healdsburg held referenda on CWF. Cloverdale and Santa Rosa rejected...
fluoridation (TABLE 4). In Santa Rosa, 57% of the voters opposed it and only 43% voted in favor. It was defeated by only 421 votes; the reason, according to one reporter, was “sheer apathy” as less than 3,000 of the city’s 9,658 registered voters cast ballots. The public utilities board dodged responsibility by merely recommending that it be placed on the ballot, but there were no open hearings. The city council was completely passive on the matter. In nearby Healdsburg, voters approved (63% for, 37% against) and the city commenced fluoridation in November 1953.

During the 1960s, 12 water systems serving 516,779 persons were added to the population served by fluoridated water in California (TABLE 5). The largest water system by far was the Contra Costa Water District with a population at that time of 225,000. In the 1960s, California ranked near the bottom (~ 46th) of all states in the percentage (~ 12%) of the population benefiting from community water fluoridation, with only Utah, Hawaii, New Hampshire, New Jersey and Oregon ranked lower. How could this be remedied? One way was to educate the public by starting with future dentists and dental hygienists who would then be able to inform their patients. The public perceives the advice of their dentist or physician as the most trustworthy source of information about fluoridation. At the University of California, San Francisco, School of Dentistry, students were taught the physiology, pharmacology and toxicology of fluorides as well as clinical epidemiological evidence of the benefits in terms of caries reduction using a small group seminar format (~ 12–15 students) including a final fluoridation debate that proved very popular. In the process, the students learned about safety issues and the benefits, costs, risks and environmental impact of communal water fluoridation. Some students even volunteered as campaign workers during the East Bay Municipal Utility District (EBMUD) water fluoridation referendum in 1980, a practical learning experience. At the University of California, Los Angeles, School of Dentistry, students heard lectures and were examined on the health issues and benefits of CWF. In the 1975 referendum on CWF, students helped distribute brochures. Students at the University of the Pacific, Arthur A. Dugoni School of Dentistry reviewed an online module on CWF, followed by a two-hour seminar where this and other topics related to community oral health were discussed. At the Ostrow School of Dentistry of USC, the principles of fluoridation were taught using problem-based learning (PBL) in a case, with such cases held in the first

### TABLE 4

<table>
<thead>
<tr>
<th>Year</th>
<th>In favor</th>
<th>Opposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1952</td>
<td>604 (63%)</td>
<td>348 (37%)</td>
</tr>
<tr>
<td>2014</td>
<td>2,184 (66%)</td>
<td>1,113 (34%)</td>
</tr>
<tr>
<td>2016*</td>
<td>3,223 (57%)</td>
<td>2,433 (43%)</td>
</tr>
</tbody>
</table>

*Backwardly worded referendum (a no vote indicated support for CWF).

### TABLE 5

<table>
<thead>
<tr>
<th>Water system</th>
<th>County</th>
<th>Starting date</th>
<th>Population served</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contra Costa WD</td>
<td>Contra Costa</td>
<td>May 1965</td>
<td>225,000</td>
</tr>
<tr>
<td>Crescent City</td>
<td>Del Norte</td>
<td>November 1969</td>
<td>11,246</td>
</tr>
<tr>
<td>Fairfield</td>
<td>Solano</td>
<td>December 1967</td>
<td>72,000</td>
</tr>
<tr>
<td>Fresno Co. Waterworks 11</td>
<td>Fresno</td>
<td>October 1963</td>
<td>641</td>
</tr>
<tr>
<td>Fresno Co. Waterworks 14</td>
<td>Fresno</td>
<td>October 1968</td>
<td>977</td>
</tr>
<tr>
<td>Loyalton</td>
<td>Sierra</td>
<td>May 1968</td>
<td>1,070</td>
</tr>
<tr>
<td>Martinez</td>
<td>Contra Costa</td>
<td>January 1965</td>
<td>28,500</td>
</tr>
<tr>
<td>Merced City WS</td>
<td>Merced</td>
<td>June 1966</td>
<td>57,645</td>
</tr>
<tr>
<td>Pittsburg MW</td>
<td>Contra Costa</td>
<td>April 1965</td>
<td>48,700</td>
</tr>
<tr>
<td>Roseville</td>
<td>Placer</td>
<td>October 1967</td>
<td>47,000</td>
</tr>
<tr>
<td>San Jose</td>
<td>Santa Clara</td>
<td>September 1965</td>
<td>70,000</td>
</tr>
<tr>
<td>Scotia-Pacific</td>
<td>Humboldt</td>
<td>October 1962</td>
<td>1,000</td>
</tr>
</tbody>
</table>


### TABLE 6

<table>
<thead>
<tr>
<th>Water system</th>
<th>County</th>
<th>Starting date</th>
<th>Population served</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Bay MUD</td>
<td>Alameda and Contra Costa</td>
<td>1976</td>
<td>1,100,000</td>
</tr>
<tr>
<td>Eureka</td>
<td>Humboldt</td>
<td>February 1972</td>
<td>25,000</td>
</tr>
<tr>
<td>Fountain Valley</td>
<td>Orange</td>
<td>June 1973</td>
<td>53,691</td>
</tr>
<tr>
<td>Fresno Co. Waterworks 27</td>
<td>Fresno</td>
<td>March 1971</td>
<td>1,225</td>
</tr>
<tr>
<td>Fresno Co. Waterworks 28</td>
<td>Fresno</td>
<td>November 1979</td>
<td>250</td>
</tr>
<tr>
<td>Huntington Beach</td>
<td>Orange</td>
<td>July 1973</td>
<td>185,000</td>
</tr>
<tr>
<td>Long Beach WD</td>
<td>Los Angeles</td>
<td>June 1971</td>
<td>425,000</td>
</tr>
<tr>
<td>Marin Municipal</td>
<td>Marin</td>
<td>December 1973</td>
<td>170,000</td>
</tr>
<tr>
<td>Stanford University</td>
<td>Santa Clara</td>
<td>April 1970</td>
<td>23,000</td>
</tr>
<tr>
<td>Vacaville</td>
<td>Solano</td>
<td>February 1975</td>
<td>76,200</td>
</tr>
<tr>
<td>Alameda WD**</td>
<td>Alameda</td>
<td>June 1971</td>
<td>275,000</td>
</tr>
</tbody>
</table>


**Serves Fremont, Newark and Union City.
two years and cut across all disciplines. At the Loma Linda University School of Dentistry, CWF was incorporated in both the teaching of pediatric dentistry and general dentistry, each devoting about 15 minutes to this topic.

During the 1970s, the biggest fluoridation victory was the EBMUD serving 30 cities in two counties, including Oakland, Berkeley, Richmond and Walnut Creek, with a total combined population of 1,100,000 (80% residing in Alameda County and 20% in Contra Costa County) (TABLE 6). This followed two embarrassing_referenda defeats in 1960 and 1964. In 1974, a fluoridation referendum won narrowly, 50.5% to 49.5%; and in 1980 voters reapproved fluoridation by 54.9% to 45.1% as shown in FIGURE 1. Usually, once a community has been fluoridated, voters are less likely to reject it in a recall referendum or to believe all the dire predictions of the fluoridation opponents.

In the 1970s, in spite of some major successes such as EBMUD and the city of Long Beach in Southern California, the city of Los Angeles was a big disappointment. In 1974, the L.A. City Council adopted a fluoridation ordinance by a 10-4 vote; the ordinance was signed by the acting mayor shortly afterward. Subsequently, the L.A. City Council lost courage and reversed its decision, leaving it to the voters to decide. Two prominent state legislators, Art Torres and Richard Alatorre, who had turned against the measure, influenced the city council and the voters. John Yiamouyiannis, PhD, a biochemist, was hired by the National Health Federation in Monrovia to stop fluoridation. He succeeded using scare tactics, falsely alleging higher than average cancer rates in fluoridated communities. The studies cited by Dr. Yiamouyiannis, according to one reviewer, were more like “a propaganda flyer than serious scientific effort.” It took some time to disprove such claims, by which time the referendum was already over. Opponents of water fluoridation won that referendum handily by 213,573 (56%) votes to 166,549 (44%) votes. Thereby about 9 million people were denied the benefits of communal water fluoridation for another 24 years.

**Recent History of Water Fluoridation in California**

Dental health experts voiced amazement when San Francisco Supervisor Wendy Nelder suddenly renewed the fight against fluoride in water on Sept. 5, 1984. Dentists said the water treatment had saved children’s teeth from millions of cavities and had proven to be inexpensive and safe for more than 30 years. The reaction to her charge that fluoridation of San Francisco’s water — begun in 1952 — might cause AIDS was scathing. In 1981, the Centers for Disease Control and Prevention (CDC) had recognized AIDS as an infectious disease. By 1983, a causative retrovirus had been isolated from the lymph node of an AIDS patient by a team of virologists at the Pasteur Institute in Paris. In 1984, a nearly identical virus was isolated by a team led by Robert Gallo, MD, at the National Institutes of Health in Bethesda, Maryland, with evidence that it caused AIDS; this virus was later named human immunodeficiency virus (HIV). CWF opponents, led by Nelder, attempted to pressure the city’s board of supervisors to stop San Francisco’s 34-year-old practice of fluoridating its water supply. Although the local press and radio widely publicized the opponents’ unsubstantiated claims that fluoridation renders people susceptible to AIDS by destroying the body’s defense mechanisms, with rare exception the media were supportive of CWF. Political leaders dismissed Nelder’s call for an investigation into the health effects of water fluoridation; then Mayor Dianne Feinstein denounced Nelder’s charges as “off the wall.” The board voted to continue to support CWF based on the city health department’s report on the benefits and safety of fluoridation. The safety and dental benefits of CWF were reconfirmed in an updated review of the medical literature by the San Francisco Department of Public Health in 2011. Nelder served on the board of supervisors from 1981 to 1991. As top vote-getter in the 1982 election, she became president of the board from 1983 to 1985. During this time, she pushed her antifluoride campaign but could not muster sufficient support from the board to place it on the ballot. Five years later, she tried again but was blocked again. She did not seek reelection in 1990 but ended her political career after running unsuccessfully for assessor. Her outspoken opposition to CWF possibly contributed to her political demise.
In 1992, only 15.7% of California’s population on public water systems received fluoridated water, ranking 48th among states just ahead of Hawaii, Utah and Nevada. By 2014, the percentage climbed to 63.7% and the number of Californians receiving fluoridated water was almost five times higher, increasing from less than 5 million in 1992 to 24.7 million in 2014. The turning point was when the California Legislature and the governor enacted AB 733 in 1995 at the initiative of Assemblymember Jackie Speier (D-Burlingame), “a legislator known for her courage under fire and her penchant for hard-hitting bills,” who pressed on with a statewide fluoridation bill because of the dental needs of children. In order to get the bill passed, she enlisted bipartisan support from members of the state Assembly and Senate as well as the influential Speaker of the House Willie Brown as co-authors. The bill underwent further transformation to garner the necessary support of some wavering legislators; the capital costs for the equipment and building had to be funded from nonstate sources. The day-to-day operating expenses could be passed onto the customers who would be saving money on their dental bills. This act required water systems with 10,000 or more service connections to fluoridate once; funding from an outside source was provided. The California Endowment, a private foundation, contributed $15 million and First 5 California contributed varying amounts, depending on the county, to fund capital costs to initiate CWF using money obtained through the state cigarette tax. The Dental Health Foundation and the California Dental Association (CDA) Foundation were instrumental in distributing these funds. The ongoing expense of CWF is low, ranging from about 50 cents per person per year for communities with more than 20,000 residents to $3 per person per year in communities with 5,000 or fewer residents.

In 1995, Speier termed out as an assemblymember and her political future was unclear; conventional wisdom would have been to avoid so-called “controversial” issues such as water fluoridation. Speier saw it as a health issue and did not hesitate to persist in promoting passage of this statewide bill; therein lies an important lesson. Clearly it did not hinder her political career; in 1998, she was elected to the California State Senate, and in 2008, following the death of Congressman Tom Lantos, she was overwhelmingly elected to succeed him as the U.S. representative for California’s 14th Congressional District.

Speier saw it as a health issue and did not hesitate to persist in promoting passage of this statewide bill.

Following the passage of AB 733 and with the efforts of a broad-based California Fluoridation Task Force, in 1998, the California Endowment provided $15 million dollars in grants to water utilities through the CDA Foundation to leverage the state law. More recently, other sources of grant support have assisted additional communities to cover initial implementation costs.

The city of Los Angeles fluoridated its water supplies in 1999 by action of the city council after several public hearings but without the kind of public outcry from 25 years earlier. However, it has taken longer to fluoridate Los Angeles County, which includes 88 cities, because of the many water suppliers and the vast area covered. According to Maritza Cabezas, DDS, MPH, the county dental director, 58% of L.A. County’s population receive optimally fluoridated water, 5% near optimal, 19% partial and 17% no fluoride.

In February 2003, the board of the Metropolitan Water District of Southern California (MWD), which supplies water to about 18 million consumers, heard testimony concerning water fluoridation. The board consisted of 55 representatives from various communities and convincing them to move on fluoridation was no small task. Proponents of water fluoridation had a “dream team” of dentists, physicians, public health officials, school teachers and nurses and parents all conveying the message of safety, efficacy and the need for this proven public health measure. The MWD board voted to accept the recommendation, and in September 2003, $5.5 million in grant monies was made available from the California Endowment; as a result, California no longer lagged behind most other states. In November 2007, the MWD started bringing fluoridation systems online at its five massive filtration plants, the largest fluoridation project in the U.S.

In the case of San Diego, both the California attorney general and the city attorney’s office opined that when sufficient funding became available state law would preempt San Diego Municipal Code Section 67.0101 dating back to 1954, which prohibited the city from fluoridation. Accordingly, state law preempts this old city ordinance. In June 2008, the San Diego City Council voted unanimously to accept $3.9 million to fund the city’s fluoridation program. As a result of state law and the availability of funding, the city began fluoridating its public water supply in February 2011. San Diego not only delivers water to its citizens, it also supplies treated water to the cities of Del Mar, Coronado and Imperial Beach. More than 1.36 million people receive fluoridated water treated by San Diego.
Healdsburg has remained fluoridated since 1952 in spite of two attempts by opponents to stop the process by referendum. In 2014, Healdsburg voters again approved fluoridation by a margin of 2:1 (2,184 votes to continue water fluoridation; 1,113 votes to stop water fluoridation). In that referendum, the local Healdsburg Tribune strongly supported continued water fluoridation as did a local dentist, Shawn Widick, DDS. Undeterred by the vote to continue fluoridation in Healdsburg in 2014, another referendum was held in 2016, based on 709 valid signatures gathered by anti-fluoridationists on a proposed ordinance intended to stop fluoridation. The measure was again defeated, this time by 57% in favor of continuing fluoridation in a backwardly worded ballot where a no vote meant continuing fluoridation, which may have confused some voters. Although no survey has been undertaken to determine why voters in Healdsburg consistently supported fluoridation, one might speculate that they were more trusting of the medical/dental profession than they speculated that they were more trusting of chemical additives.9

Other communities in Sonoma County, such as Sebastopol, Cloverdale and Santa Rosa, lack the benefits of communal water fluoridation. A fluoridation preliminary engineering design report, costing about $113,000, and an environmental impact study on aquatic marine life, costing $66,766, concluded that fluoridation was unlikely to harm federally listed salmonids that occur in local streams. The report was presented to the Fluoridation Advisory Committee (appointed by the Sonoma Department of Health Services) that met for more than two years (2013–2015). This committee recommended overwhelmingly (19 in favor, two opposed) in support of fluoridation.30 Sadly, those recommendations languished without any action by the Sonoma Board of Supervisors, the Sonoma County Water Agency nor the Santa Rosa City Council. The Sonoma County Water Agency supplies drinking water to more than 600,000 consumers in nine cities and water districts in northern Marin County, as well as Cotati, Petaluma, Rohnert Park, Santa Rosa, Sonoma and Windsor in Sonoma County, of which Santa Rosa is the largest customer.

The current tactic of antfluoridationists has been to focus on fluoride not as a carcinogen but as a neurotoxin, claiming that fluoride presents a risk under Section 21 of the Toxic Substances Control Act (TSCA).31 The Fluoridation Action Network, representing fluoridation opponents, has filed a lawsuit in the U.S. District Court, Northern District of California seeking a ban on fluoridation additives. A court hearing was expected to take place in San Francisco in August 2019. Challenges to communal water fluoridation based on religious freedom, due process and claims of harm have a long history. The legal validity of fluoridation has been repeatedly tested and affirmed by courts of last resort in the United States.35

Concluding Remarks

It is worth noting that administrative bodies such as the L.A. City Council, the board of the MWD and the San Diego City Council decided to fluoridate (or continue fluoridation as in the case of San Francisco Board of Supervisors) following open hearings thereby avoiding divisive and expensive referenda. This should be a guide as to how to proceed in implementing community water fluoridation by the Sonoma County Water Agency in Santa Rosa and the surrounding communities, the last holdouts of major-sized communities in California. In a review of the outcome of decisions regarding CWF throughout the U.S., Easley found a substantial difference between the results of decisions by governing body when compared to results subject to voter referenda. Over a 10-year period from 1980 to 1989, 78% of governing body decisions were in favor of CWF, while only 37% of referenda on CWF were successful.34

Looking at the percentage of Californians served by community water systems receiving fluoridated water, one sees that for 34 years, between 1961 and 1995, there was little progress in bestowing this proven public health measure to the California public because of apathy, lack of political support and a small but determined opposition. Over those 34 years, the population of California doubled from 15.7 million to 31.7 million, yet those with CWF changed very little, from 12% to 17%. However, 1995 was the year that Speier introduced Assembly Bill 733, after which things improved. Based on the most recent survey (2014), 63.7% of Californians on community water systems benefited from drinking optimally fluoridated water, slightly below the 74.4% for the nation as a whole. California is not in the top

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**FIGURE 2.** Percentage of Californians served by community water systems receiving fluoridated water.
Lessons Learned

- Dentists, dental hygienists, physicians and public health personnel need to know the scientific basis of CWF and have the ability to communicate clearly concerning its benefits.
- For successful adoption of CWF, one must be perceptive and shrewd about politics and be able to identify political leaders who care about health.
- State legislators need to create the legislative backbone, such as in enabling ordinances and providing appropriations.
- If CWF becomes subject to a referendum, pay attention to wording of ballots in order not to confuse voters.
- Nurture the dental professional pipeline by preparing and involving dental students.
- Address new tactics of opponents on risk issues such as fluoride being a neurotoxin rather than a carcinogen.
- Keep the local media, especially science writers, informed on issues related to CWF; be responsive to their inquiries.

10 states in terms of percentage, but it leads in having more people in California receiving fluoridated water than in any other state, almost 25 million. California has come a long way thanks to the efforts of many dedicated public health workers, dentists and a few courageous politicians.

The history of water fluoridation in California is a story of perseverance, strategy and commitment to the oral health of the population. Some of the lessons learned from this history are summarized in Table 7. One lesson from the Healdsburg referendum of 1952, 2014 and 2016 is that, though we may win some battles, the dispute over communal water fluoridation never ceases. Historian Donald McNeil has described the fight over fluoridation as “America’s longest war,” which is still continuing because the issue is “almost tailor-made for endless controversy.” Some Americans mistrust authority, government and science, and people are prone to resist scientific claims in spite of thorough testing and factual observation when they clash with their intuitive beliefs. Atul Gawande points out that even where the knowledge provided by science is overwhelming, people often resist it — and sometimes outright deny it. That is the reason why the fight for communal water fluoridation has continued now for nearly 70 years.

Table 7

<table>
<thead>
<tr>
<th>Lessons Learned</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Dentists, dental hygienists, physicians and public health personnel need to know the scientific basis of CWF and have the ability to communicate clearly concerning its benefits.</td>
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<tr>
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References

26. First 5 California. www.ccfc.ca.gov/about/about.html.
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38. Gawande A. The mistrust of science. The New Yorker June 10, 2016. THE AUTHOR, Ernest Newbrun, DMD, PhD, can be reached at ernnew8@gmail.com.
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Review of Safety, Frequency and Intervals of Preventive Fluoride Varnish Application for Children

Lisa H. Berens, DDS, MPH; Mimansa Cholera, BDS, MPH; Deborah Elam, MS, CAE; Susan A. Fisher-Owens, MD, MPH; Margaret Fisher, RDHAHP; Stuart A. Gansky, DrPH, MS; Irene V. Hilton, DDS, MPH; Kara Lugtu, MPH; Robert Isman, DDS, MPH; Elaine Musselman, PhD, RN; Howard Pollick, BDS, MPH; and Ling Zhan, DDS, PhD

ABSTRACT Fluoride varnish is supported by the United States Preventive Services Task Force and several professional organizations as an effective cavity preventive treatment, especially the earlier it is applied after tooth eruption, particularly on high-risk young children. It does not replace the essential early routine dental visit. This paper’s objective is to provide the rationale and guidance around the safety of frequent applications of fluoride varnish when provided in multiple (dental, medical and community) settings.

Dental caries impacts the overall health of children, their school attendance and their resultant academic success as well as increases the lifetime risk for dental and health problems. It is a disease that has long been recognized as having many influencing factors, including social, economic, genetic/biologic and individual health behaviors. San Francisco’s low-income children and children of color experience two to three times the rate of dental caries as their white and more affluent peers. Low family income is a significant risk factor for poor dental health with Medi-Cal eligibility being a proxy for low-income status. Although fluoride varnish does not address all these determinants of health, it is a prevention strategy that is both effective (especially for high-risk children with two or more
applications per year) and inexpensive at 79 cents to $1.50 per packet for one application. Until all children have easy and early access to preventive dental care and guidance and parents have the knowledge, time and support to provide healthy nutritional choices, health care providers (in medical and dental spaces) should offer fluoride varnish as one of many needed disease prevention tools. Young children tend to see primary care physicians (PCPs) far more frequently than dentists. In the United States, the American Academy of Pediatrics (AAP) recommends that a child see PCPs 11 times for a checkup by age 2. Early application of fluoride varnish and parental oral health guidance, together with a dental referral during a routine primary care medical visit by a PCP, are important approaches to caries prevention.

Early and frequent fluoride varnish applications provide proven results, especially for high-risk children. The Association of State and Territorial Dental Directors (ASTDD) and the American Dental Association (ADA) agree that at least biannual fluoride varnish applications should be applied to prevent dental caries in primary or permanent teeth for moderate or high-risk children. The United

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### Table 1: Professional Associations’ Recommendations for Frequency and Intervals of Fluoride Varnish

<table>
<thead>
<tr>
<th>Agency</th>
<th>Caries risk</th>
<th>Frequency</th>
<th>Intervals</th>
<th>Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Dental Association (ADA)</td>
<td>Moderate or high</td>
<td>At least biannually</td>
<td>6 months</td>
<td>jada.ada.org/article/S0002-8177(14)64961-8/fulltext#cesec280</td>
</tr>
<tr>
<td>Centers for Disease Control (CDC)</td>
<td>CDC recommends that parents: “Talk to your dentist, pediatrician, family doctor or nurse about putting fluoride varnish on your child’s teeth as soon as the first tooth appears.”</td>
<td>2 to 4 times/year in primary care setting</td>
<td>3 to 6 months</td>
<td>cdc.gov/oralhealth/basics/childrens-oral-health/fluoridavarnish.htm</td>
</tr>
<tr>
<td>American Academy of Pediatric Dentistry (AAPD)</td>
<td>Low Moderate to High</td>
<td>Not needed</td>
<td>Not needed</td>
<td>ndhealth.gov/oralhealth/Publications/AAP%20Caries%20Risk%20Assessment%20Tool.pdf</td>
</tr>
<tr>
<td>Association of State and Territorial Dental Directors (ASTDD)</td>
<td>Follows ADA and CDC recommendation</td>
<td>All children 9 to 24 months of age</td>
<td>4 or more times</td>
<td>astdd.org/www/docs/fl-varnish-research-brief.pdf</td>
</tr>
<tr>
<td>U.S. Department of Health and Human Services – Indian Health Service (IHS)</td>
<td>All children 9 to 24 months of age</td>
<td>2 to 4 times/year</td>
<td>3 to 6 months</td>
<td>ihs.gov/doh</td>
</tr>
<tr>
<td>American Association of Family Physicians (AAFP)</td>
<td>Based on risk</td>
<td>2 to 4 times/year</td>
<td>3 to 6 months</td>
<td>aafp.org/afp/2015/0801/p174.html</td>
</tr>
<tr>
<td>U.S. Preventive Services Task Force (USPSTF)</td>
<td>Apply fluoride varnish to the primary teeth of all infants and children starting at the age of primary tooth eruption.</td>
<td>3 to 4 times/year</td>
<td>3 to 6 months</td>
<td>uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/dental-caries-in-children-from-birth-through-age-5-years-screening</td>
</tr>
<tr>
<td>U.S. Health Resources Services Administration (HRSA) Maternal Child Health Bureau (MCHB)</td>
<td>High</td>
<td>3 to 6 months</td>
<td>3 to 6 months</td>
<td>astdd.org/www/docs/fl-varnish-research-brief.pdf</td>
</tr>
<tr>
<td>World Health Organization (WHO)</td>
<td>High</td>
<td>2 to 4 times/year</td>
<td>3 to 6 months</td>
<td>allianceforacavityfreefuture.org/en/us/technologies/fluoride-varnish</td>
</tr>
</tbody>
</table>
Purpose

We sought to establish clear guidelines to ensure that children at high risk for caries can receive the maximum benefit from fluoride varnish treatment without undue risk when applied multiple times in dental, medical and community settings. We hope here to clarify that applying fluoride varnish is safe and that concerns about multiple and more frequent applications per year may be needed to obtain optimal effectiveness (TABLE 1).

Addressing Concerns

Although fluoride is safe when applied topically in small quantities, ingestion of high levels of fluoride can lead to two types of complications: acute fluoride toxicity (can occur from a single ingestion of very high levels of fluoride) and the potential for development of dental fluorosis (as a complication of daily chronic ingestion of high doses of fluoride).

Acute Toxicity

Fluoride varnish (FV) is not associated with acute toxicity. One high dose (TABLE 2) exposure to ingested fluoride (not fluoride varnish application) can result in acute fluoride toxicity. Early symptoms include gastric pain, nausea, vomiting and burning or cramp-like abdominal pains. Neurological symptoms are rarely present. There are several ways that a child may be exposed to elevated levels of fluoride: excessive swallowing of fluoride toothpaste, excessive ingestion of prescription fluoride tablets or drops and/or excessive application of acidulated phosphate fluoride (APF) foams and gels in a dental office. There is minimal risk of acute fluoride toxicity from the small amount (0.25 ml of FV = 5.65 mg fluoride) of fluoride in each fluoride varnish packet. The “probable toxic dose” of fluoride has been set at 5 mg F/kg body weight.19 Thus, the toxic dose of fluoride ingestion is estimated at 75 mg for an average sized 3-year-old child weighing 15 kilograms (33 pounds); this is the equivalent of a toddler swallowing more than 10 whole packets of fluoride varnish at one time.19 In a 2001 study of 156 low-income children aged 3 to 5 years old receiving three fluoride varnish applications within two weeks at baseline, there were no adverse events or complaints reported by any of the subjects or their parents.20

Fluoride varnish does not cause acute toxicity: There is not enough fluoride in one packet of fluoride varnish to cause acute toxicity. In order to experience acute toxicity, a child would have to swallow 5 mg of fluoride per kilogram of their body weight in a single sitting, more than six times the age-appropriate premeasured amount (5.65 mg F) for a 6-month-old (16 pounds or 7 kilograms) baby.21 With only a few teeth, it is rare to use even one-half of a packet (2.8 mg F) on a 6-month-old baby.

Chronic Exposure

Dental fluorosis is a condition resulting from prolonged chronic exposure to elevated levels of fluoride to the developing enamel during the critical period of tooth development (from birth to age 8).22 Visible effects of fluorosis on the teeth are present even in its mildest forms, seen as teeth with white flecks, occasional white spots, frosty edges or fine, lacy, chalk-like lines.23 These are often barely noticeable and difficult to see except by a dental health care professional. In moderate and severe forms of dental fluorosis, the teeth show larger white or stained areas and, in the rare, severe form, rough, pitted surfaces (TABLE 3). Fluoride varnish application is not associated with fluorosis: Enamel formation takes about three years (less for primary teeth).24 To cause fluorosis, the tooth would have to be exposed much more frequently, for a longer period of time and at levels higher than recommended here during the three years in which enamel is forming.

**TABLE 2**

<table>
<thead>
<tr>
<th>Threshold daily dose least likely to be associated to dental fluorosis</th>
<th>Possible mild dental fluorosis daily dose</th>
<th>Probable toxic dose (PTD) — acute toxicity</th>
<th>Certainly lethal dose (CLD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.04 mg F/kg body weight</td>
<td>&gt; 0.06 mg F/kg body weight</td>
<td>5 mg F/kg body weight (range 3 mg F/kg body weight to 8 mg F/kg)</td>
<td>32–64 mg F/kg body weight</td>
</tr>
</tbody>
</table>
Dental fluorosis formation is highly dependent on the dose, duration and timing of fluoride exposure. Fluorosis risk appears to be related to total cumulative fluoride exposure to the developing dentition. Fluoride dose at any one time is also important to enamel fluorosis formation. “Evidence suggesting fluorosis can result from peak levels of fluoride in the plasma after a high single dosage exposure has only been seen with rats, when they were injected (a different mode of intake) with different doses of fluoride.”

However, a single fluoride varnish application does not result in the pathologically high-plasma fluoride (or high single-dose exposure) sufficient to cause fluorosis, as cited above. In fact, one study that examined peak plasma fluoride postvarnish application in six toddlers aged 12 to 15 months found that retained fluoride was 253 times lower than the acute toxic dose of 5 mg/kg, which means plasma fluoride after varnish placement was within one standard deviation of control levels.

The dosage of fluoride varnish per package for children younger than age 6 is 5.56 mg. Even if absorbed completely systemically, the dosage will still be about 17 times lower than the dosage that resulted in fluorosis in the study where fluoride was injected into rats.

Another study examined plasma fluoride levels following fluoride varnish application in children aged 4 to 14; the highest peak plasma fluoride level was seen within two hours of treatment and was far below established toxic levels. A nested-cohort study compared the prevalence and severity of fluorosis in permanent maxillary incisors of children who participated in a two-year randomized placebo-controlled clinical trial on fluoride varnish application at ages 1 through 4. It found no significant differences in fluorosis between the fluoride varnish and the placebo groups. At the levels and intervals being considered for use in San Francisco or anywhere else, fluoride varnish will not increase fluorosis risk.

**Intervals**

Biological effects of fluoride depend on the amount, the duration of exposure and the metabolic handling of ingested fluoride. After ingestion, fluoride is first absorbed in the stomach, followed by its distribution through soft and hard tissues and excretion in the urine and feces. The fluoride plasma peak is quickly reached after ingestion, as a result of rapid pH-dependent absorption in the stomach. Plasma fluoride levels decrease rapidly due to fluoride uptake in hard tissues and renal excretion, while the nonabsorbed fluoride is excreted in feces. Because the mean plasma fluoride level after varnish placement is within one standard deviation of control levels, the risk of any residual fluoride mixing with subsequent fluoride applications is minimal.

In 2016, the Canadian Agency for Drugs and Technologies in Health published a review of the clinical effectiveness, cost-effectiveness and guidelines relating to fluoride varnish use. The review included 326 citations, 19 of which ultimately met the study’s stringent inclusion criteria. These citations tested various fluoride varnish application schedules: two applications, four months apart; two applications, six months apart; three applications, four months apart; four applications, one week apart; three applications, six months apart; six applications, one month apart; two to four times per year; and every three to 12 months. No studies found any association between number or frequency of varnish applications and any adverse effects.

A 2018 review of three prospective fluoride varnish trials reported that “fluorosis is unlikely if not impossible to occur.” After fluoride varnish application, plasma fluoride concentrations peak within two hours and then rapidly decrease. The plasma fluoride concentrations reached and the kinetics were similar to those found after brushing with fluoridated toothpaste. The Centers for Disease Control and Prevention (CDC) states: “No published evidence indicates that professionally applied fluoride varnish is a risk factor for dental fluorosis, even among children younger than 6 years of age.”
There is no risk of fluorosis with periodic application of fluoride varnish. However, there is a risk due to daily exposure to swallowing excessive amounts of fluoridated toothpaste.

While applying fluoride varnish multiple times per year at various intervals cannot cause fluorosis, the following routes are the most common ways excessive chronic fluoride exposure occurs and could result in severe dental fluorosis during tooth development years:

- Regular use of drinking water with high concentrations of > 2 ppm (mg/l) of fluoride.
- Daily eating or swallowing large amounts of fluoridated toothpaste.

**Guidance for Health Care Providers: What To Tell Parents**

For children younger than age 6 (or until they can spit):

- Parents/guardians should apply an appropriate amount of fluoride toothpaste to an appropriately sized toothbrush (younger than age 3: rice grain-sized amount; age 3 and older: pea-sized amount), applying twice a day.
- Encourage the child to spit out extra toothpaste minimizing the fluoride that the child may swallow.
- No use of prescription-strength 5000 ppm of sodium fluoride toothpaste.
- No use of fluoride rinse.
- Fluoride varnish can be applied up to six times a year (three times at dental visits and three times in the medical office).

**Conclusion**

Currently, if a low-income child insured by Medi-Cal was offered all the possible fluoride varnish applications reimbursed by Medi-Cal/ Denti-Cal, they would only receive six applications annually (three times during medical visits and three times during dental visits). The consensus of oral health experts from the San Francisco Department of Public Health, the UCSF Schools of Dentistry and of Medicine and San Francisco State University School of Nursing, after reviewing the current fluoride varnish studies, is that six applications per year is both safe and effective. Although there is insufficient empirical evidence testing four to six annual FV applications, calculations extrapolating dosages indicate exposure levels would be well below problematic levels. It is safe to offer more than one fluoride varnish application within a short time interval, such as within a week or a month, without risk of harm.

While it is highly unlikely that any child in San Francisco will be so fortunate, providers can offer this preventive treatment with no hesitation due to safety concerns. We hope dental and medical providers consider the benefit of providing a child’s parent the home care guidance and providing the child with one of our most effective preventive dental treatments: fluoride varnish.

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versus standard fluoride varnish treatments in high-caries children aged 3-5 years.


THE CORRESPONDING AUTHOR, Margaret Fisher, RDAHP, BS, can be reached at fishermarn@aol.com.
The Pain Assessment Practices of Pediatric Dentists

Dennis Paul Nutter, DDS; Shahin Goddousi, MS; Sahand Soltani, DDS; and Colleen Gillen Azen, MS

ABSTRACT A survey of the active members of the American Academy of Pediatric Dentistry was undertaken to investigate the pain assessment beliefs of pediatric dentists in order to understand if those beliefs allow the dentist to decide how much pain a child is experiencing during procedures involving tissue trauma. The results reveal that as many as 92% of pediatric dentists hold beliefs about pediatric pain assessment that may lead to an underestimation of pediatric procedure pain.

Authors

Dennis Paul Nutter, DDS, is a diplomate of the American Board of Pediatric Dentistry, a fellow of the American College of Dentists, a past president of the California Society of Pediatric Dentistry and is in private practice in Fairfield, Calif. Conflict of Interest Disclosure: None reported.

Shahin Goddousi, MS, received his graduate degree from Touro University California in Vallejo, Calif. Conflict of Interest Disclosure: None reported.

Sahand Soltani, DDS, earned his dental degree from the University of Pacific, Arthur A. Dugoni School of Dentistry and is in private practice in San Francisco. Conflict of Interest Disclosure: None reported.

Colleen Gillen Azen, MS, is a biostatistician with the Southern California Clinical Translational Science Institute, Children’s Hospital Los Angeles and is affiliated with the University of Southern California. Conflict of Interest Disclosure: None reported.

R}eliable and valid pain assessment is critical to the refinement of interventions to alleviate procedure pain.1–3 Unalleviated procedure pain can classically condition children to fear and avoid necessary medical treatments.4–7 This fear can increase a child’s pain perception during future medical treatments by focusing a child’s attention on the procedure.8–12 Sedation is often undertaken to improve pain outcomes by reducing procedural fear and the movement associated with disruptive pain avoidance behavior.13,14 A sedation may be termed “successful” when it permits treatment to be completed in an efficient, qualitative manner that is well tolerated by the child.

In 2004, nearly half of pediatric dentists did not think that a successful sedation required disruptive distress behavior to be reduced to a level that allowed the procedure to be well tolerated by the patient.15 For “sedation success,” they only required that treatment goals be achieved despite the need for “persistent use of restraint.”15 In opposition to this view, approximately one-fourth of the pediatric dentists did not believe that a sedation can be termed “successful” or “acceptable” if immobilizing restraints were needed to complete treatment.15

The conflicting opinions that dentists hold regarding the definition of sedation success was hypothesized by Vargas and Nathan et al. to be the result of a dentist’s expectations for the child’s behavior.15 This perspective was termed the authoritarian/disciplinarian style of behavior management. Its salient characteristic is that children are expected to be “cooperative” and socially obedient to the commands (“linguistic” requests) of adult authority.16–19 If the dentist had low expectations for child behavior, that is, low expectations for child obedience, then the dentist was said to have an advocate/permissive management style.15 The Vargas and Nathan et al. survey revealed that nearly half of the dentists identified...
Authoritarian authors commonly assert that much of children’s negative procedural behavior is the result of misbehavior that is manifested as defiance, aversion to authority or unruliness.\textsuperscript{16–20} When a child’s behavior exhibits these characteristics, authoritarians reason that protective stabilization is a justified intervention even when procedural tissue trauma is occurring.\textsuperscript{16,19} This behavior assessment paradigm requires that dentists reliably discriminate between the behavior that is the result of misbehavior and that level of distress behavior that may entail from three other possibilities: pain, conditioned fear and noxiously perceived nonpain sensory stimuli.\textsuperscript{3,21} This includes the ability to differentiate misbehavior from a pain avoidance behavior that is essentially motivated by fear but has been operantly conditioned by permissive parenting to manifest as defiance.\textsuperscript{3,5,22–24}

Protective stabilization-style restraints are more difficult to justify if the negative behavior is driven by an operantly conditioned, involuntary (implicit) fear behavior.\textsuperscript{3,21} It is unknown if authoritarian pediatric dentists believe that they have the experience and training to make these types of assessments. Such a belief would run counter to the well-established finding that clinicians cannot reliably or accurately perform this type of assessment.\textsuperscript{21,26,27}

Authoritarian behavior assessment methodology that permits the dentist to downwardly revise a child’s clinical pain score will operate as a systematic error in pain assessment. Clinicians who cause procedure pain are not simply inaccurate when they gauge a child’s pain intensity, they routinely underestimate their patient’s pain.\textsuperscript{21,26,27}

Underestimation of procedure pain can have dire consequences for children undergoing invasive dental treatment. If a clinician underestimates a child’s pain, that child can experience suffering, long-term sensitization (LTS) and classical fear conditioning (CFC).\textsuperscript{3,6,28–31} LTS can result in amplified pain experience for the same pain stimulus. Things that did not hurt before can now hurt.\textsuperscript{29–32} CFC can debilitating a child’s ability to tolerate and later seek out future necessary medical treatments.\textsuperscript{4,5,31,33}

It has been demonstrated in rat models that growth hormone is endogenously produced in the hippocampal region of the brain, a region associated with learning and memory in humans.\textsuperscript{34–37} Hippocampal growth hormone has been found to double in rats during periods of acute distress.\textsuperscript{38} Consistent with this discovery, when rats are exposed to pain stimuli they memory for that pain event is doubled when growth hormone was placed in the hippocampal region of their brain.\textsuperscript{38} Theoretically, children’s neural plasticity responds to pain events in a similar robust fashion in the presence of growth hormone.

Restraining the movement that is resulting from a child’s procedural distress is sometimes necessary when it represents the least-risk alternative.\textsuperscript{25,39} The alternative of general anesthesia may not be medically sound. The nature of the pathology may not lend itself to treatment with less-invasive or noninvasive alternative techniques. In these situations, the risk of suffering LTS and CFC is weighed against the risk of suffering long-term sensitization (LTS) and classical fear conditioning (CFC) are weighed against the risk valuations ascribed to other alternative treatments and a decision is made about what modality of treatment represents the least risk to the patient while having the benefit of eliminating or stabilizing the pathology.\textsuperscript{25,39}

Authoritarian behavior assessment methodology can result in an assessment detour that leads to a diagnosis of misbehavior and not pain during procedures involving tissue trauma. In this way, the decision to intervene in procedural movement is biased in favor of restraints because the risk of suffering LTS and CFC has been removed from the calculation of restraint risk.\textsuperscript{25,26,39}

Sensational news stories and a U.S. Senate investigation of corporate dentistry serve as public reminders that poor clinical pain practice with the use of immobilizing restraint is a continuing problem in pediatric dentistry.\textsuperscript{40–44} Authoritarian pain assessment methodology may be a factor in poor distress management outcomes. A survey was designed to address two questions. Both questions seek to understand the factors that are involved in a pediatric dentist’s decision to use immobilizing restraint with children during procedures. First, do pediatric dentists hold the authoritarian belief that they, and not the child, should

### TABLE 1

<table>
<thead>
<tr>
<th>Demographic Characteristics of Respondents*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total number of usable surveys analyzed</strong></td>
</tr>
<tr>
<td><strong>Response rate (electronic + printed)</strong></td>
</tr>
<tr>
<td><strong>Primary type of practice</strong></td>
</tr>
<tr>
<td>Private practice</td>
</tr>
<tr>
<td>Private practice with corporate dental chain management</td>
</tr>
<tr>
<td>University</td>
</tr>
<tr>
<td>Hospital</td>
</tr>
<tr>
<td>University/hospital</td>
</tr>
<tr>
<td>Federally qualified health clinic</td>
</tr>
<tr>
<td>Indian health clinic</td>
</tr>
<tr>
<td>Other community health clinic</td>
</tr>
<tr>
<td>No longer actively treating children</td>
</tr>
<tr>
<td>Not a dentist who treats children</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td><strong>Years practicing</strong></td>
</tr>
<tr>
<td>1–5</td>
</tr>
<tr>
<td>6–10</td>
</tr>
<tr>
<td>11–15</td>
</tr>
<tr>
<td>16–20</td>
</tr>
<tr>
<td>&gt; 20</td>
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</tbody>
</table>

*Numbers shown as percentage of respondent.
determine how much pain a child is experiencing during procedures involving tissue trauma? Related to this, we also wanted to know if pediatric dentists were targeting pain or behavior for measurement. Second, how do pediatric dentists view the relative risk attending to alternate interventions in pain/distress? Only the findings related to the first question are reported in this paper.

Methods
This research was approved by the Institutional Review Board of NorthBay Medical Center, Fairfield, Calif. A brief letter describing the study and its purpose was emailed to 5,241 active members of the American Academy of Pediatric Dentistry during the fall of 2012. One hundred fifty-seven of these letters bounced and were undeliverable leaving a total of 5,084 delivered email surveys. Surveys were filled out anonymously online. Nonresponders were sent follow-up emails at four weeks and six weeks after the initial mailing. For those members who did not have email addresses (665), printed surveys were sent. Sixteen print surveys were returned as undeliverable. The total number of print surveys delivered was 649. There was no follow-up mailing for nonresponders of the printed surveys. The total number of surveys delivered was 5,733.

Survey Questions
The data presented in this paper are limited to demographic data and the thought processes of how dentists assess behavior of children during procedures that involve tissue trauma. There were five demographic questions. Only three were considered of interest in this presentation: practice type, gender and years of experience. Type of training and practice location are not presented at this time.

While the original survey involved 10 questions regarding the respondent’s behavior assessment practices, only six relate to this paper’s research question. Three of the six questions were later found to have an ambiguity that disqualified them from being used in the formulation of our conclusions. Their problems are discussed below in the Limitations section. Two of the remaining three questions are essentially the same question asked in different ways. Their answers have logical connections with each other.

Logically Connected Beliefs
A fundamental premise of this paper is that a respondent who believed that they had the experience and training to differentiate pain from nonpain constructs is logically expected to believe that the dentist should decide the intensity of a child’s pain experience. If a clinician holds both beliefs, they are termed a consistent authoritarian. If the clinician holds only one of these beliefs, they are termed a reluctant authoritarian. Reasons for this are given in the discussion. Alternately, a respondent who believed that they did not have the experience and training to differentiate pain constructs from other distress constructs is expressing a belief that is logically connected to the belief that the child is best suited to determine their own pain intensity. Clinicians who hold both of these beliefs are termed consistent advocates.

Definitions
To be certain there was no confusion as to what was meant by the terms used in the questions, the following statement prefaced the behavior assessment section of the survey.

“The manner in which behavior is assessed in pediatric dentistry is controversial. Choose the answer that best corresponds to your thoughts or feelings:”

- Invasive procedure is one that is causing tissue trauma such as during an injection or a restorative procedure involving removal of enamel or dentin.
- Negative, uncooperative or disruptive behavior is movement of head, arms, legs or torso including general protest with no compliance.

<table>
<thead>
<tr>
<th>TABLE 2</th>
</tr>
</thead>
</table>

Survey Questions Regarding Pain Assessment Practices

<table>
<thead>
<tr>
<th>Question</th>
<th>Strongly or generally agree</th>
<th>Neutral</th>
<th>Strongly or generally disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.* When uncooperative, negative or disruptive behavior occurs during an invasive procedure, my experience and training with children permits me to discriminate between behavior that is the result of pain and behavior that is not the result of pain. N = 1,149</td>
<td>87%</td>
<td>3%</td>
<td>10%</td>
</tr>
<tr>
<td>8. When a procedure involves the surgical removal of normal dentin (such as when the high-speed dental bur is used to extend the margins of the dental restoration), who is the best person to decide how much pain the child is experiencing? N = 1,081</td>
<td>46%</td>
<td>1%</td>
<td>53%</td>
</tr>
<tr>
<td>9. In your management of a child’s behavior, for which factors do you routinely use formal measurement scales to rate intensity of the experience? N = 1,149</td>
<td>52%</td>
<td>3%</td>
<td>10%</td>
</tr>
</tbody>
</table>

*This was the first nondemographic question asked. Some clinicians chose more than one answer.*
Results

Of the 5,733 surveys delivered, a total of 1,013 email responses and 179 paper responses were collected. The total number of survey responses was 1,192. From these, the number of usable survey responses for the purposes of analysis was 1,149. Including both printed and digitally delivered surveys, the usable response rate was 20%.

Demographic results are presented in Table 1.

Frequency responses for pain assessment questions are presented in Table 2 and Figures 1–3.

Frequency responses for logically connected beliefs are presented in Figure 4.

Frequency responses for questions that were not used to form conclusions due to their ambiguity or lack of specificity are presented in Table 3. The specific reasons for not using these questions are discussed in the Limitations section.

Statistical Analysis

Survey data were collected in SurveyMonkey and the data exported to the SAS/STAT v9.2 statistics software for analysis. Chi-square, Fisher exact tests and Cochran-Armitage trend tests were conducted to assess associations between responses to survey questions on the use of selected behavior assessment beliefs, measurement methodology of pain/distress intensity and demographic characteristics of respondents. Statistical tests were two-sided at a 0.05 significance level.

Associations

- Those respondents who used a pain scale were more likely to believe that the child was the best person to decide how much pain they were experiencing rather than the dentist, in contrast to those who did not use a pain scale (64% versus 53%, p = 0.04).
- Respondents beliefs about their experience and training were not significantly associated with who they thought was the better judge of pain, either child or dentist (p = 0.08). Of the respondents who believed they had the experience and training to differentiate pain from nonpain distress, 53% believed that the child was the best person in the procedure room to determine their pain intensity while 46% believed that it was the dentist who should decide. Of the respondents who believed they did not have the experience and training to differentiate pain from nonpain distress, 50% believed that the child should be allowed to decide their own pain while 50% believed that it should be the dentist.

Comments

A comments window was provided for the survey respondents to comment on any aspect of the survey. One hundred forty-four respondents availed themselves of this opportunity. Most of the comments were directed at questions not reported in this presentation. Sixty-three comments can be construed to possibly apply to the questions reported in this paper and are summarized here. Most of them broadly argued for a need for greater detail in the questions before they can be adequately answered. “A lot of the questions should ideally be evaluated on a case-by-case basis” is an example. Other examples are: “Children’s behavior is multifaceted and can’t be narrowed to one thing, pain.” “This survey is very generalized. Sometimes I think the dentist is the best to know what level of pain the child is experiencing and other times I think it’s the child.”

Six respondents pointed out that the alternating reversal of the Likert answers choices — strongly agree, generally agree, neutral, generally disagree, strongly disagree — was confusing and could result in unknowingly marking an answer that was the reverse of their opinion. For this reason, only the response to the first Likert scale question is being reported in this paper. Being the first, it should not have any “reverse order” artifact associated with its data.
Limitations

All surveys are limited in their ability to generalize conclusions to the survey’s target population by the response rate, which, in this case, was 20%.

Another limitation is that we only investigated how dentists think. What people think and what people do are not necessarily the same thing. A hint of this difficulty can be seen by the lack of a significant association between respondent beliefs about their experience and training in pain assessment and who they thought should be making that assessment — the dentist or the child. When respondents were asked logically connected questions about pediatric pain assessment, respondents’ answers were not logically connected for the majority of respondents.

A pilot study was not performed for this survey, which is likely reflected in the issues associated with the following questions found in Table 3.

Question 5: This question is not specific as to time. It does not tell us if the respondent is currently revising downward a child’s pain reports to justify the use of restraints or if this is a practice that only occurred in the distant past. It is also one of the questions that had its Likert answer order reversed and will suffer from some “confusion” artifact. It has not been used to form our conclusions.

Question 6: This question is also not used to form our conclusions because it has ambiguous interpretations. The intent was to identify if respondents understand that pain is defined as both an emotional and sensory experience so that the emotional “dimension” of pain is not a false contribution to pain experience. However, while older children may hide much of their pain expression in conformance to cultural prohibitions against displaying pain distress, preschool children who have less exposure to the influence of culture may “symptom magnify” their pain experience to convince an observer that they really are experiencing some level of pain. Both of these age groups have alternate interpretations of a child’s pain expression that could have been used by respondents to answer the question making both agreement and disagreement with the statement correct. The word “expression” should not have been in the question.

Question 7: This question does not identify specific authoritarian beliefs about pain assessment. As described above, the decision to use restraints involves more than an estimation of the procedure pain involved. This question serves as a calibration with a nearly identical question that was asked in the Vargas and Nathan et al. survey eight years previously. At that time, 47% of respondents were in agreement — only 1% higher than this survey. This question did differ from Vargas and Nathan et al. by excluding children aged 2 and younger from consideration. It also suffers from a potential response artifact created by the reverse order Likert scaling of answers.

FIGURE 1. Level of agreement with training and experience statement: “When uncooperative, negative or disruptive behavior occurs during an invasive procedure, my experience and training with children permits me to discriminate between behavior that is the result of pain and behavior that is not the result of pain.”

FIGURE 2. Who is the best person to decide how much pain a child is experiencing during an invasive procedure?

FIGURE 3. Formal measurement scales used by pediatric dentists.
Discussion

It is well known that pain is solely a construct of the mind, not a tangible thing; genetic and phenotypic factors make each individual’s pain sensitivity unique so that there is no uniform pain response for a given level of tissue trauma. Fifty years of research has documented that clinicians cannot accurately and reliably estimate their patients’ pain experience. Despite this evidence, 87% of pediatric dentists indicate that they believe they have the experience and training to tell the difference between behavior that is the result of pain and behavior that is the result of other types of distress during procedures involving tissue trauma.

Consistent Authoritarians

Only 46% of pediatric dentists held the authoritarian belief that the dentist should be the one to determine how much pain a child was experiencing when procedural tissue trauma was occurring. Even fewer pediatric dentists (40%) consistently held both logically connected authoritarian beliefs.

Reluctant Authoritarians

Fifty-two percent of pediatric dentists hold conflicting pain assessment beliefs. When a child’s procedural distress intensity runs outside the boundary of the dentist’s usual experience with other children for the same pain stimulus and the clinician is unable to alleviate the child’s pain symptoms, these “conflicted” dentists may feel justified in denying the authenticity of some or all of a child’s procedure pain expression. When a dentist allows the child to decide how much pain they are experiencing only when the child’s pain expression is in agreement with the dentist’s assessment of pain intensity, this actually means that it is the dentist who is always deciding the procedure pain intensity of children. This is why “conflicted” clinicians have been termed reluctant authoritarians.

Targeting Pain Versus Targeting Behavior

Pediatric dentists are frequently the source of pediatric procedure pain. When noxiously stimulating children during procedures, pediatric dentists know when, where and how the pain stimulus is occurring. In the invasive, procedural context, the only problematic metric for them is knowing the intensity of the child’s pain experience. Measuring a child’s pain experience and documenting it is a necessary step in refining one’s clinical pain interventions. Only 10% of pediatric dentists use formal pain scales to score the intensity of a child’s pain experience during procedures.

The majority of pediatric dentists (52%) utilize behavior scales to measure a child’s procedural distress. Behavior is an ambiguous assessment target that can be interpreted as a pain behavior or something else. However, most dentists who use a behavior scale, such as the four-point Frankl scale, generally prefer to allow the child to determine how much pain they are experiencing. This makes sense because the hand, leg, torso and other distress movements that are being scored with a behavior scale are virtually identical to what would be identified as pain movement when there is evidence of procedural tissue trauma.

Seers and Derry et al. reported that the highest underestimation of a patient’s pain occurs during the highest intensity of a patient’s pain experience. It is in this clinical context that a reluctant authoritarian who generally follows a methodology in pain assessment that allows the child to determine their level of pain can convert to an authoritarian method that denies the behavioral pain reports of young children. A systematic review of pediatric dental sedation studies found that pediatric dentists do continue to treat children when children’s ostensible pain behavior is in the upper registers of distress. Out of 65 sedation studies included in the review, 66% of the clinician participants in those studies completed treatment regardless of how much distress the child was exhibiting during invasive treatment. The need to use immobilizing restraint to complete treatment indicates that the child’s pain/distress was high. Distress behavior during invasive procedures that requires immobilizing restraint in order to continue treatment is, by inference, pain that is beyond a child’s pain tolerance threshold.

Pain Assessment Bias or Knowledge Deficit in Sedation Pharmacology

One of the possible rationalizations that dentists use to justify the use of restraint is unique to sedation. Anecdotally, it is known that some dentists continue treatment during pharmacologically failed sedations because
they believe that midazolam has amnesia properties that would prevent children from remembering their traumatic pain experiences. This idea is reflected in the online advertising of a popular midazolam sedation course that informs dentists that they will learn how to “transform multiple appointments and difficult cases into a single ‘no memory’ appointment.”62 Additionally, a 2016 study of midazolam sedation effectiveness also promotes this idea when it emphasizes that midazolam has the ability to make the patient “forget their unpleasant experience.”63 Both of these statements about midazolam amnesic effects are only half right. Midazolam’s amnesia properties only apply in an imperfect, dose-related manner to explicit, declarative event memory.54-66 Its effectiveness in producing explicit memory amnesia is sometimes as low as 73%.67 The implicit, nondeclarative, unconsciously and automatically accessed memories of long-term sensitization and classical fear conditioning are left intact.54,65

Forty-five percent of the sedation studies in Matharu and Ashley’s (2007) systematic review of pediatric dental sedations used midazolam in at least one of their paired drug regimens.64 Therefore, much of the continuance of treatment during high distress behavior could be due to a misunderstanding regarding sedation pharmacology and not due to a downwardly revising pain assessment bias. Still, this level of midazolam involvement does not fully explain why nearly one-third of study participants completed treatment regardless of the level of distress that the child exhibited.

**Consistent Advocates**

Only 5% of pediatric dentists consistently hold pain assessment beliefs that are not susceptible to systematic pain underestimation. The other 5% of dentists who did not believe they have the experience and training to differentiate the different mental constructs making up a child’s procedural distress (an advocate belief) paradoxically believe that it is the dentist (an authoritarian belief) who should ultimately determine how much of a child’s pain behavior is authentic and how much is false.

**Dentists Who Do Not Use Formal Measurement Scales**

A large percentage of pediatric dentists do not use any formal measurement scales to rate a child’s distress behavior (35%). If the clinician has been in practice for 16 years or more, this number increases to 50%. Anecdotally, it is understood that many clinicians narratively describe the quality of their patient’s experience (e.g., crying, moving hands and arms) in the patient’s chart to assist their team in preparing for future procedures. If intensity descriptors are also being used (e.g., “a little” or “thrashing”) or if the qualitative descriptors are only added when there are big movements, then this could mitigate a failure to assign a metric to the behavior described.

**Conclusion**

Eighty-seven percent of pediatric dentists believe that when a child is exhibiting uncooperative, disruptive, procedural behavior, the dentist’s experience and training permits them to discriminate between behavior that is the result of pain and behavior that is the result of distress or misbehavior constructs.

Fifty-two percent of pediatric dentists hold conflicting pain assessment beliefs. Either they believe that they have the experience and training to discriminate between pain and non-pain constructs during procedures involving tissue trauma or they believe that the dentist (and not the child) should decide how much pain the child is experiencing, but not both.

Forty percent of pediatric dentists consistently hold pain assessment beliefs that make them vulnerable to an underestimation of pediatric pain. They believe that they can discriminate between pain and non-pain constructs during procedures involving tissue trauma and they believe that, in this context, the dentist (not the child) should decide how much pain a child is experiencing. Ninety-two percent of pediatric dentists hold one or more pain assessment beliefs that make them vulnerable to a systematic error that tends to underestimate pediatric pain.

Fifty-two percent of pediatric dentists use behavior scales to score the intensity of negative procedural behavior while only 10% utilize pain scales. Thirty-five percent of pediatric dentists use no formal measurement scale to score the intensity of procedural behavior.

Further study is required to determine the extent of influence that authoritarian pain assessment methodology has on the decision process involved in selecting restraint as an intervention in the disruptive behavior of young children during procedures involving tissue trauma.

Until an accurate, reliable, clinically useful, objective measure of pediatric procedure pain is found, distress behavior that occurs coincident with procedural tissue trauma should be accepted as the child’s behavioral expression of pain until the child says otherwise.

**ACKNOWLEDGMENTS**

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THE CORRESPONDING AUTHOR, Dennis Paul Nutter, DDS, can be reached at dennispaulnutterdds@yahoo.com.
If you’re a dentist who’s also an employer, you have access to time-saving tools from CDA Practice Support, including a new online employee manual generator that walks you through a series of questions to quickly create your customized and compliant manual.

ONE EASY PLACE.
Comparative Evaluation of Fracture Strength of Maxillary Denture Base in Different Arch Shape and Palatal Vault Configuration by Three Different Processing Techniques

Sushil Kar, MDS; Arvind Tripathi, MDS; and Sayida Khan, BDS

ABSTRACT Fracture of acrylic resin denture bases, which is characterized in maxillary bases by midline fractures, is a continuing problem in prosthodontics. Therefore, there is a need for improvement especially in terms of fracture strength. The purpose was to investigate and compare the fracture strength of complete maxillary denture base in different arch shape and palatal vault configuration by three different processing techniques — pressure cooker, conventional water bath and microwave.

AUTHORS

Sushil Kar, MDS, is a professor in the department of prosthodontics and crown and bridge at Subharti Dental College and Hospital in Meerut, India. Conflict of Interest Disclosure: None reported.

Arvind Tripathi, MDS, is a professor and the head of the department of prosthodontics at the Saraswati Dental College and Hospital in Lucknow, India. Conflict of Interest Disclosure: None reported.

Sayida Khan, BDS, is a junior resident in the department of prosthodontics at the Saraswati Dental College and Hospital in Lucknow, India. Conflict of Interest Disclosure: None reported.

Polymethyl methacrylate (PMMA) is the most frequently used material in denture base fabrication and was first introduced in 1937 by Walter Wright and Vernon Brothers in Philadelphia. Despite their excellent properties, there is a need for improvement, especially in terms of fracture resistance. A recent analysis of denture base fractures indicated that the ratio of maxillary to mandibular fractures was generally 2 to 1 based on repairs performed by commercial dental laboratories. Babu MR, Beyli MS and Fraunhofer JA accounted many factors for influencing flexural fatigue strength, some of them being frenum notches, surface irregularities and foreign-body inclusion, porosities and residual monomer content. Palatal shapes have been found to have great influence on the fracture strength of polymerized PMMA resin denture bases. Among the different processing techniques, the conventional water bath technique has the major disadvantage of a long processing time. In 1989, Muley first reported a pressure cooker polymerization technique that was further investigated by Sidhaye and Undurwade. Kimura et al. conducted various studies on microwave polymerized denture base resins and concluded that this technique can produce denture bases with comparable physical and mechanical properties. Very few studies have reported the influence of different polymerization techniques on the mechanical strength of denture base resins.
Therefore, the purpose of this study was to investigate and compare the fracture strength of complete maxillary denture base in different arch shape and palatal vault configuration using three different processing polymerization techniques: conventional water bath, pressure cooker and microwave polymerization techniques.

Methods and Materials
The study was carried out on 120 subjects from the outpatient department. Ethical clearance was obtained by the Institutional Human Ethical Committee (IHEC) and the Institutional Research and Development Committee (IRDC) of Saraswati Dental College, Lucknow, India. Informed consent from the participants was obtained and primary impressions of maxillary arches were taken. A total of 120 specimens were fabricated using four palatal vault configurations, out of which 30 specimens each were from deep, moderate, shallow and flat palatal vault configuration. Three processing techniques were used in the study: pressure cooker, conventional water bath and microwave. The specimens under each palatal vault configuration were further divided into U arch form and V arch form with five specimens each.

Mechanical strength of all the specimens was recorded. The specimens were stored in water at room temperature for 28 days.

The inclusive criteria were middle-aged and old-aged subjects comprising of equal numbers of males and females with periods of edentulism ranging from six months to two years. The criteria for exclusion were subjects with single tooth and root stumps, TMJ problems, patients suffering from systemic diseases, denture stomatitis, history of trauma and the presence of cleft or abnormalities in the palate. Final impressions were made by selective impression technique using zinc oxide-eugenol impression pastes (DPI impression paste, Dental Products of India, Mumbai, India) that were subsequently poured with dental stone (Kalstone, Kalabhai Karson Pvt Ltd., Mumbai, India) to obtain the master cast.

Depth Measurement of Palatal Vault Configurations
A dental surveyor (Ney surveyor, Marathon 103, Saeyang Microtech, Daegu, South Korea) was used to determine zero tilt of the casts during measurements. Two lines crossing each other were drawn on the cast; the first line extended from the middle of the incisive papilla to the fovea palatine, while the second line crossed the first at the middle. The crossing point was marked by a lead pencil. The depth of the palate at this point was measured by adjusting a digital Vernier caliper (any 6 inch/150 mm). The data were recorded and categorized into four categories according to the palate depth: deep (15.5–20.0 mm), moderate (10.5–15 mm), shallow (5.5–10 mm) or flat palate (less than 5.5 mm) and arch forms U or V (Figure 1).

Measurement of U and V Arch Forms
The width of the maxillary edentulous arch was determined between the left and right side of the edentulous ridge on the posterior end of the tuberosities (Figure 2). To determine the arch shape (U or V), the width at the incisor, premolar and molar regions was measured.

Thickness of the Maxillary Denture Base
Modeling wax sheets (Dental Products of India) that were 2 mm thick were adapted on each working cast. Acrylization was carried out using either conventional water bath, pressure cooker or microwave polymerized techniques following the standardized protocols (Figure 3). Once processed, the denture bases were measured for thickness using a millimeter gauge at the midline, first premolar region, right and left second molar region and right and left anterior region and were standardized to 2 mm.

Evaluation of Mechanical Strength
All the specimens were stored in distilled water at room temperature for 28 days. Subsequently, the specimens were dried and kept with the polished surface on the platform of the Universal Testing Machine (INSTRON UTM, model 3382) (Figure 4). The fracture tests were carried out on the Universal Testing Machine at a crosshead...
speed of 5 mm/min. Force was applied via a specifically designed metal ring placed on the most prominent part of the palate and the readings were collected. The data were statistically analyzed. One-way analyses of variance (ANOVA) were used to test the differences in mechanical strength between the selected palatal vault configurations and arch form groups and the highest fracture strength between three different polymerization techniques were calculated.

**Results**

**Statistical Tools Employed**

The statistical analysis was done using Statistical Package for Social Sciences (SPSS, IBM, Armonl, N.Y.) statistical analysis software, version 15.0. The values were represented in number (%) and mean ± SD. The ANOVA test was used to compare within the group and between the groups. Post-hoc tests (Tukey-HSD) were used for each mean comparison and “p” for the level of significance.

Mechanical strength was found to be minimum for specimens processed by pressure cooker with a mean value of 846.23 ± 187.94 N (range: 481.62 to 1,225.07 N) followed by conventional water bath with 933.89 ± 181.80 N (range: 627.83 to 1,350.31 N) and maximum for specimens processed by microwave with 991.37 ± 168.63 N (range: 781.01 to 1,378.23 N). The box plot shows that the difference in mechanical strength of specimens processed by different polymerization techniques.
polymerization techniques was found to be statistically significant with overlapping of interquartile values of pressure cooker and conventional water bath and conventional water bath and microwave (FIGURE 5). Between polymerization techniques, the difference in mechanical strength was found to be minimum between conventional water bath and microwave (57.48 ± 40.18 N), but the difference between pressure cooker and microwave was found to be statistically significant (TABLE 1).

The mechanical strength of specimens processed by the pressure cooker technique was found to be maximum for specimens with deep palatal vault configuration (1,059.33 ± 74.87 N; range: 960.21–1,225.07 N) and minimum with flat palatal vault configuration (56.71 ± 35.82 N; range 481.62–799.21 N) (TABLE 2). The difference in mechanical strength of specimens processed by the pressure cooker technique with different palatal vault configuration was found to be statistically significant (p < 0.001) (TABLE 3). The difference in mechanical strength was maximum between deep and flat palatal vault configuration (406.03 ± 35.82 N) and was found to be statistically significant but no significant difference was found between shallow and flat (56.71 ± 35.82 N) (TABLE 4).

The mean mechanical strength of specimens processed by the microwave technique was 991.37 ± 168.63 N and found to be maximum for specimens with deep palatal vault configuration (1,217.39 ± 99.92 N; range: 1,055.43–1,378.23 N). The mechanical strength was found to be minimum in specimens with flat palatal vault configuration (813.07 ± 41.44 N; range 781.01–889.44 N) (TABLE 2). The difference in mechanical strength of specimens processed by the microwave technique with different palatal vault configuration was statistically significant (p < 0.001) (TABLE 3). The

| TABLE 1 |
| Analysis of Variance and Comparison of Mechanical Strength in Fracture Test (Tukey HSD Test) |
| Sum of squares | df | Mean square | F | ‘p’ |
| Between groups | 427,379.26 | 2 | 213,689.63 | 6.620 | 0.002* |
| Within groups | 3,776,934.81 | 117 | 32,281.49 | |
| Total | 4,204,314.07 | 119 | |
| Mean difference | S.E. | ‘p’ |
| Pressure cooker versus conventional water bath | -87.66 | 40.18 | 0.079 |
| Pressure cooker versus microwave | -145.14 | 40.18 | 0.001* |
| Conventional water bath versus microwave | -57.48 | 40.18 | 0.329 |

*Statistically significant values.

| TABLE 2 |
| Comparison of Mechanical Strength in Fracture Test of the Commonly Used Acrylic Denture Base Materials by Pressure Cooker Technique, Conventional Water Bath and Microwave |
| Palatal vault configuration | No. of specimens | Minimum | Maximum | Mean | SD |
| Deep | Pressure cooker technique | 10 | 960.21 | 1,225.07 | 1,059.33 | 74.87 |
| | Conventional water bath | 10 | 1,001.29 | 1,350.31 | 1,154.74 | 125.62 |
| | Microwave | 10 | 1,055.43 | 1,378.23 | 1,217.39 | 99.92 |
| Moderate | Pressure cooker technique | 10 | 800.05 | 1,106.12 | 962.29 | 88.30 |
| | Conventional water bath | 10 | 845.21 | 1,176.11 | 1,002.29 | 90.94 |
| | Microwave | 10 | 887.47 | 1,176.87 | 1,027.03 | 88.17 |
| Shallow | Pressure cooker technique | 10 | 609.21 | 821.07 | 710.01 | 69.08 |
| | Conventional water bath | 10 | 767.21 | 933.01 | 845.47 | 51.81 |
| | Microwave | 10 | 827.21 | 991.45 | 907.99 | 50.29 |
| Flat | Pressure cooker technique | 10 | 481.62 | 799.21 | 653.30 | 86.53 |
| | Conventional water bath | 10 | 627.83 | 791.01 | 733.07 | 61.23 |
| | Microwave | 10 | 781.01 | 889.44 | 813.07 | 41.44 |
| Total | Pressure cooker technique | 40 | 481.62 | 1,225.07 | 846.23 | 187.94 |
| | Conventional water bath | 40 | 627.83 | 1,350.31 | 933.89 | 181.90 |
| | Microwave | 40 | 781.01 | 1,378.23 | 991.37 | 168.63 |
A difference was found to be maximum between deep and flat (404.32 ± 33.17 N) and minimum between shallow and flat (94.93 ± 33.17 N) (TABLE 4).

Mechanical strength of specimens processed by any of the techniques was found to be maximum for specimens with deep palatal vault configuration (1,143.82 ± 118.76 N; range: 960.21–1,378.23 N) followed by moderate palatal vault configuration (997.21 ± 90.19 N; range: 800.05–1,176.87 N). Minimum mechanical strength was found in specimens with flat palatal vault configuration (733.15 ± 91.77 N; range 481.62–889.44 N). The difference in mechanical strength of specimens processed by any of the techniques with different palatal vault configuration was found to be statistically significant (p < 0.001) (TABLE 5). An overlapping of interquartile values was observed between shallow and flat palatal vault configuration (FIGURE 6). The order of mechanical strength of specimens processed by any of the techniques in different palatal vault configuration was deep > moderate > shallow > flat.

The difference in mechanical strength of specimens processed by any of the techniques with a U arch form (926.55 ± 184.88 N) and V arch form (921.11 ± 192.52 N) was not found to be statistically significant (p = 0.875) (TABLE 6).

**Discussion**

The denture base is subjected to load during function as well as parafunction. Under the load, the maximum stress is on the palatal aspect of the denture base that enables the initiation and propagation of the cracks thereby influencing the rate of failure.13 Peyton and Anthony conducted an experiment on the fracture strength of heat-cured and cold-cured denture bases and found that both the heat-cured and self-cured dentures resisted an average force of approximately 139 pounds before the initial break at the midline, but considerable additional force was required to complete the fracture in the front.14 In a survey by Darbar et al., 68% of dentures had broken within three years of their fabrication and midline fracture was found to be the most common problem.15 Of these midline fractures, 71% were seen in maxillary complete dentures and 29% were seen in mandibular dentures. Any factor that exacerbates deformation of the base or alters its stress distribution predisposes the denture to fracture.16 While impact may fracture dentures when they are dropped, repeated flexing
from chewing ultimately leads to fatigue in many dentures in the mouth. A study by Lambrecht and Kydd found two types of deformation predominance; the first was extension, a flattening or straightening of the base at the midline, and the second was compression, an increase at the curvature of the base at the midline. Beyli and von Fraunhofer analyzed the causes of fracture of acrylic resin dentures and proposed that the most promising approach to prevent or reduce the incidence was to reinforce the anterior part of the palate of the denture. Schneider et al. compared the tensile bond strengths of heat- and microwave-polymerized acrylic resins among four types of acrylic resin denture teeth and suggested that the selection of more compatible combinations of base and resin teeth may reduce the number of prosthesis fractures and resultant repairs.

The present study tested three different depths of the palatal vault with an assumption that the depth of the palate might have a role in distribution of stresses that occur during functional and parafunctional movements of the jaw and concludes that deep palatal vault denture bases have better mechanical strength when compared to the other three. Because stress is force per unit area, there is always a higher tendency of fracture of flat palatal vault bases in comparison to deep palatal vault due to less surface area. Additionally, in patients with deep palatal vault, the height of contour in the anterior part of the palate might act as a secondary stress-bearing area that helps in dissipating forces acting on the denture base, whereas in the case of flat palatal vaults, there is no counteracting force dissipation effect by anterior slope of palate. According to Schneider, the fulcrum created in a denture at the mid-palatal suture contributes to variation in resistance of the denture bases to fracture in different palatal vault configurations. Annusavice proposed that in nonuniform objects stresses typically decrease as a function of distance from the area of the applied force or applied pressure. Meyer concluded that fracture in the complete denture base occurs due to uneven and deflective occlusal contacts that will deform the denture base and create lines of fatigue.

The heating process used to control polymerization is called the polymerization cycle or curing cycle, and any change in properties is more likely to result from differences in the degree of the cure of the interstitial matrix. Ease of curing the dentures in a domestic pressure cooker was first suggested by Muley in 1976. In developing countries where large numbers of dentists practice outside of metropolitan cities, dentists are compelled to process dentures themselves because of the unavailability or remoteness of well-equipped laboratories. When a pressure of 760 mmHg (15 psi) is applied in a 6L pressure cooker by compressor for 20 minutes, the boiling water could produce steam pressure up to 1,520 mmHg. A curing time of less than 30 minutes can lead to more residual monomer than with the conventional method. Mechanical strength of specimens processed by the pressure cooker technique was found to be maximum for specimens with deep palatal vault (1,059.33 ± 74.87 N; range: 960.21–1,225.07) and minimum for flat palatal vault configuration (653.30 ± 86.53N; range 481.62–799.21 N). Donovan et al. showed the same result in their study. The difference in mechanical strength of specimens processed by the pressure cooker technique with a U arch form (851.69 ± 185.26 N) and V arch form (840.78 ± 195.23 N) was not found to be statistically significant (p = 0.857).

The water bath heat processing technique involves the activation of the initiator, i.e., benzoyl peroxide, creating the first free radicals to start the polymerization cycle above 60 degrees Celsius (140 degrees Fahrenheit). At 100.8 degrees Celsius (213.4 degrees Fahrenheit), the methyl methacrylate boils and creates porosities in the resin because the heat liberated due to polymerization does not escape easily due to the unfavorable thermic gradient. To control this thermal gradient, it is necessary to polymerize the denture base resin at a much

| TABLE 5 |
| Analysis of Variance and Between Palatal Vault Configuration Comparison of Fracture Strength (Tukey HSD Test; All Three Techniques) |

<table>
<thead>
<tr>
<th>Source of variation</th>
<th>Sum of squares</th>
<th>Df</th>
<th>Mean square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between groups</td>
<td>3,020,422.60</td>
<td>3</td>
<td>1,006,807.53</td>
<td>59.573</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Within groups</td>
<td>1,183,891.47</td>
<td>116</td>
<td>10,205.96</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>4,204,314.07</td>
<td>119</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mean difference</th>
<th>S.E.</th>
<th>'p'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deep versus moderate</td>
<td>146.61</td>
<td>26.08</td>
</tr>
<tr>
<td>Deep versus shallow</td>
<td>322.66</td>
<td>26.08</td>
</tr>
<tr>
<td>Deep versus flat</td>
<td>410.67</td>
<td>26.08</td>
</tr>
<tr>
<td>Moderate versus shallow</td>
<td>176.05</td>
<td>26.08</td>
</tr>
<tr>
<td>Moderate versus flat</td>
<td>264.06</td>
<td>26.08</td>
</tr>
<tr>
<td>Shallow versus flat</td>
<td>88.01</td>
<td>26.08</td>
</tr>
</tbody>
</table>

*Statistically significant values.
slower rate, approximately eight hours for complete polymerization. In the conventional water bath polymerization technique, mechanical strength of specimens was found to be maximum for specimens with deep palatal vault configuration (1,154.74 ± 125.62 N; range: 1,001.29–1,350.31 N) and minimum for specimens with flat palatal vault configuration (733.07 ± 61.23 N; range: 627.83–791.01 N). The difference in mechanical strength of specimens processed by the conventional water bath technique with U arch form (932.33 ± 176.57 N) and V arch form (935.46 ± 191.65 N) was not found to be statistically significant (p = 0.957).

In 1968, Nishii et al. introduced microwave processing for polymerization of denture base resin. In this technique, microwaves were used to generate heat inside the resin. Kimura et al. conducted an experiment on a microwave flask constructed of glass fiber-reinforced polyester resin with polycarbonate bolts, and he processed the denture in an LG microwave oven with rotating turntable. The microwaves produced are electromagnetic waves. Domestic microwave ovens that use a frequency of 2,450 MHz can be used for this purpose. The numerous intermolecular collisions that occur cause rapid heating and less than 10 minutes is required for complete polymerization. As the temperature increases, the number of monomer molecules decreases and the residual monomer content is reduced to a minimum. The polymerization heat is dissipated more effectively, faster and with lesser risk of porosity that results in better dimensional accuracy, transverse strength and less residual monomer content of the denture base. Levin et al. conducted experiments on five different resins processed with microwaves and conventional water bath and concluded that the important physical characteristics of microwave-cured resin are approximately the same as resin cured in a conventional water bath. The results of the present study are supported by the findings of Gurbuz et al. that the heat-curing method of the water bath produces denture bases with mechanical strengths lesser but comparable to the microwave processing technique. Kim and Watts evaluated the effect of woven E-glass fiber reinforcement on the impact strength of complete dentures and found that impact strength of maxillary dentures was increased by a factor greater than twice when reinforced with woven E-glass fiber. However, in a situation where the equipment required for microwave and water bath were not available, the pressure cooker technique can be used as a valid alternative for curing. Another observation in this study was that the denture bases fabricated on deep palatal vaults had the highest mean mechanical strength irrespective of the type of curing employed. Conversely, denture bases fabricated on flat palatal vaults had the lowest mean mechanical strength. Differences in mechanical strength of specimens with a U arch form and a V arch form in none of the palatal vault configuration were found to be statistically significant.

### TABLE 6

<table>
<thead>
<tr>
<th>Configuration</th>
<th>U arch (n = 20)</th>
<th>V arch (n = 20)</th>
<th>Statistical significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>Maximum</td>
<td>Mean</td>
<td>Minimum</td>
</tr>
<tr>
<td>Pressure cooker</td>
<td>591.45</td>
<td>1,125.01</td>
<td>851.69</td>
</tr>
<tr>
<td>Conventional water bath</td>
<td>653.89</td>
<td>1,350.31</td>
<td>932.33</td>
</tr>
<tr>
<td>Microwave</td>
<td>790.87</td>
<td>1,378.23</td>
<td>995.65</td>
</tr>
<tr>
<td>Total</td>
<td>591.45</td>
<td>1,378.23</td>
<td>926.55</td>
</tr>
</tbody>
</table>

* Statistically not significant values.
Fracture strength

Conclusion

The present study therefore suggests that denture bases of different palatal vault configurations and arch forms processed by using the microwave processing technique were significantly stronger than denture bases processed by conventional water bath and pressure cooker techniques. However, the equipment required for the microwave polymerization technique is expensive and not available in the routine lab, whereas the conventional water bath polymerization technique is the most commonly used technique worldwide and the equipment required is readily available. Deep palatal vault configuration denture bases possessed better mechanical strength than moderate, shallow and flat vaults. However, the mechanical strength of denture bases was not influenced by the arch forms (U and V shapes) irrespective of the different processing techniques.

Acknowledgment

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References


The corresponding author, Sushil Kar, MDS, can be reached at drsushil_kar@yahoo.co.in.
San Diego: $1,350,000 | 5 ops
Vista + RE: $450,000 | 4 ops
SOLD! Pacific Beach: $207,000
Escondido: $180,000 | 2 ops
Chula Vista: $430,000 | 5 ops
Palm Desert Area: $210,000 | 5 ops
SOLD! Fullerton: $245,000
South Bay + RE: $649,000 | 6 ops
Glendora: $425,000 | 4 ops
SOLD! Beverly Hills Endo: $399,000
Glendale: $650,000 | 4 ops
Santa Monica: $510,000 | 5 ops
Agoura Hills: $365,000 | 3 ops
Simi Valley: $235,000 | 3 ops
Newhall: $250,000 | 5 ops
Camarillo: $275,000 | 5 ops

Valencia: $600,000 | 5 ops
Camarillo: $360,000 | 4 ops
Ventura Turnkey: $110,000 | 3 ops
SOLD! Camarillo: $240,000
Bakersfield: $275,000 | 3 ops
Santa Barbara + RE: $1,050,000 | 4 ops
Santa Barbara County: $222,702 | 4 ops
Santa Barbara: $122,000 | 4 ops
Santa Barbara Wine County: $444,000 | 3 ops
SOLD! Camarillo: $1,553,000 | 6 ops
Central Coast: $548,000 | 5 ops
Central Coast: $390,000 | 3 ops
Central Coast Endo: $1,000,000 | 5 ops
SOLD! San Luis Obispo: $1,820,000
San Luis Obispo County: $650,000 | 4 ops

Central Coast Lease: $25/ft/yr NNN | 7 ops
N. Santa Barbara County: $1,437,000 | 9 ops
SOLD! San Luis Obispo: $460,000
San Luis Obispo Perio: $640,000 | 4 ops
Carmel: $525,000 | 4 ops
San Jose: $200,000 | 4 ops
Watsonville + RE: $491,000 | 5 ops
San Anselmo: $230,000 | 2 ops
SOLD! Sacramento: $230,000 | 2 ops
Fresno County: $343,000 | 4 ops
SOLD! Fresno County: $499,000
Davis: $1,700,000 | 6 ops
Sacramento: $270,000 | 6 ops
Sacramento Area: $329,900 | 5 ops
Roseville: $360,000 | 5 ops
Shasta County: $135,000 | 5 ops

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LOS ANGELES & VENTURA COUNTY


CERRITOS — Located in a busy strip mall, this GP has almost 50 yrs of goodwill. Consists of 6 eq ops. Property ID #5286.

CERRITOS — COMING SOON!!

CULVER CITY — GP w/ 60 yrs of goodwill to offers is located in a 1 story free standing bldg. Averaging 30 new patient/mo. Grossed $365K in 2018. NET $206K. Property ID #5276.

GRANDA HILLS — With 50 yrs of goodwill this general practice grossed approx. $328K in 2018. NET $206K. Property ID #5291.


ROWLAND HEIGHTS — Estab. in 2009, this GP is located in a 1 story free standing bldg. Grossed $772K in 2018. NET $237K. Property ID #5278.

SIMI VALLEY — COMING SOON!

TORRANCE — Located right off the PCH, this GP is Collecting $43K in monthly revenues. Net of $123K. Property ID #5281.

VENTURA — COMING SOON!!

ORANGE COUNTY
ANAHEIM — COMING SOON!!


FOUNTAIN VALLEY — COMING SOON!!

LAGUNA NIGUEL — With 16 yrs of goodwill this GP is located in a single story shopping center. Has 4 eq ops. Property ID #5290.


ROCKLIN — General practice located in a 1 story office. Has 3 eq ops. Buyer’s net of $142K. Property ID #5268.


SAN BERNARDINO — COMING SOON!!

US & CANADA — Total 40+ offices located in 30+ cities. Contact us for details. Property ID #5240.

SAN DIEGO COUNTY
CARLSBAD — This beautiful practice has over 22 yrs of goodwill. Has 4 eq ops in a 1,800 sq ft suite. Fee for service office. Grossed approx. $440K for 2018. Property ID #5256.

CARMEL VALLEY — Price Reduced! Turn key practice with 3 eq ops and 1 plumbed not eq on an approx. 1,815 sq ft suite. PPO and Cash only. Grossed approx. $325K in 2018. ID # 5274.

EL CAJON — GP — Real State. Price Reduced!!! Consists of 5 eq ops and equipped with 3D Sirona CBCT Digital X-ray. Grossed over $1M in the past 10 years. NET $365K. Property ID #5265.

SANCTIONS


RIVERSIDE COUNTY
RANCHO MIRAGE — Beautiful Fee for service General / Implant practice located in free standing bldg. Has 4 eq ops. Grossed $1.7M with a Buyer’s net of $1M. Property ID #5284.

TEMECULA — Pedo and Ortho Practice! It’s located in a duplex single story building. Grossed $1.7M with a Buyer’s net of $1M. Property ID #5243.


LA QUINTA — Price Reduced!! Well established GP with over 8 years of goodwill. This modern designed practice has 8 eq ops. On a the busiest major intersection. Grossed approx. $1.6M for 2018. NET $568K. Property ID #5130.


SAN BERNARDINO — COMING SOON!!


SOLD
In our digital world, it seems as though we are inundated with video recordings at every turn. Our every move is being observed, whether via our smartphones, our doorbells or even satellites miles above the earth. But what does this mean for the dental office?

Surveillance cameras in dental offices are becoming more and more common. The driving force behind them is typically security, as cameras can aid in loss control, deter theft and discourage other criminal activity.

But cameras are not without their drawbacks. Prior to hitting the record button, practice owners should be aware of the laws and regulations surrounding their use. While laws vary from state to state, some basic guidelines include the following:

- Only record video, not audio. Many states, including California, have strict laws against eavesdropping.
- Do not place cameras in areas where there is a reasonable expectation of privacy, such as restrooms or changing rooms.
- Inform all employees, in writing, that cameras are in use. You do not need their permission, but you do need a signed acknowledgment, which should be kept in their employee file.
- Inform patients that cameras are in use. If used in the reception area, this can be done with a simple sign. If used in operatories, have patients sign an acknowledgment and release form.
- Have a consistent policy in place on how recordings may be used and how long to keep them.

Most important, dental practice owners should consider HIPAA and privacy rules when installing cameras. Ensure that cameras are not able to capture a computer screen with a patient’s private information. Patients can often feel uncomfortable being recorded, so be prepared to turn off the camera if requested to do so. Be sure to document this in the patient’s chart.

If using cameras, it is also crucial for practice owners to consider who has access to the recordings. This

From one-on-one risk management advice by phone to informed consent forms to expert-led seminars, we’re here to help you practice with confidence.

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is true for recordings taken both inside and outside of the practice. If an exterior camera captures a patient entering the office, that alone is considered private health information and must be protected.

In one case reported to The Dentists Insurance Company’s Risk Management Advice Line, a patient backed into a parked car in the parking lot after leaving her appointment. She drove off without leaving a note, as required in California, which is a misdemeanor hit-and-run. Because the dental office’s windows faced the parking lot, the car’s owner came into the office and inquired if they witnessed who had hit his car.

Upon reviewing the surveillance footage, the dentist saw that the incident occurred and confirmed that it involved one of his patients. The owner of the damaged vehicle requested to view the footage and asked for the patient’s contact number. The dentist called the Advice Line seeking guidance on how to handle the situation.

The Risk Management analyst reminded the dentist of his obligation to report the incident to law enforcement. She also advised that he should reach out to the patient, inform her of the footage and suggest that she contact the damaged vehicle’s owner. Additionally, he was advised to let the patient know that should law enforcement ask to view the footage, he must comply.

“In an effort to protect privacy, it is not a good idea to universally allow someone to view footage when asked. There are precautions to consider, such as other patients who may be visible in the footage or staff who may not have consented to release footage containing their images,” said Risk Management analyst Trina Cervantes.

In another case reported to the Advice Line, an 8-year-old patient with autism was seen for fillings. The dentist used a protective stabilization board to stabilize the child. The child’s mother was not in the operatory during treatment. The patient became uncooperative and the assistant began to tap the patient’s head, a successful technique they had used in the past to calm patients with autism.

The dentist was able to complete the treatment. Upon dismissing the patient to his mother, she explained to her that though the child was uncooperative, they were able to complete the scheduled treatment. A few hours later, the patient’s father showed up to the office with pictures of his child on his cellphone, furious because the child had a bruise under his eye. He noticed that the office had a surveillance camera. The father demanded to see the footage. The dentist allowed him to view it. He became even more upset when he saw that the assistant was tapping his child’s head and felt that this may have contributed to the child’s anxiety levels increasing. He expressed that the office should be familiar with and have the skills to appropriately manage patients with autism. He told the dentist that she would be hearing from his attorney and stormed out of the office.

The dentist called the Advice Line to ask whether she was required to turn over the footage to the patient’s father. The analyst advised the dentist that the video is part of the patient record; therefore, she must ensure that it does not include information pertaining to other patients or staff.

Similarly, there are situations in which patients may request to record treatment. TDIC advises against allowing patients to record treatment as other patients or employees could inadvertently be recorded without consent.

“A video of a patient undergoing an exam or treatment is considered protected health information under HIPAA, and under the law it must be treated as such,” Cervantes said.

Video surveillance can be a proactive way for practice owners to protect their patients and themselves. They can also pose unexpected risks if used without caution. By following a few basic guidelines, it is possible to benefit from video cameras while at the same time keeping the private health information of patients and employees just that — private.

TDIC’s Risk Management Advice Line is a benefit of CDA membership. If you need to schedule a no-cost consultation with an experienced risk management analyst, visit tdicinsurance.com/RMconsult or call 800.733.0633.
4359 SANTA CRUZ GP offering 30+ years of goodwill within walking distance to the beach! Located in a well-established, attractive, single story professional building complex wample parking, good visibility and easy access. 2 doctor days/week, 2 hygiene days/week, 380 active patients with approx. 10 new patients/mo. 3 fully equipped ops in 850 sq. ft. Average GR $250K with Average adj net of $135K. Asking price $150K.

4351 SEBASTOPOL AREA GP & BLDG. Charming practice situated amidst rolling hills, soaring redwood trees and lush vineyards. Where coffee shops roast their own beans, dining options vary from down-home to gourmet, and people are friendly. Offering 70+ years of goodwill. Beautiful, modern facility with 3 fully-equipped ops (room for a 4th op) and digital x-ray. Equipment in pristine condition, most purchased 2016-2018. Dental suite has lots of natural light with views looking into a courtyard and garden. 2019 GR annualized at $679K+ with adj. net of $210K. Average 3.5 doctor days/week and 4 hygiene days/week. 800 active patients, all fee-for-service. Seller owns the building, it is available for purchase. Asking $305K for practice, $425K for building. Owner/doctor willing to help for smooth transition.

4338 PENINSULA PROSTHODONTIC PRACTICE Preeminent 45 year Prosthodontic practice located in mid peninsula neighborhood. State-of-the-art 1,027 square foot facility with 5 operators. Seller will help in the transition. Outstanding referrals sources. Average Gross Receipts $1.3M with 4 doctor-days per week. Asking $884K.

4256 SANTA CRUZ COUNTY GP Seller moving out-of-state and offering 33 years of goodwill. Wonderful location on major thoroughfare in a charming beach community close to wineries and the water. Tranquil and majestic, beautifully appointed, 5 op facility. Approx. 1,300 active patients (all fee-for-service). Seller will help for smooth transition. Asking $198K.

4243 CAPITOLA GP Gorgeous, state-of-the-art practice offering 33+ years of goodwill. Beautifully appointed office environment and building, located within minutes of charming downtown Capitola, known for its colorful, seaside shops and restaurants tucked into a hillside along Soquel Creek. Must see this office to appreciate its splendor. EZ freeway access, 5 fully equipped ops. 850-900 active patients (all fee-for-service). 4 doctor days/4 hygiene days per week. 2018 GR $928K with adj. net of $328K. Seasoned staff willing to stay on and Owner/Doctor willing to help for smooth transition. Asking $643K for practice. Seller owns building, it is available for purchase, or to lease.

4261 CAPITOLA GP Retiring doctor offering an established practice in professional office complex built around a garden setting. Average gross $743K+ with 4 doctor days and 6 hygiene days per week. Asking $562K.

4355 SAN FRANCISCO ENDO Endodontic practice in signature building with wealth of referral sources. State-of-the-Art, modern, 1,027 square foot office with 2 fully equipped ops. Well established, seller with sterling reputation willing to help for smooth transition.

4331 SAN FRANCISCO GP Downtown SF practice in gorgeous, remodeled 1,300 office with panoramic views. Suite includes 4 fully equipped ops, reception area, business office, private office, staff lounge, lab area, and sterilization area. Beautiful, modern cabinetry and equipment. 1,600 active patients with 15-20 new patients/mo. Owner/doctor works 3 days/wk with 5 hygiene days/wk. Average gross receipts $738K with average adj. net of $305K. Asking $495K.

4358 SAN MATEO GP Unique opportunity to own a downtown San Mateo GP surrounded by a variety of retail, restaurant, service and specialty shops generating significant foot traffic and daily business draw. 1,498 square foot facility with 4 ops, reception area, business office, private office, staff lounge, lab area, sterilization area, bathroom, storage & dedicated parking spaces. Family oriented practice with an emphasis on Restorative care. Average annual Gross Receipts $400K+.

4362 MARIN COUNTY GP Seller owned 1,550 square foot facility with 5 fully-equipped ops. Owner/Doctor transitioning into retirement and offering 36 years of goodwill in desirable area. Located on a well traveled road in a charming town with temperate weather, easy, outdoor living and natural beauty. Enjoy California living at its best. No Delta Premier patients. Excellent reputation and word-of-mouth referrals. Seller will help for smooth transition. Average Gross Receipts last 2 yrs is $450K. Asking $248K for the practice. Blvd cond is available for purchase.

4216 SIERRA NEVADA FOOTHILLS 23 year practice located in the heart of the Sierra Nevada foothills in modern building close to downtown area. 1,024 square foot office with 4 fully-equipped ops., upgraded major equipment and digital radiography. Average Gross Receipts $890K+ with 56% average overhead. Asking price for practice $604K.

**COMING SOON:**
Napa County GP, Santa Clara GP, Monterey County GP, Alameda County Pediatric Dentistry, Santa Cruz County GP, & Mid-Peninsula GP

Carroll & Company
2055 Woodside Road, Suite 160
Redwood City, CA 94061
DRE #00777682

Mike Carroll  Pamela Carroll-Gardner  Mary McEvoy Carroll

carroll.com    dental@carrollandco.info    (650) 362-7004    (650) 362-7007
Thinking of selling items at your dental practice? Do you purchase items from out-of-state vendors? Do you know what items are exempt from tax? If so, then you should know California’s sales and use tax rules.

Sales tax is collected by sellers on items sold within California. Use tax is similar to sales tax, except that purchasers pay it to the state for items used within California that were purchased from out-of-state vendors who do not collect California sales tax. The tax rate for both sales and use tax are the same but the rates can vary by location.

A dentist or dental practice that receives at least $100,000 in gross receipts annually and is not otherwise registered with the California Department of Tax and Fee Administration (CDTFA) must register as a “qualified purchaser” and report and pay use tax. A business with a California seller’s permit or a consumer use tax account can report and pay use tax through those accounts.

A seller’s permit is required if selling items subject to sales tax. Following are three methods of product acquisition and sales and their associated sales tax collection obligation.

Purchase product without paying sales tax to distributor and then sell product. A dental practice must provide a California Resale Certificate to the distributor in order to not pay sales tax to the distributor. The dental practice then must collect sales tax based on the price it sells the product.

Purchase product, pay sales tax to distributor and sell product for higher price. In this scenario, the dental practice is responsible for collecting and reporting sales tax on the difference between the purchase cost and the sale price. For example, the dental practice pays a distributor for electric toothbrushes at $25 each plus sales tax. The practice then sells each toothbrush for $30 each plus sales tax. The practice collects the sales tax for each $30 sale and reports and forwards the sales tax on the $5 price difference.

Purchase product, pay sales tax to distributor and sell it at cost. A dental practice that does this can inquire with the CDTFA as to the necessity of a seller’s permit. Whether or not a permit is obtained, the dental practice should maintain records to document that it was not necessary to collect sales tax.

What Is Taxable?

Dentists generally are considered consumers and pay sales and use tax on materials, supplies, dental laboratory products ... that are used in the performance of their services.

Dentists generally are considered consumers and pay sales and use tax on materials, supplies, dental laboratory products ... that are used in the performance of their services. The primary method of collection is for a dentist to pay sales tax to the supplier upon the purchase of product.

Services generally are not taxable. A tangible item that is incidentally included as part of a service is not subject to sales tax. For example, a tray fabricated for the purpose of providing in-office teeth whitening is not taxed even if given to the patient after the treatment.

“Medicines” as defined by Regulation 1591 and with some exclusions are not subject to sales and use tax. Medicines include “any product fully implanted or injected in the human body, or any drug or any biologic, when such are approved by the United States Food and Drug Administration to diagnose, cure, mitigate, treat or prevent any disease, illness or medical condition regardless of ultimate use, or ... any substance or preparation intended for use by external or internal application to the human body in the diagnosis, cure, mitigation, treatment or prevention of disease and which is commonly recognized as a substance or preparation intended for that use.” The regulatory definition of medicines includes permanently implanted articles such as dental implant systems, including dental bone screws and abutments.

Orthodontic appliances are specifically excluded from the definition of “medicines” as are dental prosthetic devices and materials such as dentures, removable or fixed bridges, crowns, caps,
inlays and artificial teeth. These are items for which dental practices should pay sales or use tax when purchased. The tax may not be passed on to patients as a separate tax.

Dental laboratories are the retailers of the plates, inlays and other products that they manufacture for dentists or other consumers. Tax applies to their entire charges for such products regardless of whether a separate charge or billing is made for materials and manufacturing services. 

REFERENCES

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.
SELL YOUR PRACTICE . . . . . . .

. . . . to the right buyer!

Knowing how, means doing all of the following - with precision:

1. Valid practice appraisal.
2. Contract preparation and negotiations, including critical tax allocation consideration.
3. Bank financing or Seller financing, with proper agreements to adequately protect the Seller and make the deal close - realistically and expeditiously.
4. Performance of “due diligence” requirements, to prevent later problems.
5. Preparation of all documentation for stock sale, when applicable.

Lee Skarin & Associates has scores of Buyers in their database. The Buyers’ profiles personal desires and financial ability have been categorized to expertly select the right Buyer for your practice. Expert Buyer selection solidifies a deal. Lee Skarin & Associates services all of Southern California.

Lee Skarin & Associates is California’s leading Dental Practice Broker. Their in-house attorney, Kurt Skarin, PhD., J.D., specializes in these matters. He does all of the above, and more. He is the catalytic agent that makes the sale happen - quickly and smoothly.

All six of these services costs no more. Maybe even less!

Lee Skarin & Associates

Dental Practice Brokers
CA DRE #00863149

Your calls are invited. Put our thirty years of experience to work for you!
Visit our website for current listings: www.LeeSkarinandAssociates.com
<table>
<thead>
<tr>
<th>Location</th>
<th>Practice Details</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>6169 VACAVILLE</strong></td>
<td>Long established Delta PPO practice. 5-days of hygiene. 2019 trending $740,000</td>
<td>Full Price $300,000.</td>
</tr>
<tr>
<td><strong>6168 SACRAMENTO'S CAMPUS COMMONS</strong></td>
<td>&quot;Bread &amp; butter&quot; Delta PPO practice averages $480,000 in collections per year.</td>
<td>Full Price $200,000.</td>
</tr>
<tr>
<td><strong>6167 NORTH SANTA CLARA COUNTY</strong></td>
<td>&quot;OUT-OF-NETWORK&quot; Perfect for Skilled Dentist who seeks strong patient relationships and wants to be insurance independent! 2019 trending $840,000+ on Owner's 3-day week.</td>
<td>Full Price $150,000.</td>
</tr>
<tr>
<td><strong>6165 ROSEVILLE ORTHO</strong></td>
<td>&quot;OUT-OF-NETWORK&quot; Stanford Ranch. Great satellite office. $455,000 invested in build-out, furnishings, computers and equipment. 3-chair Bay. Digital Pan with Ceph. 51 active patients and averages 3 patients per month.</td>
<td>Full Price $150,000.</td>
</tr>
<tr>
<td><strong>6164 SAN FRANCISCO BAY AREA</strong></td>
<td>&quot;OUT-OF-NETWORK&quot; Highly regarded as evidenced by 25+ new patients per month. Collections have topped $2 Million in each of the last 3 years with Profits averaging $1 Million. Paperless. 3D Cone Beam. Great location. Seller shall work-back to affect orderly transition. Rare opportunity for Dentist seeking Superior Platform to practice their craft at highest level.</td>
<td>Full Price $240,000.</td>
</tr>
<tr>
<td><strong>6163 LAKEPORT</strong></td>
<td>Attractive option to practicing in ultra-competitive settings in expensive housing markets. Appeal of practicing here is ability live a less hectic life. Decompress, have more time for yourself. Beautiful 6-op facility with high-end technology and completely networked. 2018 collected $956,000 with Profits of $360,000. 2019 trending $1.1+ Million in collections. Building optional purchase.</td>
<td>Full Price $240,000.</td>
</tr>
<tr>
<td><strong>6162 REDDING</strong></td>
<td>Great alternative to practicing in uber-competitive ultra-expensive housing communities. Strong foundation evidenced by 1,500+ patients and 8-days of Hygiene. Charges totaled $709,800 in 2018 down from 2017 which realized $779,000. Owner chooses to work less and takes 9-weeks off. &quot;Bread &amp; butter&quot; practice. All specialty work referred. Roll-up sleeves and do $1+ Million. Patients are here. Seller previously owned very busy Group Practice in Orange County beach community. Comparing both, he prefers his Redding practice.</td>
<td>Full Price $175,000.</td>
</tr>
<tr>
<td><strong>6158 FORTUNA</strong></td>
<td>Relaxed lifestyle in Humboldt County's Banana Belt. Adjacent to Ferndale. Perfect for Dentist seeking small town living. 2018 Collected $395,000 with $156,000 in Profits. 2019 trending $400,000+ 6-weeks off. Lots of work referred.</td>
<td>Full Price $75,000.</td>
</tr>
<tr>
<td><strong>6157 SACRAMENTO'S ELK GROVE AREA</strong></td>
<td>&quot;SOLD&quot; 2018 collected $909,000 on Owner's 3-day week. Successor can increase to 4-days as practice is rich in patients. 25+ new patients per month. 5-ops digital Pan, strong Recall, great staff.</td>
<td>Full Price $520,000.</td>
</tr>
<tr>
<td><strong>6152 SAN RAFAEL</strong></td>
<td>&quot;SOLD&quot; 2018 collected $520,000. Stand-alone building optional purchase. Nearby DDS who desires own building should relocate their practice and have instant $1+ Million practice in superior location.</td>
<td>Full Price $520,000.</td>
</tr>
<tr>
<td><strong>6147 SAN FRANCISCO BAY AREA</strong></td>
<td>&quot;OUT-OF-NETWORK&quot; &quot;SOLD&quot; 2018 collected $2.2 Million. Hygiene produced $1+ Million. $700,000+ in profits. Seller available for long transition.</td>
<td>Full Price $85,000.</td>
</tr>
</tbody>
</table>

**Practices Wanted**

<table>
<thead>
<tr>
<th>Location</th>
<th>Practice Details</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>4003 PEDO CHINESE / HISPANIC</strong></td>
<td>3,000+ Charts. Move to your office.</td>
<td>Full Price $150,000.</td>
</tr>
<tr>
<td><strong>4006 ALTA LOMA</strong></td>
<td>High identity Center. Absentee owned and Grossing $700,000. 5 ops, 3 equipped.</td>
<td>Full Price $150,000.</td>
</tr>
<tr>
<td><strong>4009 IRVINE</strong></td>
<td>Lady DDS Grossing $1 Million. 5 Ops. Partnership.</td>
<td>FP $150,000.</td>
</tr>
<tr>
<td><strong>4011 DIAMOND BAR</strong></td>
<td>This is a dream Million Dollar location to be. 5 ops Several Restaurants bring in droves of customers on a daily basis. FP $150,000.</td>
<td>FP $150,000.</td>
</tr>
<tr>
<td><strong>4013 ORANGE COUNTY BEACH CITY</strong></td>
<td>Grossed $70,000 last month. 4 ops with room for more. Full Price $800,000.</td>
<td>Full Price $800,000.</td>
</tr>
<tr>
<td><strong>4015 HEMET</strong></td>
<td>Easy way to Gross $500,000. Grossing $240,000 on one day week.</td>
<td>Full Price $110,000.</td>
</tr>
<tr>
<td><strong>4019 ONE MILLION DOLLAR NET PROFITS</strong></td>
<td>Opportunity of a lifetime.</td>
<td>Full Price $1,000,000.</td>
</tr>
<tr>
<td><strong>APPLE VALLEY</strong></td>
<td>Grosses $500,000 to $600,000. 3 ops. Low overhead.</td>
<td>Full Price $300,000.</td>
</tr>
<tr>
<td><strong>BAKERSFIELD AREA</strong></td>
<td>Grossing $400,000 per month on 2 day week.</td>
<td>Full Price $800,000.</td>
</tr>
<tr>
<td><strong>DIAMOND BAR</strong></td>
<td>5 ops with digital Pan. Very busy future here. FP $150,000.</td>
<td>FP $150,000.</td>
</tr>
<tr>
<td><strong>IRVINE</strong></td>
<td>Lady DDS grossing $1 Million. Will share office.</td>
<td>FP $150,000.</td>
</tr>
<tr>
<td><strong>LA HABRA</strong></td>
<td>Huge Shopping Center. Well maintained. PT Seller will stay.</td>
<td>Full Price $250,000.</td>
</tr>
<tr>
<td><strong>LADERA RANCH</strong></td>
<td>4 ops. Grossing $500,000. High Growth area.</td>
<td>Full Price $250,000.</td>
</tr>
<tr>
<td><strong>LAGUNA WOODS</strong></td>
<td>Grossed $800,000 during Renovation. Renovation done. Should now gross $1 Million.</td>
<td>Full Price $150,000.</td>
</tr>
<tr>
<td><strong>LOS ALAMITOS</strong></td>
<td>Established 4 ops with real estate.</td>
<td>Full Price $85,000.</td>
</tr>
<tr>
<td><strong>MIRACLE MILE NEAR FAIRFAX</strong></td>
<td>Beautiful corner suite with Wilshire view. 3 ops recently remodeled.</td>
<td>Full Price $240,000.</td>
</tr>
<tr>
<td><strong>ORANGE</strong></td>
<td>Grossing $1.2 Million. State-of-art beautiful</td>
<td>Full Price $200,000.</td>
</tr>
<tr>
<td><strong>ORANGE COUNTY</strong></td>
<td>High profile shopping center. Grossing $1.5 Million.</td>
<td>Full Price $200,000.</td>
</tr>
<tr>
<td><strong>ORANGE COUNTY</strong></td>
<td>Near Chapman / Tustin Streets. Grossing $400,000. Merge or grow.</td>
<td>Full Price $250,000.</td>
</tr>
<tr>
<td><strong>ORANGE COUNTY BEACH CITY</strong></td>
<td>5 ops. Gross $1.2 Million first year. Area growing.</td>
<td>Full Price $250,000.</td>
</tr>
<tr>
<td><strong>ORANGE COUNTY BEACH CITY</strong></td>
<td>Absentee owned. Grossing $900,000+. 4 ops with room for 5th. Hands-on Owner will do $1 Million first year.</td>
<td>Full Price $250,000.</td>
</tr>
<tr>
<td><strong>ORANGE COUNTY BEACH CITY</strong></td>
<td>Grossing $800,000 part-time. Valuable Real Estate may be available.</td>
<td>Full Price $250,000.</td>
</tr>
<tr>
<td><strong>PALM SPRINGS AREA</strong></td>
<td>Grossing $1.5 Million. 8-ops.</td>
<td>Full Price $250,000.</td>
</tr>
<tr>
<td><strong>REDLANDS</strong></td>
<td>5 ops. Grossing $500,000. Low overhead. Part-time Seller.</td>
<td>Full Price $450,000.</td>
</tr>
<tr>
<td><strong>RIVERSIDE</strong></td>
<td>Lady DDS grossing $300,000. 3 ops. Full Price $250,000.</td>
<td>Full Price $250,000.</td>
</tr>
<tr>
<td><strong>SAN JUAN CAPISTRANO BEACH</strong></td>
<td>Grossing $200,000 on 16 hour week.</td>
<td>Full Price $250,000.</td>
</tr>
<tr>
<td><strong>SANTA CLARITA</strong></td>
<td>70,000 autos pass this location daily. Tremendous upside.</td>
<td>Full Price $250,000.</td>
</tr>
<tr>
<td><strong>SOUTHERN CALIFORNIA</strong></td>
<td>Crown Valley Shopping Center. 4 ops. Grossing near $800,000. Lots of new home development.</td>
<td>Full Price $250,000.</td>
</tr>
<tr>
<td><strong>UNION PRACTICE - INLAND EMPIRE</strong></td>
<td>Grossing $650,000 on 2.5 day week. Nents close to $400,000.</td>
<td>Full Price $250,000.</td>
</tr>
<tr>
<td><strong>UPLAND</strong></td>
<td>3 ops, low overhead. Seller will transition. Full Price $360,000.</td>
<td>Full Price $360,000.</td>
</tr>
<tr>
<td><strong>WEST LOS ANGELES</strong></td>
<td>Prestigious Medical Building. Grossing $800,000.</td>
<td>Full Price $250,000.</td>
</tr>
<tr>
<td><strong>WESTMINSTER</strong></td>
<td>Starter in busy strip center. One side Hispanic, other side Vietnamese.</td>
<td>Full Price $85,000.</td>
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</tbody>
</table>
The following is a true story of an ethical dilemma that would challenge any of us. I was asked to lunch by a friend who wanted to know how to handle a situation; what was the right thing for him to do?

My friend, Dr. A, was asked if he would cover emergencies for Dr. B while Dr. B was out of the office for three months. Dr. A readily agreed. Before Dr. B opened his own practice, he had worked for a few other dentists locally, and during that time Drs. A and B got together socially and became friends. You can imagine Dr. A’s surprise when he saw the first of Dr. B’s emergencies and it appeared to him that the treatment was well below an accepted standard of care. The patient complained of spending all her money for treatment that wasn’t satisfactory. It seemed to Dr. A that the case could not be finished without starting over and that is when he called me to discuss the situation.

After gaining the patient’s permission, we looked at the films and read over the clinical notes. I was in total agreement with him; it was time to start over with bone grafting and new implants. When I asked Dr. A what he thought he should do, he replied that he didn’t know and was seeking my input. His feeling was the glaringly substandard treatment was beyond peer review and that he should contact the dental board to investigate. He wanted to know if I agreed or had any other suggestions for him. I told him his choice to call the dental board was, in my opinion, the correct action to take.

Dr. A called the board, it investigated and an administrative hearing was held. Based on cumulative information from multiple patients, Dr. B’s license was revoked.

Dr. A received a few calls from other dentists in the community supporting his report to the board, saying they had also observed substandard treatment by Dr. B. Dr. A asked the dentists why they hadn’t taken action. The question was met by silence.

So, the question is what actions could have been taken early on to possibly prevent this unfortunate outcome?

- The dentists Dr. B was working for could have called CDA and sought advice on how to best handle the situation.
- They could have met with Dr. B and discussed their observations that the quality of his work was deteriorating.
- If Dr. B had colleagues who were close friends, the dentists could have sought their advice.

There is a profound ethical issue here. As dentists, we do not have a legal obligation to report substandard care, but we do have an ethical obligation to do so in instances of gross or continual faulty treatment (CDA Code of Ethics, Section 1F1). All of this could possibly have been avoided if Dr. B’s colleagues had intervened in a timely manner.

Robert Reed, DDS, recently retired from 50 years of practice in Bakersfield, Calif. He serves as a member of the CDA Judicial Council and the CDA Foundation Board of Directors. If you have an ethical concern you’d like to have the judicial council address, please email Lori Alvi at lori.alvi@cda.org.

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Top Ten Issues for Dentists Contemplating Retirement In Ten Years or Less

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<table>
<thead>
<tr>
<th>BAY AREA</th>
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<tbody>
<tr>
<td>AC-989 SAN FRANCISCO (Facility): Busy Retail Shopping Plaza w/ major anchor tenants! 3 ops Price Reduced $125k</td>
</tr>
<tr>
<td>AC-1059 DAILY CITY: Amazing practice w/ seasoned staff in highly desirable neighborhood. 1500 sf w/ 4 ops $345k</td>
</tr>
<tr>
<td>AG-871 SAN FRANCISCO: Seller Motivated! ~600 sf w/ 2 ops Price Reduced $65k</td>
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<tr>
<td>AG-944 SAN FRANCISCO: An opportunity like this does not come along very often! ~980 sf w/ 3 ops Reduced $575k</td>
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<tr>
<td>AG-945 SOUTH SAN FRANCISCO: Be a part of this vibrant, diverse population. ~1800 sf w/ 4 ops $495k</td>
</tr>
<tr>
<td>AG-990 SAN FRANCISCO: Build the practice of your dreams! ~850 sf w/ 3 ops Reduced $228k</td>
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<tr>
<td>AG-993 WEST PORTAL AREA: Desirable area w/ easy commute to downtown San Francisco. ~1000sf w/ 3 ops Reduced Price: $410k</td>
</tr>
<tr>
<td>AG-994 SAN FRANCISCO: Highly profitable with net profit over $400k! ~850 sf w/ 3 Ops $825k</td>
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<tr>
<td>BC-741 DANVILLE (Facility): Move in Ready! ~1600 sf w/ 3 ops. PRICED TO SELL! $10k</td>
</tr>
<tr>
<td>BC-926 ANTIOCH: Long established, well respected office. 1860 sf w/ 5 ops $495k</td>
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<tr>
<td>BC-949 ALBANY: Desirable commercial/residential area. Medical Prof Bldg w/ good frontage. 3200sf w/ 4 ops $695k Reduced: $1.8</td>
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<tr>
<td>BC-1010 ANTIOCH: Amazing Opportunity in Health Prof. Complex 2118 sf w/ 2 equipped ops + 3 add'l $250k</td>
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<tr>
<td>BC-1022 OAKLAND: “Pill Hill” Area adjacent to hospital! 1054 sf &amp; 2 ops. Plumbed for 1 add’l $150k</td>
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<tr>
<td>BC-1056 SAN RAMON (Facility): Move-in ready facility in well maintained professional complex. 1698 sf w/ 4 ops Reduced: $100k</td>
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<tr>
<td>BG-981 BERKELEY: Long established, family-oriented practice. ~1100 sf w/ 3 Ops $345k/ Real Estate Available $499k</td>
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<tr>
<td>BG-1025 WALNUT CREEK: You won't find a more outstanding opportunity than this extraordinary practice! ~2138 sf w/ 6 ops. $750k Reduced: $95k</td>
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<tr>
<td>BN-952 BERKELEY: Don’t hesitate on this incredible opportunity! ~835 sf w/ 3 Ops. Seller Motivated $200k</td>
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<tr>
<td>BN-1023 RICHMOND: This is a rich opportunity for the astute dentist! 1450sf w/ 2 ops + 2 add’l. $50k/ Real Estate $750k</td>
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<tr>
<td>BN-1038 BERKELEY: A perfect opportunity to own a practice in one of the Bay Area’s most popular cities! 1000sf w/ 3ops. $385k</td>
</tr>
<tr>
<td>BN-1060 LAFAYETTE: Imagine being able to live, practice &amp; raise your family here in this community! 1400sf w/ 3op $225k</td>
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<tr>
<th>BAY AREA CONTINUED</th>
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<tbody>
<tr>
<td>CC-846 SAN RAFAEL: Prof/Retail Building Complex. 3 ops 640 sf Collections $433k in 2017 $275k</td>
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<tr>
<td>CC-927 SAN RAFAEL: Build the practice of your dreams by increasing this 2-day work week! 800 sf w/ 3 ops $175k</td>
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<tr>
<td>CC-960 SONOMA: Great location in one-of-a-kind setting! 950 sf w/ 3 ops. $385k/ Real Estate Available $350k</td>
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<tr>
<td>CC-979 NOVATO: Seller Retiring. 803 sf w/ 3 ops near downtown and Old Town Novato. $195k (Real Estate $215k)</td>
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<tr>
<td>CC-1020 SANTA ROSA: Cash Flow of over $270k. Unique FFS Practice. 1320 sf w/ 4 ops. $450k</td>
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<tr>
<td>CC-1030 SANTA ROSA: Condo office in modern bldg w/ ample parking &amp; adjoining Ortho practice! 1683 sf w/ 5 ops $325k</td>
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<tr>
<td>CC-1049 SANTA ROSA: Fully Remodeled, Amazing Location. 2000 sf w/ 5 ops $685k Real Estate Also Available</td>
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<tr>
<td>CG-616 NAPA COUNTY: State-of-the-Art office! ~850 sf w/ 2 Ops. Price Reduced – Seller Motivated $250k</td>
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<tr>
<td>CG-995 VALLEJO: Live, play and practice here where your lifestyle can’t be beat! ~2035 sf w/ 7 ops $1.175M</td>
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<tr>
<td>CG-1048 SONOMA: This highly successful family-oriented practice has it ALL! ~1500 sf w/ 4 ops. $650k</td>
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<tr>
<td>CN-911 SANTA ROSA: “Quality Care &amp; Patient well-being FIRST”. 2250 sf w/4 ops + 1 add’l. Seller Ready to Retire $499k</td>
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<tr>
<td>DG-862 MID-PENINSULA: Rare gem with up to 7 operatories in the Bay Area! ~2274 sf w/ 6ops + 1 add’l. $475k</td>
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<tr>
<td>DG-986 CAMPBELL: The ideal opportunity to practice in this community! ~988 sf w/ 3 ops Seller Motivated $288k</td>
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<tr>
<td>DG-1006 MONTEREY AREA: This practice is one which every dentist aspires to! ~3400 sf w/ 8 ops Reduced $1.325M</td>
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<tr>
<td>DG-1009 CARMEL: Amazing fee-for-service practice w/ no contracts! ~1150sf w/ 4 ops. $625k</td>
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<tr>
<td>DG-1014 MONTEREY: Don’t miss your opportunity to live and practice in beautiful Monterey! ~1125 sf w/ 4 Ops. $875k</td>
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<tr>
<td>DG-1034 BURLINGTON: Med Prof Bldg on bustling commercial corridor. ~2000 sf w/ 5 ops $425k</td>
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<tr>
<td>DG-1035 LOS GATOS: Over 40 years Goodwill in this charming community! ~1010 sf w/ 4 Ops. $790k</td>
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<tr>
<td>DG-1042 MOUNTAIN VIEW: Amazing opportunity providing quality, high-end dentistry! ~ 890 sf w/ 3 Ops. $895k</td>
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<tr>
<td>DN-1031 CUPERTINO: This remarkable practice awaits only your talent and skill! 1500sf w 3 ops + 1 add’l. $1.25M</td>
</tr>
</tbody>
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BAY AREA CONTINUED

DN-1032 PLEASANTON Facility: The perfect place to live, practice & raise a family! 1400sf w/4ops. Includes CTScan! $185k
DN-1041 SAN JOSE: This stunning practice is an excellent opportunity for new grads! 1207sf w 2ops + 1 addl. $195k
DN-1003 PLEASANTON Facility: This is an excellent opportunity for a graduate or a dentist seeking a Satellite location. 1000sf w/ 3ops. $68k
DN-1046 SANTA CRUZ AREA: Opportunities like this does not come along, except once in a lifetime! Office 2050 sf w/ 5 ops. Total sq ft 3880. $595k / Real Estate: $1.1mil

NORTHERN CALIFORNIA

EC-1018 WEST SACRAMENTO: All new leasesholds & top of the line PC EQ in 5 ops! 6 ops currently in use. 10 ops total available! $795k
EG-910 MIDTOWN SACRAMENTO: A thriving practice does not come along very often! ~1107 sf w/ 2 addl. Reduced $210k
EG-968 SACRAMENTO: Desirable, mid-town neighborhood, w/ ample parking in garage! ~1527 sf w/ 5 Ops. Reduced $480k
EG-972 ELK GROVE: Prime location! Real Estate available to purchase in the future! ~3500 sf w/ 8 ops. Reduced $495k
EG-1012 EAST SACRAMENTO: A practice like this one does not come available very often! ~2900 sf w/ 8 ops. $2.5M
EG-1016 LINCOLN: Look no further than this growing community to springboard into your success! ~1800 sf w/ 4 Ops Reduced $570k
EG-1039 EL DORADO HILLS VICINITY: The ideal opportunity to practice in this community! ~1100 sf w/ 4 Ops, $350k
EG-1061 SOUTH AUBURN VICINITY: Come live, play and practice in the heart of this pristine town! ~1100 sf w/ 4 Ops. $350k
EN-1051 SACRAMENTO: Location, Accessibility and Quality Relationships! 1,671sf w/ 5ops. $995k
EN-1052 EAST SACRAMENTO: Remarkable, long-established opportunity, loaded w/ goodwill. 1100 sf w/ 4 ops, $950k
EN-1055 ROCKLIN Facility: Build your own success here in this family-oriented community! 3650 sf w/ 4 ops + 1 addl. $95k
EN-1062 ROSEVILLE Facility: Enjoy your success in the busy swirl of activity! 1026 sf w/ 2 ops. $65k
FC-650 FORT BRAGG Family-oriented practice. 5 ops in 2000 sf $350k for the Practice & $400k for the Real Estate
FG-841 ARCARA: Great demographics w/ very little competition! ~1114 sf w/ 3 ops Reduced Price: $200k/ Real Estate Available
FN-961 EUREKA: Where the quality of life can’t be beat! 1400 sf w. 4 ops. Practice Reduced: $395k/ Real Estate Available $395k
FN-855 NO. HUMBOLDT: Seller relocating! Long-established, 100% FFS practice! 1600 sf w/ 3ops + 1 addl. $190k/ Real Estate Available
GN-953 CHICO: Established for 34 years and the seller is passing their goodwill on to you! 1067sf w/ 3 ops. Now Only $220k!
GN-924 TEHAMA COUNTY: Don’t miss this ideal opportunity! 3000 sf w/ 6 ops. Practice $495k / Real Estate $455k
GN-988 YUBA CITY: Excellent Merger Opportunity! Location and Lifestyle! 1,600 sf w/ 3 ops. $100k
HG-1053 GRASS VALLEY: Well-established practice of 40+ years, known for its quality dentistry! ~1200 sf w/ 3 ops $420k
HG-815 TRUCKEE AREA: Amazingly priced at 50% of Collections! ~1000 sf w/ 3 ops $165k/ Real Estate Available

NORTHERN CALIFORNIA CONTINUED

HG-983 GRASS VALLEY: Newly remodeled office in highly desirable neighborhood! ~1250 sf w/ 3 ops. Reduced Price $195k/Real Estate Available
HG-987 LAKE TAHOE AREA: State-of-the-Art Practice located in picturesque mountain setting! 3,400 sf w/ 6 Ops CALL FOR DETAILS
HN-618 SIERRA FOOTHILLS: Seller Retiring! Huge opportunity for growth by increasing office hours! 750 sf w/ 2 ops $65k
HN-879 SEDONA: Great Cash-Flow for Only 3 Days a Week! 2950 sf w/ 3 ops Reduced Price: $265k
HG-934 GRASS VALLEY: Underworked PT base should support larger production numbers! ~1200 sf w/ 3 Ops Reduced $168,750/Real Estate Available
HN-999 CALAVERAS Co. (Facility/Real Estate): 1,500 sf w/ 2 equipped Ops + 1 fully plumbed & 3 partially plumbed. $500k
HN-991 PLACERVILLE: Quality, conservative and compassionate practice! Will consider work back. 1,654 + 473 sf w 5 ops. $675k

CENTRAL VALLEY & SOUTHERN CALIFORNIA

IC-975 MODESTO: Established 33 years. 1,100 sf w/ 3 ops $225k
IG-881 TURLOCK: Long established has unsurpassed quality care. ~3500 sf w/ 10 Ops (shared). Reduced: $295k
IG-1007 GREATER MODESTO AREA: Combines a quality learning environment with relaxed rural living. ~3000sf w/ 6 ops. $645k
IG-1009 TRACY: This opportunity is waiting for you to sink your roots down and invest your future here! ~1200sf w/ 4 ops. $745k
IN-917 MERCED AREA: Well established practice with a stable, loyal patient base! 1300 sf w/ 3 Ops. Reduced! $295k
IC-911 FRESNO COUNTY: Seller willing to consider Associateship for qualified DDS w. intention to Buy In! Considerable Goodwill in Community! 3,000 sf w/ 6 ops $350k
IC-929 LOS BANOS: Heavy emphasis on hygiene. 1000 sf w/ 3 ops $80k
IC-1054 VISALIA: Practice AND REAL ESTATE! Prof Bldg on major thoroughfare. 2,260 sf w/ 6 ops $275k/ Real Estate $517k
KL-909 SAN DIEGO: Remarkable Opportunity. Long established in vibrant North Park. 2400 sf w/ 5 ops & 2 Peds chairs $810k
KG-921 SANTA MARIA: Live and practice in this desirable collegiate coastal community! ~930 sf w/ 3 ops Seller Motivated $285k

SPECIALTY PRACTICES

BC-784 CENTRAL CONTRA COSTA CO Period Seasoned Staff. Office runs like well-oiled machine! 3 ops $295k
BG-843 WALNUT CREEK Period: Priced at 50% of collections! 4 ops $390k
BG-1024 WALNUT CREEK Prosth: Stellar reputation for providing the highest level of treatment! ~2138 sf w/ 6 ops. $750k Real Estate: $995k
BN-998 WALNUT CREEK/SAN RAMON AREA Ortho: Looking for your dream Orthodontic practice! 1450 sf w/ 5 Open bays/Chairs. $1.150M
DC-835 TRIBAL PER: Collections over $1.2M. 2,100 sf $800k
DN-1044 FOSTER CITY Perio: Shared Space. Conveniently located within walking distance of major corporations. 830sf w/ 3 ops. $195k
GG-940 NORTH OF SACRAMENTO Perio: Practice is on track to collect more than $1,000,000 in revenues this year! ~4300 sf w/ 5 ops. Reduced $555k
JG-757 VISALIA Perio: Incredible Giveaway at this price! Collections over $800k! ~2000 sf w/ 5 ops Steal at $150k

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Tech Trends

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

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– Hubert Chan, DDS

Amazon Echo Auto ($24.99, by invitation only, Amazon)

Given the presence of Apple (via AirPlay) and Google (via Android Auto) in the automotive industry, it is not surprising that Amazon has made Alexa available for cars. Unlike Apple and Google, which have chosen to partner with manufacturers to integrate their products into a car’s onboard systems, Amazon has created the ultra-affordable, standalone Echo Auto, which is half the size of a modern cellphone and powered by micro-USB. For cars with Bluetooth, the Echo Auto leverages the cellphone’s Bluetooth connection to project audio to the speaker system; for cars without Bluetooth, it can use a wired 3.5 mm or USB connection to do the same task. This review utilized a car with Bluetooth and an iPhone X with the latest Alexa app.

Setting up the Echo Auto is easy, but not straightforward. The written directions are not clear and how the device works is not articulated on Amazon. Your phone needs to be connected via Bluetooth to your car to begin, then opening the Alexa app allows the Echo Auto to begin functioning. By itself, the Echo Auto provides excellent voice recognition and limited Alexa integration, but therein lies the problem: Opening the Alexa app on a modern cellphone that is paired by Bluetooth to a car offers the same features. Crucially, Alexa’s map feature is primitive, with its destination search ability limited, current location detection poor and a frustrating process to change routes. Despite having multiple Alexa-enabled home devices (and therefore expecting some kind of enhanced experience), I found myself using my cellphone as the Echo Auto either could not properly recognize my voice commands or did not have the capacity to find or convey the information I needed. The Echo Auto is an affordable Amazon device, which unnecessarily duplicates and complicates auto travel applications. After one week with it, I utilized the Echo Auto in the most satisfying way: I asked Alexa to return the Echo Auto to Amazon.

– Alexander Lee, DMD

Would you like to write about technology? Dentists interested in contributing to this section should contact Andrea LaMattina, CDE, at andrea.lamattina@cda.org.
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