The Dentist’s Role in Sleep-Related Breathing Disorders: Impact, Implications and Implementation

Jamison R. Spencer, DMD, MS
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DENTISTS# ROLE IN SLEEP-RELATED BREATHING DISORDERS: IMPACT, IMPLICATIONS AND IMPLEMENTATION

An introduction to the issue.
Jamison R. Spencer, DMD, MS

WHAT EVERY DENTIST SHOULD KNOW ABOUT SLEEP-RELATED BREATHING DISORDERS
This essay helps the dental team understand the details about what they should be doing to make the biggest difference for their practice’s and community’s health.
Steve Carstensen, DDS

BRUXISM, OBSTRUCTIVE SLEEP APNEA AND DENTISTRY
This article discusses how the dental professional can be an integral part in working with the medical community to identify and manage patients with obstructive sleep apnea.
Cameron A. Kuehne, DMD, MS

INTEGRATING DENTAL SLEEP MEDICINE INTO YOUR PRACTICE: S.E.T.U.P. FOR SUCCESS IN SLEEP
This article provides insight into systems for incorporating or improving a dental sleep medicine program into the dental practice.
Marty R. Lipsey, DDS, MS

INFORMED CONSENT FOR DENTAL SLEEP MEDICINE
This article explains how taking the time to obtain an informed consent can reduce clinician liability and result in a more motivated patient.
Ken Berley, DDS, JD

PEDIATRIC OBSTRUCTIVE SLEEP APNEA: AN INTERDISCIPLINARY APPROACH TO TREATMENT
This manuscript highlights the opportunities medical and dental professionals have to collaboratively manage obstructive sleep apnea in children and teens.
Thomas Stark, DDS, LTC(P); Peter O’Connor MD, COL; and Tracey Fischer, MA, MA, CCC-SLP

Cover apnea illustration: Habib M’henni/Wikimedia Commons
Bluetooth and Mondegreens

Kerry K. Carney, DDS, CDE

My brother, a retired network administrator, likes to tell me that his hearing loss is just an “undocumented feature” of aging. But sometimes, conversations seem more interesting and surprising as our auditory function declines and the brain substitutes for words that are misheard. This auditory accommodation is sometimes called a mondegreen.

The term was coined in 1954 by a writer who had misheard the lyric in a Scottish ballad about a knight and substituted words that made sense to her. What should have been “they killed him and laid him on the green” became “they killed him and Lady Mondegreen” for the writer.

Surely, everyone has had the experience of singing gayly along with a popular song only to have someone else bemusedly correct their mondegreen. My favorite example was a friend who energetically sang John Fogerty’s “Bad Moon Rising” refrain “there’s a bad moon on the rise” as if it were “there’s a bathroom on the right.”

It was years into our marriage before I realized that my husband and I had the same mondegreen for lines in Longfellow’s “Paul Revere’s Ride.” For both of us, the signal from the North Church tower sounded like “one-ith by land and two-ith by sea.” We both thought some old English vernacular was responsible for what we heard.

Mondegreens are a tribute to the brain’s attempt to make sense out of nonsense. The brain offers up a logical substitute for words that are misheard or unrecognized. It is a charming undocumented feature of perception and cognition.

But what about the reverse? What about when we hear a word or words that are so familiar that we do not think twice about their meaning, even when they make no sense in their new context. Take the word Bluetooth. This word is made up of two very common and easily understood words, but understanding each word provides no clue as to what Bluetooth really means. Our brain just accepts it as a new term without any logical connection to the meanings of the words blue and tooth.

As dentists, how can we not pause and wonder about this blue tooth? Most of us use Bluetooth every day, but why is it blue and what does it have to do with dentition?

Two engineers working on the project to unify devices attended a conference in the summer of 1997 and then went out for drinks afterward.1,2 In addition to discussing the project, they talked about their mutual interest in Vikings. One of the engineers was reading about a 10th century Danish king, Harald Bluetooth, who unified Denmark, conquered Norway and converted the Danes and Norwegians to Christianity. Harald Bluetooth’s history reads a lot like a backstory for the popular TV series “Game of Thrones.” It contains plenty of battles, blood and betrayals. Harald Bluetooth’s ability to unite the divided Nordic peoples reminded the engineer of the battle to unite fixed and mobile devices through standardized data exchange. He decided that the working code name for the system should be “Bluetooth” as a salute to this Nordic unifier.

It was not uncommon for rulers to have an epithet – a descriptive phrase expressing a quality or characteristic of the person (Bluebeard, the Red, the Great, the Terrible, Greycloak, etc.) Harald’s epithet, Bluetooth, was probably due to an endodontic problem that produced a noticeably darker blue or black tooth. Though the depictions of Harald on the internet never show him with a toothy smile,
it seems plausible that a dead tooth was the origin of the epithet.

As far as the origin of the Bluetooth logo, it is the combination or an overlaying of the two runes that symbolize Harald Bluetooth’s name on a blue field. There were other suggested names for the system. One alternate name was FLIRT, which derived from the idea that the devices could connect without touching. PAN, for personal area network, was a top choice, but it pulled up too many hits when googled and that had the potential for trademark problems.

The technology was launched as Bluetooth with the idea that it could be changed based upon future market research. The rest is history. The name stuck, and we all use Bluetooth to connect to our cars, our phones, our earbuds, our watches and many of life’s other technological conveniences. All our devices are connected through the unifier, Bluetooth.

According to one online authority, “…Bluetooth has evolved from a wireless replacement for old RS-232 cables to a fully fledged, far-reaching standard in its own right. It caters to everything from file sharing and device pairing, to wireless music and accessories ….”

So, the next time you see someone apparently talking to themselves with their Bluetooth-connected AirPods, remember a Danish king over 11 centuries ago who had an endodontic problem that resulted in a less than optimal cosmetic outcome and appreciate the connection between our profession and a ubiquitous bit of technology today.

[Editor’s Note: Many thanks to my friend David, a survivor of the Paradise Camp Fire, who brought this interesting connection to my attention.]

1. Estes AC. Bluetooth is named after a medieval king who may have had a blue tooth. gizmodo.com/bluetooth-is-named-after-a-medieval-king-who-may-have-h-1671450657.

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Impressions

Treating Obesity May Impact Periodontitis

Obesity and periodontal disease are among the most common diseases in the United States, and studies show these chronic conditions may be related. But according to a study published in the British Dental Journal, the connection between obesity and gum disease isn’t as simple as cause-and-effect; instead, the relationship centers on what both diseases have in common: inflammation.

A research team, led by Andres Pinto, PhD, professor of oral and maxillofacial medicine and diagnostic sciences at the Case Western Reserve University School of Dental Medicine in Ohio, set out to explore the effect of obesity on nonsurgical periodontal care and to evaluate potential pathways that illustrate the connection between the two conditions. The team examined a plethora of existing studies, most of which analyzed data from population subsets at one point in time, as opposed to studying the same population over a longer period.

Researchers found data showing that increased body mass index, waist circumference and percentage of subcutaneous body fat and serum lipid levels are associated with an increased risk to develop periodontitis. The underlying biological mechanisms of this association involve adipose tissue-derived cytokines, such as tumor necrosis factor-α and interleukin-6, which affect whole-body metabolism and contribute to the development of a low-grade systemic inflammation, according to the study.

The research team concluded that changes in body chemistry affect metabolism, which in turn causes inflammation — something present in both obesity and periodontitis. “Periodontal disease occurs in patients more susceptible to inflammation — who are also more susceptible to obesity,” Dr. Pinto said.

This information can inform how health care professionals plan treatments for patients suffering from obesity and periodontal disease.

“Oral health care professionals need to be aware of the complexity of obesity to counsel their patients about the importance of an appropriate body weight and maintaining good oral hygiene,” Dr. Pinto said.

Further research on the relationship between gum disease and obesity is needed, as there is, at this point, limited evidence to recommend changes in treatment planning, according to the study.

“There is a thought, from the clinical perspective, that if you treat one of the issues, it may impact the other,” Dr. Pinto said. “This is the big question. For example, if we treat obesity successfully, will this impact periodontal disease to the point of being of clinical relevance compared to the control population. The jury is still out given the paucity of controlled, well-designed, clinical trials on this issue.”

Learn more about this study in the British Dental Journal (2019); doi.org/10.1038/s41415-019-0611-1.
Lead Isotypes in Ancient Human Teeth Identify Geographic Origin

Working with lead isotopes taken from tooth enamel of prehistoric animals, researchers at the University of Arkansas have developed a new method for assessing the geographic origins of ancient humans. The new method allowed the researchers to compare the ancient human teeth to those of prehistoric animals, as well as to rocks and soil samples, taken from the same area. The research, sponsored in part by the National Science Foundation, was published online in February ahead of print in the *Journal of Archaeological Science*.

John Samuelsen, doctoral candidate in anthropology and research assistant at the Arkansas Archeological Survey, analyzed linear patterning of lead isotopes on teeth from a 600- to 800-year-old skull and mandible cemetery at the Crenshaw site in southwest Arkansas. The ongoing study is being conducted in collaboration with the Caddo Nation of Oklahoma to help answer questions the tribe has about the cultural affiliation and origin of the remains. The Crenshaw site along the Red River is a culturally significant multiple-mound ceremonial center of the Caddo Indians.

Lead is a toxic trace metal that affects the health of biological organisms, but it is useful for determining geographic origins. Its isotopic content within human and animal tooth enamel, via food chain pathways, reflects the geology of the region in which an organism grew up.

Samuelsen and his colleagues found that teeth of five of the 352 individuals tested with the new assessment method contained isotopic signatures consistent with those found in the teeth of prehistoric animals from several sites in the area. Moreover, their isotopic signatures were inconsistent with isotopes from humans and animals from other regions.

While the lead isotopes from animal teeth were successful at identifying local human remains, versus those from other geographical areas, those isotopes taken from nearby rocks were far too variable to be useful for the same purpose, Samuelsen said. He emphasized that a full evaluation of the human remains will be addressed in a future study.

Learn more about this study in the *Journal of Archaeological Science* (2020); doi.org/10.1016/j.jas.2020.105079.

Periodontitis Affects Pregnancy Outcomes

A recent study has linked periodontal disease during pregnancy to worse health outcomes for mothers and their children. The study was published in the November 2019 issue of the journal *PLOS One*.

Researchers from the pediatrics department at the Botucatu Medical School in Brazil studied the potential health consequences of periodontal diseases during pregnancy on maternal and infant health. Their study included 138 pregnant women who gave birth at a hospital in Botucatu and were all in good general health in the second trimester of pregnancy.

The study found that women who had severe periodontal disease during pregnancy were more likely to experience premature membrane rupture and inflammation of the vulva and vagina. Their offspring also were more likely to experience fetal growth restriction.

About two-thirds of the women experienced periodontal disease during their pregnancy and 18% had severe periodontal disease. Experiencing severe periodontal disease proved to have negative consequences for both maternal and newborn health.

The odds of fetal growth restriction were 11 times higher in women with severe periodontal disease than those without periodontal disease. In addition, women with severe periodontal disease were 5.6 times more likely to experience premature rupture of the membrane and 3.5 times more likely to have vulvovaginitis.

The authors noted two key limitations of their research. First, the study included a relatively small sample size, which resulted in a low occurrence of some negative health outcomes known to occur with periodontal disease. In addition, the authors could not determine whether the women received dental treatment following a diagnosis of periodontal disease.

The authors intend to take what they learned from the study and promote more oral health care for pregnant women.

Learn more about this study in *PLOS One* (2019); doi.org/10.1371/journal.pone.0225036.
Better Method Devised for Treating Periodontitis

New biodegradable rods developed by researchers will provide better treatment for periodontal disease and could spare patients from the many side effects associated with antibiotic treatment, according to a study published in the International Journal of Pharmaceutics in December 2019.

The inflammation of periodontal disease affects the entire body and is often the cause of other diseases such as heart attacks or pneumonia, said Karsten Mäder, PhD, head of the Institute of Pharmacy at Martin Luther University Halle-Wittenberg, Germany (MLU). Therefore, mechanical cleaning procedures are often followed by antibiotics. These are usually administered in pill form, which puts a strain on the entire body. Common side effects are diarrhea, abdominal pain and nausea as well as skin reactions such as redness and itching. The possible development of resistance to common antibiotics is also a major factor in this form of treatment.

Ideally, the antibiotic would only act locally in the mouth rather than throughout the entire body. Dr. Mäder’s research group therefore combined a proven antibiotic (minocycline) with an equally proven pharmaceutical excipient (magnesium stearate).

“The complex is just as effective, but more stable. It slowly releases the antibiotic on the spot,” said Dr. Mäder. “In addition to the continuous and sustained release of the antibiotic, we needed to find an easy way of administering it.”

The research group found a practical solution to this problem by utilizing pharma-grade polymers to produce flexible, biodegradable rods containing the antibiotic. The small rods can be easily inserted into the gingival pocket. Because they are broken down by the body, they do not have to be removed after treatment.

A patent for the complex active ingredient and its formulation has been applied for, according to the study, which also stated that rapid implementation in clinical studies is possible because all of the pharmaceutical-grade ingredients are already available on the market. The rods can also be produced using proven techniques, so they can be market ready in just a few years’ time.

Learn more about this study in the International Journal of Pharmaceutics (2019); doi.org/10.1016/j.ijpharm.2019.118794.

New Bioactive Peptide Helps Prevent, Heal Cavities in Lab Experiments

Researchers have discovered a bioactive peptide that coats tooth surfaces, helping prevent new cavities and heal existing ones in lab experiments. The research was published in the journal ACS Applied Materials & Interfaces in December 2019.

The peptide was discovered by Hai Ming Wong, DDS, PhD, and colleagues from the University of Hong Kong and the Prince Philip Dental Hospital in Hong Kong when they wanted to develop a two-pronged strategy to prevent and treat tooth decay: prevent colonization of the tooth surface by the plaque-forming bacteria that cause cavities and reduce demineralization while increasing remineralization. They based their anticavity coating on a natural antimicrobial peptide called H5. Produced by human salivary glands, H5 can adsorb onto tooth enamel and destroy a broad range of bacteria and fungi.

To promote remineralization, the team added a phosphoserine group to one end of H5, which they thought could help attract more calcium ions to repair the enamel than natural H5. They then tested the modified peptide on slices of human molars. Compared with natural H5, the new peptide adsorbed more strongly to the tooth surface, killed more bacteria and inhibited their adhesion and protected teeth from demineralization, according to the study. Surprisingly, however, both peptides promoted remineralization to a similar degree.

Researchers say that someday people could apply the modified peptide to their teeth, after brushing, as a varnish or gel to protect against tooth decay. Learn more about this study in ACS Applied Materials & Interfaces (2019); doi.org/10.1021/acsami.9b19745.
The Dentist’s Role in Sleep-Related Breathing Disorders: Impact, Implications and Implementation

Jamison R. Spencer, DMD, MS

In fall 2017, the ADA House of Delegates approved a policy statement on the role of dentistry in the treatment of sleep-related breathing disorders (SRBDs). Included in that policy statement are guidelines related to the screening, referral and treatment of adults and children with possible SRBDs.

Over the past 20 years, it has become increasingly common for dentists to be involved with SRBDs. Lectures related to sleep apnea are included at every large dental meeting and at local dental societies and study clubs. Long-held paradigms in restorative dentistry and orthodontics are being reconsidered and sometimes modified as dentists “look beyond the teeth” and consider the upper airway in their diagnosis and treatment planning.

These changes have been supported by over 40 years of research and clinical experience. Medicare recognizes oral appliance therapy provided by a licensed dentist as a first-line treatment for mild to moderate obstructive sleep apnea, which is considered a medical disorder. Hundreds of thousands of people who were not able to tolerate the use of continuous positive airway pressure (CPAP) are now effectively treated with oral appliance therapy around the world, and dentists are now looking to help children and adults avoid development of SRBDs or reduce the likelihood of mild problems becoming more severe.

Dentists are in a unique position to participate in the care of people with potential SRBDs. Dentists are also familiar with screening for conditions that we don’t necessarily diagnose, like cancer for example.

Whether or not a dentist wishes to actively be involved with the treatment of patients with SRBDs, the caring dentist will certainly wish to acquire the necessary skills to be able to identify possible SRBDs in their patients and refer those patients to their medical and dental colleagues for further diagnosis and treatment.
As dentists, we have a special focus on prevention. We screen asymptomatic people and often discover underlying problems that have the potential to result in pain and dysfunction if not addressed. We have the ability to help our patients understand such issues and encourage them to make well-informed decisions to protect their overall health. We see these patients on a regular basis and build relationships with them based on caring and trust. Helping these same patients understand a possible sleep issue, even when it is not related directly to their dental health, can literally be life altering or even lifesaving.

In this issue, we present five articles written by esteemed dentists who are directly involved in the screening, evaluation and treatment of SRBDs and cover these issues in both adults and children.

Steve Carstensen, DDS, addresses the critical points that all practicing dentists need to know in order to effectively help their patients who are or may be suffering with SRBDs. One does not need to be an expert in sleep apnea in order to immediately start helping their patients, and the impact on your patients cannot be understated.

Cameron A. Kuehne, DMD, MS, discusses the potential connections between the scourge of restorative dentistry, bruxism and obstructive sleep apnea. Dr. Kuehne takes a highly practical and clinically relevant approach to this topic. Unfortunately, not all bruxism is related to SRBDs, but recognizing when it might be could improve the odds of a successful, long-term clinical outcome.

In his article, Marty R. Lipsey, DDS, MS, takes on perhaps the largest stumbling block for dentists trying to help their patients with SRBDs — the billing of medical insurance. As a California resident and owner of a medical billing service, Dr. Lipsey is intimately aware of the issues in this area. Because money matters are typically of significant consideration for our patients, this is also an important area for dentists to at least be familiar with.

Ken Berley, DDS, JD, takes into consideration the informed consent of our patients. As a practicing dentist and attorney, Dr. Berley deals extensively with cases where proper consent was unfortunately not obtained. In dental sleep medicine, as in other areas of dentistry, proper informed consent protects the patient as well as the dentist. Our goal is to communicate these sometimes difficult and complicated issues in a way that allows our patient to make a well-informed decision. Because the treatment of SRBDs crosses over between dentistry and medicine, there are unique aspects to the informed consent process.

And lastly, Thomas Stark, DDS, LTC(P), reviews how obstructive sleep apnea is evaluated and treated in children using an interdisciplinary approach. The opportunity for prevention-oriented dentists, working with skilled dental and medical specialists, to make potentially major and extensive impacts on the current and future health and well-being of their pediatric patients is incredibly exciting. In his well-referenced article, Dr. Stark highlights the current state of the art and science in helping our children.

This CDA Journal issue is meant to be an overview of our role as dental professionals in the screening, referral, evaluation and treatment of patients with or with potential SRBDs. We have not addressed newer techniques such as hypoglossal nerve stimulation or gone into great detail on other surgical and nonsurgical approaches to the treatment of sleep apnea. We have also not provided a step-by-step guide to providing oral appliance therapy. It is my hope that this issue of the CDA Journal will inspire you to immediately start screening your patients for potential SRBDs, that you will review the ADA policy statement with your team and discuss how you will proceed in your practice and that you will then take the next steps toward acquiring additional knowledge and skill in this area.

Dentistry’s role in the diagnosis, treatment and perhaps even prevention of SRBDs is significant, and I believe it will become more significant and more widespread in years to come. As we look beyond the teeth to potentially alter the current health path of our patients in a positive direction, working hand in hand with our medical colleagues, we and those we serve will be rewarded for our efforts.
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<th>PRF/Phlebotomy</th>
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<td>April 11 - 12 or August 14 - 15</td>
<td>May 9 or September 26 or November 14</td>
<td>July 25 or August 29 or September 12 or November 7</td>
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<td>All-on-4® Dental Assistants’ Course</td>
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<td>May 30 or July 18</td>
<td>September 19</td>
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<td>PRF/Bone Regeneration Principles</td>
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Periklis Proussaefs DDS, MS
Dr. Proussaefs is a prosthodontist and Associate Professor at Loma Linda University. He is the founder of the California Institute of Dental Education. He has published over 55 peer-reviewed articles related to implant dentistry. Most of his award-winning publications involve bone grafting and alveolar ridge augmentation techniques. Dr Proussaefs has been editorial board member in several scientific journals with high impact factor. He is one of the first published authors back in 2001 in topics related to utilizing autologous blood concentrates in conjunction with bone grafting procedures. His seminars have an evidence-based approach enriched with his 20+ years of experience in advanced implant dentistry.

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What Every Dentist Should Know About Sleep-Related Breathing Disorders

Steve Carstensen, DDS

Abstract  Dentists have the opportunity to attend to more of their patient’s health than what is found in the oral cavity. The American Dental Association has prompted members to embrace a larger scope of practice, obligating every dentist to become aware of sleep-related breathing disorders and seek additional training for all team members. Collaboration with other medical providers will become a part of everyday dental practice and airway health will become a component of every treatment plan.

Author  Steve Carstensen, DDS, started treating sleep problems in 1998 and practices at Premier Sleep in Bellevue, Wash. He completed UCLA’s mini-residency in sleep and is a diplomate of the American Board of Dental Sleep Medicine. He lectures internationally, directs sleep education at the Pankey Institute and is a guest lecturer at the Spear Education, University of the Pacific, and Louisiana State University dental schools. He was editor-in-chief of Dental Sleep Practice Magazine from 2014 to 2019. Along with a co-author, Dr. Carstensen wrote The Clinician’s Handbook for Dental Sleep Medicine published by Quintessence in 2019. Conflict of Interest Disclosure: None reported.

No one can survive without breathing. Everyone can survive while breathing badly — but there’s a price to pay for compromising respiration. When the body is denied essential nutrients, such as oxygen, normal physiologic responses like inflammation are enhanced and there are always consequences. The dentist is the best medical provider to identify those problems early in life and to help people redirect their choices toward health. Indeed, of all the medical providers in most people’s lives, they spend more time with the dental hygienist than any other. Including awareness of sleep-related breathing disorders (SRBD) in everyday dental practice is straightforward, rewarding and mandatory. This essay helps the dental team understand the details about what they should be doing today to make the biggest difference for their practice’s and community’s health.

In 2017, the American Dental Association adopted the Policy Statement on the Role of Dentistry in the Treatment of Sleep-Related Breathing Disorders. That document encourages dentists to screen for SRBDs and outlines appropriate actions for them to take when they participate in the treatment and management of airway problems. The first step in understanding the dentist’s role, then, is to obtain and study this landmark document, available at ada.org.

Early in the establishment of sleep medicine as a subspecialty of medical practice, positive air pressure (PAP) machines came to dominate physicians’ treatment choices. This was supported by the rapid development of sophisticated PAP machines, improved masks and widespread enthusiasm among physicians for having an alternative to surgery. As early as 1982, papers were published about dentists fitting patients with oral appliances to support the airway against
collapse. This was only a year after Colin Sullivan, PhD, BSc, MB, published his first paper on the development of continuous positive airway pressure (CPAP). Dentists have been collaborating with sleep physicians for nearly four decades to treat SRBDs, including obstructive sleep apnea syndrome (OSAS), but oral appliances have never had the research and corporate support that PAP therapy has had. The American Academy of Sleep Medicine (AASM) produces policy statements for the specialty; in 2015, the AASM and the American Academy of Dental Sleep Medicine (AADSM) jointly published a guideline that lists oral appliances alongside PAP devices as key therapy choices for all levels of OSAS diagnosis.

Every licensed dentist is legally supported in placing oral appliances for treating SRBDs, although the lack of training in most dental education programs requires dentists to acquire additional education to include oral appliance therapy (OAT) within their scope of practice. Training choices vary from lectures at dental meetings to online training to multiple-session events hosted by dental colleges. Like other areas of practice, dentists are free to decide for themselves whether they are sufficiently trained. The trade organization AADSM has a “qualified dentist” category that is earned with certain C.E. programs, but that and other self-designated accreditations have not been adopted into any regulation of dentistry. There are professional peer-reviewed journals, textbooks, blogs and trade magazines for expanding the dentist’s scope.

During the course of ordinary dental practice, patients present with a variety of clinical conditions for the dentist to assess and to apply medical decision-making skills, diagnose and create a treatment plan to address. Professional training focuses dentists and dental hygienists on typical dental diseases such as caries, periodontal disease, occlusion and temporomandibular disorders. While other pathologies, such as oral cancer, are also part of the curriculum, the typical dental practice is occupied with surgical and preventive procedures. This pattern is supported by a coding system for record-keeping and insurance benefits that is procedure based without the explicit requirement to document the diagnosis or medical decision-making procedures routinely found in medical encounter notes.

There are many dental conditions commonly seen that have connections to airway-related problems. One example is periodontal disease; a study published in 2016 noted that OSA correlates with increasing periodontal disease severity. The prevalence of SRBDs in the population is difficult to declare with certainty. A study in Lausanne, Switzerland, reported that 49% of men and 23% of women had moderate to severe sleep-disordered breathing. The most commonly cited percentage of the at-risk population that has been diagnosed for SRBDs is 15%, and that number has not changed in the 20-plus years this author has been involved in treating airway problems. It is safe to say that every dental practice has many patients at risk for SRBDs and that the vast majority of those patients have not been tested for the disease. Of those tested, most diagnosed patients are prescribed PAP devices. Data compiled for World Sleep Day 2019 by Philips Respironics, one of the major PAP providers, shows that 65% of people with sleep apnea have never used or are no longer using therapy to treat their disease. One study of VA patients showed 90-day adherence of 2.5 hours per night. Considering these statistics, it is reasonable to say that dentists are treating many adults with undiagnosed and undertreated sleep-related breathing disorders.

Dental practices emphasize regular preventive visits for their patients and each encounter provides an opportunity to update the patient’s medical history and inquire about new symptoms. The airway-aware dental team can use these visits to create meaningful conversations about SRBDs. Simple screening tools such as the Epworth Sleepiness Scale and the STOP-BANG are each comprised of eight questions that produce a score to determine risk of medically defined obstructive sleep apnea (OSA). Even simpler is the Elbow Test — if a person has been told they snore and have been prompted to change sleep position to stop snoring and/or resume breathing, there is a 90% positive predictive value for SRBDs. These questionnaires are readily obtainable via any search engine. Screening tools are effectively incorporated into the dental encounter only when every member of the clinic team understands them and why they are included in the office visit. Patients will wonder why the dental office is inquiring about sleep habits and observed breathing patterns until the connection between oral and whole-body health is presented by the trained dental team member.

Technology is a tempting tool to use as a screening device. One instrument

Dentists have been collaborating with sleep physicians for nearly four decades to treat SRBDs, including obstructive sleep apnea syndrome (OSAS).
commonly found is cone beam computed tomography (CBCT). These devices create accurate images of 3D structures and allow the radiologist or trained dentist the ability to assess the airway. Because the vast majority of the scans are obtained while the subject is upright and awake, however, there has been no consensus about the use of CBCT data for identifying patients at risk for SRBDs. One meta-analysis concludes that people diagnosed with OSA have a smaller minimum cross-sectional airway than that found on unaffected controls, but it does not provide a clinically useful scale to compare with the patient in the chair.11

Consumer-level devices and smartphone apps are also widely used to gauge various parameters of sleep, with claims by the commercial entities ranging from measuring snoring to assessment of sleep quality. These devices, while very useful for patient communication, are not validated against scientifically established testing cleared by the FDA for use in medicine. These apps and devices can be an excellent way to alert undiagnosed people to seek expert advice and for patients to gain some confidence in prescribed therapy as they watch scores improve.

Screening is used in medicine to identify who should be recommended to the next test. If a person completes an Epworth Sleepiness Scale, for example, and it results in a score of 12 (out of a possible 24), this indicates someone who has excessive daytime sleepiness. This is not specific for SRBDs, but it does mean that the person should be tested further to understand the reason behind the sleepiness. Very often this is an SRBD, so that sleepy patient should be sent for evaluation by a sleep specialist.

Dentists are not currently licensed to treat patients for SRBDs if those patients have not been diagnosed by a medical doctor. After diagnosis, they can fully manage therapy for a large segment of patients who have mild OSA without serious medical comorbidities such as cardiovascular disease. By collaborating with medical colleagues, the airway-aware dentist can be a critical part of the treatment of this large number of at-risk adults.

SRBDs in children are different in nearly every way from adults. Children (for the purposes of this essay, defined as preadolescent and before growth of the maxilla and mandible is complete) are assessed for SRBDs by observation of behavior common to a compromised airway, primarily mouth breathing and poor sleep quality. In common use are the Pediatric Sleep Questionnaire and the BEARS questionnaire; these and others are imperfect but can serve well to begin the conversation with families.12 Those children found at risk are still recommended to be seen by a pediatric sleep specialist for testing in a child-friendly sleep lab.13

There are, unfortunately, very few of these facilities or trained sleep doctors available compared to the number of children at risk, so, again, it falls to the dentist to identify those patients in their everyday dental practice.

Dentists are trained to assess and manage growth and development of the jaws to achieve dental goals like a fine occlusion and pleasing arrangement of teeth. If the scope is limited to those laudable benchmarks, a major potential health contribution is left out: establishment of maximum health for the airway associated with those growing structures. After all, the American Dental Association House of Delegates adopted a definition of dentistry in 1997 that says, in part, that “dentistry is the evaluation, diagnosis and treatment of the oral cavity, maxillofacial area and adjacent and associated structures and their impact on the human body.” That means that dentists must assess the nasal cavity, airway and oropharynx to determine if there are compromises that affect the health of the rest of the body. A child with poor breathing, whether through bad daytime habits such as mouth breathing or nighttime restrictions in respiration from SRBDs, will not be providing the rest of their body the ability to grow and develop to maximum potential.

The maxilla is the common structure defining the oral and nasal cavities and the position of the palate relative to the posterior wall of the oropharynx. As such, the three-dimensional position of the maxilla is key to whether the airway is optimized during growth. Patients with a hypoplastic maxilla or one that has been misshapen by muscle forces and air pressure compromises will suffer from an underdeveloped airway.14 Dentists, to be able to assess their child patients for a properly developing craniofacial-respiratory complex, must learn to evaluate the three-dimensional position of the maxilla during each exam while the child is growing. If the child shows signs of airway-related problems, intervention during this period can often establish a more open airway while simultaneously encouraging alveolar growth, creating room for all the permanent teeth.
It’s not just structure that draws the attention of the airway-aware dentist, however, because early problems such as tongue- and/or lip-tie, allergies and simple bad habits can result in the mouth being the primary respiratory portal. Christian Guilleminault, MD, DSc, who defined the term “obstructive sleep apnea” and is among the world’s leading clinicians and researchers, declared that “nasal breathing, 24/7, is the only possible finish line for children’s airway.”

Dentists and their team members are ideally positioned to recognize and offer help to families to get their children on the right path for daytime as well as nighttime breathing. By encouraging healthy habits of keeping their lips together, breathing through the nose and posturing the tongue in the roof of the mouth during a properly coordinated swallow, the trained dental team member can help children grow their craniofacial-respiratory complex to maximum advantage while there is time to shape that maxilla.

SRBDs affect more than blood oxygen levels and mechanical problems in the upper airway. For two examples, let’s consider heart rhythm regulation and the balance between the sympathetic and parasympathetic divisions of the autonomic nervous system. Dentists are often surprised to learn that snoring might have effects on the heart and brain; if this essay prompts professional curiosity and the reader seeks deeper understanding, one of the writer’s goals is accomplished.

The thorax expands when the diaphragm is activated, creating low pressure in the chest cavity, normally resolved with air flowing through respiratory channels. If the airway is blocked, the pressure gradient pulls more blood into the heart, overfilling the right atrium. The walls of the atrium expand, stretching beyond normal shape. Embedded in the atrial wall is the sinoatrial node, the pacemaker for heart rhythm. People with OSA have conduction abnormalities, longer electrical recovery time of the sinoatrial node and atrial enlargement compared to people without SRBDs; this disruption to the homeostasis of the heart leads to atrial fibrillation.

Cardiomyopathy, atherosclerosis, hypertension and a host of other heart diseases accompany chronic SRBDs as well. The limbic system, a complex group of brain structures, can be simplistically considered as the connection between purely autonomic brain stem functions and the highly evolved cortical regions. Signals from sensory input are filtered in the thalamus to reduce cortical activity during sleep. The autonomic nervous system cycles between parasympathetic (rest and restore) and sympathetic (fight or flight) predominance based on the body’s needs second by second, while maintaining enteric nervous system functions such as respiration. Because the limbic system is the center of the body’s regulatory processes, it is highly sensitive to outside input. An often overlooked part of the limbic system is embedded in cranial nerve 1, the olfactory bulb. Mechanoreceptors there send airflow signals to the limbic system to aid homeostatic regulation. Disruption to the normal pattern of pressure change during respiration yields imbalances to the hypothalamic-pituitary-adrenal or HPA axis. The HPA axis regulates cortisol production; when that system is out of sync with the circadian rhythm, all body systems are affected.

Conclusion

Dentists have long had the obligation to consider whole-person health in their practices. General medicine is relatively unconcerned with the necessity to treat readily observable oral disease. Most dentists, therefore, lack the need to regularly interact with other medical professionals to provide this care, resulting in the separation of dentistry from medical practice. The growing awareness of SRBDs as a factor affecting every cell in the human body requires every medical provider to consider SRBDs when assessing and diagnosing each patient. Thus, dentists must learn how airway disruptions possibly explain clinical findings, consider the airway during evaluation and treatment planning and interact with other medical providers in managing chronic disease. Bridging the divide between dentistry and medicine will result in higher levels of patient care and a reduction in health care burden for entire populations. Little of this expanded connection requires medical providers to learn much about oral homeostasis but it does demand dental professionals expand their scope to embrace many aspects of primary care. What does the dentist need to know about SRBDs today? That every service provided in a dental office must consider airway health as a necessary part of the care.

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ABSTRACT There are many recent studies pointing to a connection between bruxism and obstructive sleep apnea (OSA). Due to the potential for adverse health effects related to untreated or improperly treated OSA, dental professionals have a key role in helping to identify and manage OSA.

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Obstructive sleep apnea (OSA) is a serious health problem that affects at least 9% of women and at least 24% of men aged 30 to 60, and many clinicians feel that these numbers may be an underestimation of the prevalence of OSA. Many physicians and researchers believe that as the incidence of obesity continues to rise, the prevalence of OSA increases. However, it is now understood that OSA may affect anybody, not just the elderly or the obese. Healthy men, women and children may also be at risk for OSA. Thus, it is not possible to rule out sleep apnea in anyone based on their physical attributes alone. Multiple studies have shown that an anatomically small airway increases risk for OSA and is comparable to the increased risk for OSA that obesity and age cause. If there is any suspicion that a person may be at risk for OSA, they should be evaluated medically due to the vast complications associated with OSA. Diagnosis of this problem is the key to receiving proper treatment. Due to the underdiagnosis of this problem, it is possible that many people are currently untreated or are being treated incorrectly for their OSA. Finding these untreated or incorrectly treated people is medically necessary due to the increased risk of the health concerns associated with OSA.

OSA has been implicated with many different health concerns such as hypertension, stroke and congestive heart failure. Obstructive sleep apnea has also been linked to Type 2 diabetes, and it is thought that up to 83% of Type 2 diabetics suffer from unrecognized OSA. Most of these studies agree that the exact mechanism by which OSA is linked to different medical problems is not fully understood. However, the literature available that shows the connection between OSA and multiple medical comorbidities is immense. The medical community is beginning to understand the consequences of untreated OSA and realizes the importance of early diagnosis and treatment of this serious issue. The dental community needs to follow suit.

Through correct intervention, OSA is a treatable problem and there are multiple different treatments for OSA. Dental oral appliance therapy is one of the most common forms of treatment for OSA. A dental oral appliance is a...
device that fits within the oral cavity and prevents upper airway collapse in patients with OSA. Dental oral appliances have been shown to be a valid alternative to continuous positive airway pressure (CPAP).9,10 Dental oral appliance therapy has been effective in reducing blood pressure.11 A study published in 2011 by Holley et al. is one of the largest studies ever done comparing the effectiveness of adjustable dental oral appliance to CPAP for the treatment of OSA.12 This study, with 497 subjects, showed a vast improvement in OSA levels in both groups, especially when comparing the subjects with mild OSA. No statistically significant difference was seen between the treatments of dental oral appliances and CPAP when looking at subjects with mild to moderate OSA. There was a statistically significant difference when comparing the two treatments in subjects with severe OSA, with the CPAP group showing a better result. However, the subjects with severe OSA still showed considerable improvement when treated with the dental oral appliance. This study showed the best improvement of OSA with a dental oral appliance than any other past study. The method used in the treatment of OSA is important to ensure the patient’s compliance with therapy. Compliance has also been shown to be high with dental oral appliance therapy as patients prefer the treatment of OSA with a dental oral appliance over other forms of OSA treatment.13 The type of dental oral appliance used for the treatment of OSA needs to be chosen wisely to aid in patient compliance.

There are many dental oral appliances used to treat OSA, but not all dental oral appliances are as effective as others. A mandibular advancement device (MAD) has been shown to be an effective dental oral appliance for the treatment of OSA,10 while certain tongue-retaining devices and soft palate lifts have not.10 Tongue-retaining devices and soft palate lifts tend to be poorly tolerated by patients.10 Mandibular advancement devices are usually tolerated the best of any dental oral appliances used for the treatment of OSA.10 Of the MADs, there are titratable versions that have been shown to be more effective than fixed versions.14 Titratable dental oral appliances give a better range to fine-tune the appliance to the most therapeutic position possible. It has also been shown that custom MADs are more effective than boil-and-bite MADs.15 Boil-and-bite type dental oral appliances are usually bulky and less retentive than a custom-made dental oral appliance. Research has shown that protrusion of the mandible, not the vertical dimension of occlusion, is the key to relief of OSA.16,17 Vertical dimension of occlusion is usually increased or decreased for comfort issues and not as a way of correcting OSA. A correctly fit custom MAD fabricated and adjusted by trained dental personnel is a viable treatment for patients with OSA.

Many patients with OSA also suffer from bruxism, although current literature would suggest that the relationship between bruxism and OSA is not yet fully understood.18 Bruxism is the third most frequent parasomnia disorder and has been defined as an oral activity characterized by teeth grinding or clenching during sleep.19,20 One study suggested that upwards of 15% of children grind their teeth at night.21 Most studies agree that around 8% to 9% of adults brux at night.22 There have been many different forms of treatment for bruxism in the past; however, the most accepted treatment for bruxism is the dental nightguard (NG).23,24 While most research has shown that an NG does not necessarily stop the muscle contractions responsible for bruxism, an NG does help to protect teeth from wearing down.19 In one study, though, short-term relaxation of the muscles associated with bruxism occurred.24 The pathophysiologic reasons for why some people brux at night are not completely understood at this point; it is possible that bruxism may be due to an underlying OSA problem.21 There have also been studies showing a correlation between sleep apnea symptoms and temporomandibular disorders.25 The literature has shown that bruxism may be caused in part by a narrowing of the airway due to OSA. Transient arousals, as seen in OSA, have been experimentally shown to cause bruxism.26 Arousals are a change in sleep cycles from a deeper to lighter stage of sleep or from REM stage sleep to awake. Also, a rise in sympathetic activity, as seen during an apneic event, can induce bruxism.27 Studies have shown that as an MAD is applied at therapeutic levels for the treatment of OSA, nocturnal bruxism tends to lessen.28 The implication is that the dentist who is fabricating an MAD for the treatment of OSA may be actually helping to treat an underlying cause of bruxism instead of just helping to protect the teeth. The dentist is a key part in the treatment of both OSA and bruxism. The dentist also should be instrumental
in the process of screening patients for OSA. A patient who presents with a chief complaint of bruxism should be screened for OSA due to the association between OSA and bruxism. Before a dental NG is fit to help protect the teeth from bruxism, OSA needs to be ruled out. Recent studies have shown that NG treatment may actually aggravate the patient's OSA problem. One such study showed that an NG with a vertical dimension of occlusion that was too extreme aggravated OSA.16 Another study of interest was a pilot study done by Gagnon29 that showed 50% of patients with OSA who wore a dental NG had an aggravation of their apnea-hypopnea index (AHI), which is classified as mild when the AHI is between five and 15, moderate between 15 and 30 and severe when greater than 30). In this study, 10 patients slept three nights at a sleep lab: one night as a baseline, one night with an NG (maxillary, flat-plane, hard) and one night with no guard in place. The study showed that there was no statistically significant difference in the AHI between the night with the NG versus the night without the NG, but that five of the 10 patients had an aggravation of their AHI. An interesting note was that patients had no statistically significant difference in the AHI between the night with the NG versus the night without the NG, but that five of the 10 patients had an aggravation of their AHI. The authors suggested that dental clinicians should be aware that manipulating spaces within the mouth can reduce tongue space and possibly cause aggravation of sleep disturbances such as OSA and snoring. As such, screening of all dental patients before a dental NG for bruxism is fabricated needs to be a priority. Dentists have the unique opportunity to see their patients on a six-month basis and have the chance to recognize a potential issue with OSA.

### Summary

Due to the life-threatening nature of OSA, all dental patients should ideally be screened for OSA, especially before a nightguard for bruxism is fit. The dental professional can and should be an integral part in working with the medical community to identify and manage patients with OSA.

### References


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Incorporating Dental Sleep Medicine Into Your Practice: S.E.T.U.P. for Success in Sleep

Marty R. Lipsey, DDS, MS

ABSTRACT This article provides insight into systems for incorporating or improving a dental sleep medicine program into the dental practice.

Why should I get started? How do I get started? How do I screen my patients? What about sleep testing and diagnosis? What documents do I need in my records? How do I deal with medical insurance?

As a practitioner, lecturer, consultant and medical billing expert, I will provide insight into these and more commonly asked questions. Clinical procedures and appliances will not be discussed in this article. It is my goal to present easily duplicated, tried-and-true systems that have been developed and fine-tuned for more than 16 years. This is a system that my team and I have successfully implemented in practice and that we have used to help hundreds of dentists implement or improve the dental sleep medicine area of their dental practices. This is a step-by-step process for successful implementation of a dental sleep medicine program, which I will outline below as a “S.E.T.U.P. for Success in Sleep” protocol. The steps in that protocol are independent of and apply regardless of the dentist’s choice of bite registration technique or appliance. These protocols are comprehensive and will benefit the entire dental team. The good news, right from the start, is that the protocols do not require the purchase of any new software or expensive instrumentation to incorporate dental sleep medicine into your practice.

A significant number of patients who walk through our doors every day present with life-threatening and life-shortening risk factors for sleep-related breathing disorders. Furthermore, the entryways to the nasal and oropharyngeal airways are constantly in our field of view during every clinical procedure throughout our day. Dentists can play a major role in the recognition of the signs and symptoms and the overall management of obstructive sleep apnea (OSA). Levendowski et al. found that the high prevalence of undiagnosed sleep apnea in dental patients suggests that dentists could provide a valuable service to their patients by incorporating sleep apnea screening and treatment.
into their practice. In their study of two dental practices, 28% of female patients and 67% of male patients were shown to have a high pretest probability of having at least mild sleep apnea. Al-Jewair et al.1 found in a total of 200 consecutive female and male dental patients that 21.75% of the females and 78.3% of the males were at high risk of OSA.

In 2017, the ADA’s House of Delegates adopted the “Policy Statement for the Role of Dentistry in the Treatment of Sleep-Related Breathing Disorders.” This should be deemed as setting the current standard of practice. In that policy, dentists are encouraged to screen patients for sleep-related breathing disorders and refer as needed to the appropriate physicians for proper diagnosis. The policy also clearly states that oral appliance therapy is an appropriate treatment for mild and moderate sleep apnea and for severe sleep apnea when continuous positive airway pressure (CPAP) is not tolerated by the patient.

The steps for “S.E.T.U.P. for Success in Sleep” are screen, educate, test, understand and present.

Screen

While screen is the first step in the acronym and also in actual implementation, keep in mind that we are actually educating our patients during screening. Screen and educate are truly combined cornerstones of the process. For practitioners desiring to act in accordance with the ADA policy statement and to have a successful dental sleep medicine program in their practice, step one is to screen 100% of your patients for sleep-related breathing disorders. There are a number of recognized screening forms that are commonly used in medical practice to screen for OSA. Singh et al4 found that four screening tools are widely recognized as being easy to administer: STOP, STOP-BANG (SB), Epworth Sleepiness Scale (ESS) and four-variable screening tool (4-V). The bottom line is that each practice should find an organized way to screen and discuss sleep health with every patient. A point person or sleep coordinator should be tasked to assure that these forms are reviewed and that conversations take place so at-risk patients clearly understand the life-threatening and life-shortening nature of this disease.

In most dental practices, the flow for new patients is different as compared to the flow for patients of record. Likewise, the flow of these screening processes may differ as well. Including a sleep health screening form with new patient paperwork will help gather information for an initial sleep health conversation with each new patient. For patients of record, each practice should decide whether it is easier and more efficient to have patients complete a sleep health questionnaire at their recare appointment or if the hygienist or sleep coordinator should accomplish this task in a conversation with the patient.

During screening, all patients in the practice will fall into one of the categories shown in the Table. A suggested action for each category is proposed. Beyond any suggested action (and even when no action is necessary for a particular patient), keep in mind that the underlying principle of this program is that we are always striving to increase the sleep health awareness of our patients. As was mentioned previously, screening and education go hand in hand. This is a value-added service for the practice and the educational and health lessons extend to other family members.

It is important to understand that the sole purpose of screening is to identify patients who are at risk for sleep-related breathing disorders. It is the first step in an overall process. Comparing to our usual dental world, it would be inappropriate to discuss possible root canals and crowns with a patient before a complete dental examination. During that dental examination, we would utilize all appropriate diagnostic tools and imaging. Only after a complete analysis would we then discuss treatment options. Likewise, sleep health screening is not the appropriate time to discuss treatment. There is usually no medical diagnosis at this step in the process. With that said, this is a very common mistake made by many dental teams. During the screening process, if you are asked, “What might be wrong?” or “What treatment might I need?” the only answer is, “I don’t know and that’s why we are going through this screening process.” The screening process is the first step in an effort to identify patients at risk and increase our patients’ sleep health awareness. We then move on to educate about the risks of the disease and the benefits for those at risk to complete a diagnostic sleep study that will be reviewed and interpreted by

<table>
<thead>
<tr>
<th>Patient category</th>
<th>Suggested education action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at risk and never tested</td>
<td>No action for this patient. Explain why the practice has implemented a sleep health awareness program.</td>
</tr>
<tr>
<td>At risk and never tested</td>
<td>Review risk factors and educate as to benefits of diagnostic sleep testing.</td>
</tr>
<tr>
<td>Diagnosed and compliant with CPAP</td>
<td>Encourage patient to continue CPAP usage.</td>
</tr>
<tr>
<td>Diagnosed and noncompliant with CPAP</td>
<td>Review prior findings with patient in an effort to find a medically recommended treatment option that patient can be compliant with.</td>
</tr>
<tr>
<td>Diagnosed and OA compliant</td>
<td>Review history of treatment and continued care.</td>
</tr>
<tr>
<td>Diagnosed and noncompliant with OA</td>
<td>Review prior findings with patient in an effort to find a medically recommended treatment option that patient can be compliant with.</td>
</tr>
</tbody>
</table>
a board-certified sleep physician. Only then might we be able to talk about what’s wrong and what might be needed to fix it.

If we find that a patient has had a prior sleep study, we should obtain a copy before we begin to speculate on what to recommend or not recommend. During the overall screening process, we will also undoubtedly identify patients who were previously told by a physician that they should undergo a diagnostic sleep study and did not. Screening is also where we will identify untreated patients previously diagnosed with OSA as well as noncompliant CPAP patients. Any and all of these situations require our further assessment of the diagnostic and treatment history before we jump in with recommendations. These situations would only then warrant further patient education and direction to the next appropriate step. Even when patients have had prior sleep tests, it is not appropriate to discuss treatment until we have reviewed medical history and prior diagnostic sleep study reports. The S.E.T.U.P. process is the most patient-, practice- and physician-friendly when you don’t jump ahead. Lastly, but equally as important to mention, is that screening is not the appropriate time to discuss cost or medical insurance or appliances. We’ll get there, but we have to first educate ourselves and then the patient on the specifics of their individual risk factors and the appropriate next step to take.

**Educate**

Education is the most critical part of the process and probably the “make it or break it” for the success of implementing a dental sleep program. As you read through the articles in the CDA Journal, you are increasing your own sleep health awareness, which is certainly a key component of what we will introduce as the educational triangle (FIGURE). Sleep health education begins with educating ourselves and our entire team so we are then able to educate our patients to help them understand what may previously have been out of the scope of usual conversation at the dental office.

The sleep coordinator and the dental team should not assume that the patient has a thorough understanding of this disease and all appropriate treatment options even if they have previously gone through diagnostic sleep testing. The reality of the medical practice world often may not have allowed sufficient time for patients to fully understand what may previously been out of the scope of usual conversation at the dental office.

For the dentist and the dental team, educating themselves in sleep health must be coupled with educating them in a process that informs and educates patients. The entire team must be onboard. The team must understand the process that they will all carry out for implementation and follow-through of a step-by-step dental sleep medicine program for the practice.

The sleep coordinator is responsible for maintaining the integrity of the educational triangle. Without a point person other than the dentist, the program is more often miss than hit. Let’s review the initial steps in education. It is through these steps that each office can identify the responsibilities and delineate the duties of the sleep coordinator. Those responsibilities and duties will also become easier to enumerate and define as we go through the remainder of the steps in the S.E.T.U.P. process. Dentists should become the captain of their teams to assure that they and the entire team have had an appropriate level of sleep health education. The sleep health education and awareness level of the dentist should help to determine if team education is best accomplished in house or if the team should seek outside education in areas that may include learning sleep health terms and terminology, sleep pathophysiology, diagnostic sleep testing and oral appliance therapy. Most of what we are dealing with in incorporating dental sleep into the practice is new and different, but it certainly does not need to be difficult if the dentist assures that the educational targets are appropriate and have been achieved by the different members of the team. The sleep coordinator can be tasked with assuring that front- and back-office members understand their responsibilities and have the knowledge necessary to accomplish these tasks.

The dentist must establish a flow for the sleep program and assure that the sleep coordinator is familiar with and able to guide staff and patients through the program. Safeguards must be put in place so that the dental sleep program is not derailed before it ever gets started. It might be one of the oldest clichés in life, but in the dental office, new habits are hard to make and easy to break. The sleep coordinator’s prime responsibility is to keep the integrity of a routine sleep health screening process and to assure that patients are receiving the direction and education that is necessary to predictably and successfully move on to the next step.
Test

Up to this point, the documentation that should be in your clinical records is detailed notes of the sleep health review with the patient as well as detailed notes regarding any relevant comorbidities. A copy of any screener/questionnaire should be in the record. A copy of the patient’s medical insurance card should be obtained, as it will be necessary for upcoming verification of medical insurance benefits.

Diagnostic sleep testing can be accomplished with polysomnography (PSG) during an overnight stay in a lab or at home with a home sleep testing device (HST). In all cases, the results must be read and interpreted by a medical doctor who will also provide a medical diagnosis and treatment recommendations. It is within the scope of dental practice to provide oral appliance therapy. Only a physician can review the sleep study data, provide the diagnosis and recommend the appropriate treatment options.

If the patient has previously undergone a diagnostic sleep study, a copy should be easy to obtain by having the patient sign a medical records release form. This can be faxed to the facility or to the physician’s office where the study was completed.

If the patient is at risk and has not undergone a diagnostic sleep study, testing is the next step in the process. The results of the sleep study will dictate how to proceed and will frame the conversation and case presentation with the patient. The availability of sleep physicians and testing facilities will vary depending on the geographic location. In most metropolitan areas, patients and practices will have many options. This article deals with incorporating dental sleep medicine into the dental practice, and we therefore will assume that most readers are near the beginning of this process. As might be practical in building any referral relationship, a face-to-face meeting with the sleep physician should be helpful and informational. It is important to discuss the sleep physician’s feelings about treatment options for patients you might refer to their practice. We are looking for a physician partner who will make treatment recommendations in the best interest of the patient. We are looking for a physician partner who will recommend oral appliance therapy as a treatment option when it is appropriate according to the guidelines of the American Academy of Sleep Medicine. We are also looking for someone we can respect and learn from as we enter the medical sleep world of our dental practice. Understanding when a particular sleep physician will and will not recommend oral appliance therapy can help the dentist make the best referral choices.

It is equally important to determine what the sleep physician expects of the dentist as a referrer to the sleep practice.

When the patient has completed the diagnostic sleep study, the sleep study report becomes the key document in the clinical record and is critical for medical insurance purposes. When oral appliance therapy is listed as one of the recommended treatment options, that report provides the physician’s directive for the dentist to proceed.

When oral appliance therapy is a recommended treatment option and the patient chooses to proceed in that direction, their medical insurance company will usually require a patient-signed CPAP Intolerance or Refusal form in order to provide coverage for oral appliance therapy. Getting this document should become normal practice and a responsibility of the sleep coordinator.

Understand

There are, at minimum, three people involved in the understand portion of the process. The first two are the dentist and the sleep coordinator. The third is the patient and perhaps additionally the bed partner or a family member of the patient. The dentist and sleep coordinator must review and understand all findings, including but not limited to the sleep study report. Understanding the patient’s personal and family medical history as well as a thorough evaluation of the patient’s introral health is critical to this stage of the process.

The dentist and sleep coordinator should review the sleep study so they can prepare themselves to present the findings to the patient and help the patient to understand the most important and relevant findings during case presentation. The dentist and sleep coordinator should understand the technical data in the sleep study report. They should also understand how to communicate these findings in a simple and illustrative way to the patient. Items that may be critical to the patient’s understanding may include: How many times does the patient choke and suffocate per hour/night, how long is the longest choking and suffocating event, how much oxygen desaturation is the patient going through as a result of their choking and suffocating during sleep? How might the sleep health findings be related to medications that the patient is taking,
to impending life-shortening or life-threatening medical issues, to excessive daytime sleepiness/drowsiness? What is the board-certified sleep doctor recommending for treatment? The list of considerations goes on and on, but there is a personalized story to tell from the data collected in each case. We must understand how to be good educators and communicators during this part of the process, so we are prepared for the case presentation.

This is the appropriate time to gather medical insurance benefit information. The patient is almost certainly going to ask the “how much” question at the case presentation. Reach out for competent help in this process. An expert third-party medical billing team can assist in not only obtaining all the necessary details of benefit verification but in completing medical insurance authorization, which is often necessary for third-party reimbursement. This part of the process is not dental business as usual. It is different, but not difficult if you outsource the process through a competent partner. The dental team should understand that assisting with medical insurance is a win-win process and more cases will be accepted when we implement a patient-friendly medical insurance protocol.

Present

The case presentation is a combined effort by the dentist and sleep coordinator. Each practice will develop their own approach and personality for successfully accomplishing this part of the process. The previous section outlined what the dentist and sleep coordinator should review and understand so that, in turn, can help the patient to understand the details of the findings and the recommendations for treatment. Here are a few additional pearls that are positive for both patient and practice and will help your case presentations be most successful:

- Use visual words in your case presentation. Don’t assume that your patient understands the life-shortening and life-threatening nature of this disease. Paint an easy to understand picture. If you shortcut patient education, you shortcut the formula to success.
- Review all treatment options from the sleep study report. Don’t be negative about CPAP. It is the gold standard medical treatment and is the most appropriate treatment for severe cases. If a patient is CPAP intolerant or refuses CPAP and you have a physician’s recommendation for oral appliance therapy, you should point out the benefits of this treatment option.
- Lean on the board-certified sleep physician’s written report in your case presentation. Their expertise, findings and treatment recommendations carry a lot of weight for the patient.
- Don’t guarantee success of treatment. That’s not the standard in the medical world. Guarantee and provide your best effort to control this life-shortening and life-threatening disease.
- Present an all-inclusive fee for an all-inclusive initial course of therapy. This is easier for the patient to understand and accept.
- Be patient-, practice- and physician-friendly when it comes to working with medical insurance. Working with a partner to outsource verification of medical benefits, medical authorizations and medical billing will help you to help more patients by getting more yeses to treatment that you present.

REFERENCES

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HERE’S TO 26 CONSECUTIVE YEARS
RATED A (EXCELLENT) BY AM BEST
HERE’S TO PROTECTING DENTISTS AND ONLY DENTISTS
RELENTLESS PURSUIT OF NEW WAYS TO REDUCE YOUR RISKS
FAIR RATES AND UNFLINCHING PROTECTION

SINGULAR FOCUS
EARNED TRUST
COLLECTIVE STRENGTH

PERSONAL SERVICE • UNPARALLELED EXPERTISE
EMPOWERING YOU TO PRACTICE WITH CONFIDENCE
TRAILBLAZING LEADERSHIP BY VISIONARY DENTISTS
UNDIVIDED ATTENTION • DELIVERING ON OUR PROMISES

HERE’S TO BEING IN YOUR CORNER FOR 40 YEARS AND COUNTING
Informed Consent for Dental Sleep Medicine

Ken Berley, DDS, JD

ABSTRACT Informed consent for dental sleep medicine is a process of obtaining permission before conducting health care intervention or for disclosing personal information. An informed consent is given based on a clear appreciation and understanding of the facts, implications and consequences of an action. Adequate informed consent is rooted in respecting a person’s dignity.

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Informed consent for dental sleep medicine (DSM) is a process of obtaining permission before conducting health care intervention or for disclosing personal information. An informed consent is given based on a clear appreciation and understanding of the facts, implications and consequences of an action. Adequate informed consent is rooted in respecting a person’s dignity.1 Informed consent is collected according to guidelines from the fields of medical ethics and research ethics. Informed consent is a legal obligation due from a physician (dentist) to their patient, an obligation that may not be met by the physician’s (dentist’s) skillful treatment of their patient. It may only be met by the treating physician (dentist) obtaining from their patient knowing authorization for carrying out the intended medical procedure. The physician (dentist) is required to disclose whatever would be material to their patient’s decision, including the nature and purpose of the procedure and the risks and alternatives. The disclosures should be made by the physician (dentist) to their patient and not through use of consent forms that are not particular to individual patients. To minimize any subsequent claim by the patient that there was a lack of adequate disclosures, the physician (dentist) should record in the patient’s chart the circumstances of the patient’s consent and should not rely on the patient’s unreliable ability to recall those circumstances.2,3

To legally provide any service or medical procedure for a patient, the patient must give permission for the treatment. The permission is only valid if it is given with full knowledge of the possible risks and benefits of the treatment. Therefore, appropriate informed consent is mandatory for oral appliance therapy (OAT). While significant complications have been rare, tooth and jaw movement secondary to mandibular advancement device (MAD) usage is a common long-term result. To practice dental sleep medicine and minimize risk, patients must be adequately informed before treatment is initiated.4
Elements of Informed Consent
Appropriate informed consent is composed of three elements: disclosure of information, capacity to consent and voluntary consent. Each element must be satisfied to achieve adequate permission to perform any medical procedure.

The patient must be presented with adequate information to make the decision to proceed or decline the treatment. The information that must be disclosed is unique to each patient. The information must be presented in a way that the patient can understand and, ideally, presented in the native language of the patient. Likewise, the method of disclosing pertinent information must be unique to the patient, such as for a patient with hearing problems.

The patient must have the mental capacity and be of legal age to consent. Mental capacity is a real concern for DSM practitioners. OSA has been closely linked to dementia. Frequently, our patients present with obvious neurological deficiency. It is certainly advisable to have a family member present during the consent process. Having the family member co-sign (witness) the consent document will minimize the risk associated with providing treatment on a patient who presents for treatment with obvious neurocognitive deficits. Additionally, severe sleep deprivation can make the consent process problematic.

The patient must be free to voluntarily consent. While this may not seem to be a problem, male patients are frequently under pressure from their partners to receive treatment for their snoring or obstructive sleep apnea (OSA). If in doubt, ask the partner to leave the room and have a frank conversation with the patient in private.

The United States currently has no federal statute that comprehensively addresses informed consent to health care procedures. Rather, each of the 50 states has one or more informed-consent statutes (California Informed Consent Statute 22 CCR § 72528), each of which is subject to amendment during each session of the states’ legislatures. Furthermore, a state’s statutes addressing informed consent may be supplemented by common-law (judicially enacted) concepts. This manuscript summarizes “best practices” as they can be gleaned from a review of the California informed-consent laws, ethical standards and accreditation standards in the health care industry.

General Components of Consent
In the absence of special circumstances, a physician (dentist) may not treat a patient without first obtaining their consent. Courts in many jurisdictions, however, have questioned whether consent should be binding where the patient does not, at least in some measure, consciously weigh the risks of undergoing treatment against the risks of foregoing treatment. A decision to undergo treatment despite such risks is the product of “informed consent.” But the average patient’s ignorance of medical science very likely makes him or her unaware of particular risks inherent in a proposed treatment, and hence prevents him or her from giving the informed consent that the law requires. Informed consent, therefore, concerns the extent to which a doctor must disclose risks inherent in a contemplated method of treatment.

Common elements that should be included in all consent forms are:
- The diagnosis.
- The nature and purpose of the procedure(s) for which consent is sought.
- All material risks and consequences of the procedures.
- An assessment of the likelihood that the procedures will accomplish the desired objectives.
- Any reasonably feasible alternatives for treatment, with the same supporting information as is required regarding the proposed procedures.
- The prognosis if no treatment is provided.

Disclosure
Disclosure requires the physician (dentist) to supply each prospective patient with the information necessary to make an autonomous decision and also to ensure that the patient adequately understands the information provided. This latter requirement implies that a written consent form be written in lay language suited for the comprehension skills of subject population as well as assessing the level of understanding through conversation. In order to ensure that informed consent is properly obtained, the physician (dentist) should actually discuss with the patient each of the procedures to be performed, detailing their nature, risks and alternatives. This conversation should take place before the patient is under the influence of preoperative medications. Thus, the consent form should provide blanks for the date and precise time of signature by both the patient or their responsible party and the physician (dentist). The patient should also be given an opportunity to ask questions concerning the proposed
treatment and the written consent should confirm that the opportunity has been given. The consent should be signed by the patient or responsible party in the presence of an attesting witness.\textsuperscript{11}

There is always concern regarding the amount of information that must be disclosed for a patient to make an informed decision about any therapy. The court in Cobbs' employed several postulates. The first is that patients are generally persons unlearned in the medical sciences, and therefore, except in rare cases, courts may safely assume that the knowledge of patient and physician (dentist) are not in parity. The second is that a person of adult years and in sound mind has the right, in the exercise of control over their own body, to determine whether or not to submit to lawful medical treatment. The third is that the patient's consent to treatment must be an informed consent to be effective. And the fourth is that the patient, being unlearned in medical sciences, has an abject dependence upon and trust in their physician (dentist) for the information upon which he relies during the decisional process, thus raising an obligation in the physician (dentist) that transcends arms-length transactions.

From the foregoing axiomatic ingredients emerges a necessity, and a resultant requirement, for divulgence by the physician (dentist) to their patient of all information relevant to a meaningful decisional process. In many instances, to the physician (dentist) whose training and experience enable a self-satisfying evaluation, the particular treatment that should be undertaken may seem evident, but it is the prerogative of the patient, not the physician (dentist), to determine for himself the direction in which he believes their interests lie. To enable the patient to chart their course knowledgeably, reasonable familiarity with the therapeutic alternatives and their hazards becomes essential.

The court in Cobbs held that “as an integral part of the physician’s overall obligation to the patient there is a duty of reasonable disclosure of the available choices with respect to proposed therapy and of the dangers inherently and potentially involved in each.”\textsuperscript{12} A medical doctor, being the expert, appreciates the risks inherent in the procedure he is prescribing, the risks of a decision not to undergo the treatment and the probability of a successful outcome of the treatment. But once this information has been disclosed, that aspect of the doctor's expert function has been performed. The weighing of these risks against the individual subjective fears and hopes of the patient is not an expert skill.\textsuperscript{13} Such evaluation and decision is a nonmedical judgment reserved to the patient alone. A patient should be denied the opportunity to weigh the risks only where it is evident; the patient cannot evaluate the data, as, for example, where there is an emergency or the patient is a child or incompetent. For this reason, the law provides that in an emergency, consent is implied.\textsuperscript{14} If the patient is a minor or incompetent, the authority to consent is transferred to the patient’s legal guardian or closest available relative.\textsuperscript{15} In all cases, the decision whether or not to undertake treatment is vested in the party most directly affected: the patient.\textsuperscript{16}

The scope of the disclosure required of physicians defies simple definition. Some courts have spoken of “full disclosure”\textsuperscript{17} and others refer to “full and complete” disclosure,\textsuperscript{18} but such facile expressions obscure common practicalities. Two qualifications to a requirement of “full disclosure” need little explication. First, the patient's interest in information does not extend to a lengthy polysyllabic discourse on all possible complications. A minicourse in medical science is not required; the patient is concerned with the risk of death or bodily harm and problems of recuperation. Second, it is not a physician's duty to discuss the relatively minor risks inherent in common procedures when it is common knowledge that such risks inherent in the procedure are of very low incidence. In a medical-malpractice action based on the doctrine of informed consent, an objective standard applies and the question is whether a reasonably prudent patient, fully advised of material known risks would have consented to the suggested treatment.\textsuperscript{19}

When there is a common procedure, a doctor must, of course, make such inquiries as are required to determine if for the particular patient the treatment under consideration is contraindicated — for example, to determine if the patient has had adverse reactions to medication; but no warning beyond such inquiries is required as to the remote possibility of death or serious bodily harm. When there is a more complicated procedure, the jury should be instructed that when a given procedure inherently involves a known risk of death or serious bodily harm, a medical doctor has a duty to disclose to his/her patient the potential of death or serious harm and to explain in lay terms the complications that might possibly occur. Beyond the foregoing
The test for determining whether a potential peril must be divulged is its materiality to the patient’s decision.

The effective management of a sleep-related breathing disorder (SRBD) requires the qualified dentist to provide the patient with an overview of the disease process as well as an understanding of how oral appliances treat SRBDs. OSA is the result of neuroanatomical factors and pathophysiological processes that either singularly or collectively fail to maintain the patency or opening of the upper airway. Patient education should include the role of these processes as well as highlighting demographic, ethnic and gender risk factors. Additionally, patients should be informed about disease processes including comorbid conditions arising from or associated with OSA. The patient undergoing OAT should be informed of their SRBD severity including an understanding of the resulting apnea-hypopnea index (AHI), respiratory disturbance index (RDI) or respiratory event index (REI) from objective sleep-apnea testing.

Initiating OAT includes obtaining informed consent and a letter of medical necessity and should allow for modification of the treatment plan as needed to obtain the desired therapeutic result. Informed consent is the process by which the treating dentist discloses appropriate information to a competent patient so that the patient may make a voluntary choice to accept or refuse treatment. The qualified dentist should provide the patient an opportunity to ask questions about the risks of treatment as well as educate the patient as to the risks associated with no treatment. Informed consent also requires that the qualified dentist informs the patient as to alternate therapies to OAT, such as positive airway pressure therapy, positional therapy, maxillofacial surgery or otolaryngologic surgery. Upon agreement to a plan of treatment, the patient should sign the informed consent and a letter of medical necessity and should allow for modification of the treatment plan as needed to obtain the desired therapeutic result.

The patient should also be informed that OAT success may be impacted by...
fragmented sleep, oxygen desaturation and other coexisting sleep disorders. Additionally, the qualified dentist should explain risk modifiers that may mitigate disease severity. The patient should be advised that the risk of disease severity or treatment success may be negatively influenced by using tobacco, alcohol, caffeine or recreational substances.\(^2\) The impact of both weight loss and weight gain should be discussed with the patient. The educated and informed patient may choose to reduce disease impact by modifying behaviors that increase SRBD risk or severity. Additionally, patients should be educated about the importance of sleep hygiene. The patient should understand the impact of ambient room lighting, temperature, the use of electronics in bed, animals on the bed as well as the importance of regular sleep schedules. While these considerations may not directly affect OA efficacy, they can collectively fragment sleep and aggravate daytime sleepiness concerns. Improper sleep hygiene can also indirectly reduce patient perception of oral appliance benefit in terms of sleep quality and daytime function.\(^2\)\(^6\)

The complications that could occur over a lifetime of MAD wear are numerous. It would be difficult to include a complete list of all possible issues that could arise. However, some of the possible issues include tooth movement, jaw movement, TMD, injury secondary to appliance breakage, dry mouth, excessive saliva, sore teeth, dental decay, periodontal disease, mobile teeth, fractured teeth and dental restorations, popping and noise in the jaw, acrylic or other (material) allergies, posterior open bite, difficulty chewing, residual sleepiness and symptoms after treatment and increased AHI/ RDI during a follow-up sleep study.\(^4\)

Additionally, OSA is an unusual disease because it has been associated with many comorbid medical conditions. The law of informed refusal requires that a patient be informed of the risk associated with refusing treatment. As a result of OSA or as a complication of OA treatment, patients may develop any or all of the following temporary or permanent comorbid diseases: coronary artery disease, high blood pressure, diabetes, cerebrovascular disease, stroke, heart problems, heart attack, atrial fibrillation, depression, mood disorders, vivid dreams, anxiety, feeling suffocated, sexual dysfunction, weight gain, obesity, dementia, Alzheimer’s disease, gastroesophageal reflux (GERD), chronic obstructive pulmonary disease (COPD), congestive heart failure, cancer, excessive daytime sleepiness, increased work-related and traffic-related accidents and death.\(^4\)

**Capacity To Consent**

Capacity pertains to the ability of the patient to both understand the information provided and form a reasonable judgment based on the potential consequences of their decision. In general, it is the dentist’s role to provide the necessary medical facts and the patient’s role to make the subjective treatment decision based on their understanding of those facts.\(^2\)\(^9\) The patient must have the capacity to reason and make judgments.\(^2\)\(^9\) To give informed consent, the individual concerned must have adequate reasoning faculties and be in possession of all relevant facts. Impairments to reasoning and judgment that may prevent informed consent include basic intellectual or emotional immaturity, high levels of stress such as post-traumatic stress disorder or a severe intellectual disability, severe mental disorder, intoxication, severe sleep deprivation, Alzheimer’s disease or being in a coma. When the patient lacks the requisite capacity to consent, another person is generally authorized to give consent on their behalf, e.g., parents or legal guardians of a child (though in this circumstance the child may be required to provide informed assent) and conservators for the mentally disordered or consent can be assumed through the doctrine of implied consent, e.g., when an unconscious person will die without immediate medical treatment.\(^2\)\(^6\)

In dental sleep medicine, practitioners routinely treat patients with "severe sleep deprivation" who have difficulty following conversations or who may fall asleep during consent discussions. If a dentist is unsure of the patient’s ability to consent, it is always advisable to have a family member witness the consent and sign the informed-consent document. As a practice tip, patients who present excessively sleepy need a driver and may need to be referred back to their sleep physician for control of the patient’s excessive daytime sleepiness until the MAD is effective.\(^4\)

**Voluntariness of Consent**

Voluntariness refers to the patient’s right to freely exercise their decision-making without being subjected to external pressure such as coercion, manipulation or undue influence. A patient’s decision to proceed with any medical procedure must be voluntary.
and without coercion and the patient must have a clear understanding of the risks and benefits of the proposed treatment alternatives or nontreatment, along with a full understanding of the nature of the disease and the prognosis.\textsuperscript{30}

**Informed Refusal**

The legal principals of informed consent also apply to the doctrine of informed refusal. Any adult patient who has the requisite capacity has the legal right to refuse any medical treatment.\textsuperscript{26} The patient’s ability to control their bodily integrity through informed consent is significant only when one recognizes that their right also encompasses a right to informed refusal.\textsuperscript{31}

In obtaining an informed refusal, the health care provider is required to fulfill the same steps as in an informed consent. The patient must be provided the diagnosis, a layman’s description of the procedure, the likelihood of success (prognosis), alternatives and the risks associated with no treatment. This discussion must include MI, hypertension, strokes, diabetes and automobile/industrial accidents. The final step of the informed refusal is to document the discussion and the refusal. It is ideal if the dentist has an informed-refusal form that is specific to this discussion. If no such document exists, detailed notes should be made in the patient’s record fully memorializing the discussion.\textsuperscript{4}

**Written Consent**

Most practitioners believe that a written signed consent is legally required. This is not the case. A written consent is only for documentation. Oral consent is legally binding but proving what information was presented in order to obtain consent is difficult. Typically, practitioners are wise to have a discussion with the patient outlining the common complications inherent in OAT. Included in the discussion is a time for questions to be answered. Once the discussion is completed, the written consent is presented for signature. Remember, a well-written and executed informed-consent document is your most valuable defense tool if your records are ever reviewed by a plaintiff’s attorney. With a well-written, signed informed consent most lawsuits never happen.\textsuperscript{4}

**Concerns**

The practice of dental sleep medicine presents some unusual risks. The most common risk of providing a mandibular advancement device is occlusion issues that develop as a result of the persistent forces placed on the teeth and jaws. MADs can cause the maxillary teeth to tilt posteriorly and the mandibular teeth to tilt anteriorly. This action will result in a posterior open bite in a significant portion of OAT patients. It is imperative for all practitioners to inform their patients of the risk. At each appointment, occlusion should be examined and morning repositioner wear should be encouraged.

Patients with a history of TMD must be informed of the possibility of muscle pain, capsulitis, dysfunction and difficulty chewing with MAD use. Fortunately, MAD appliance wear will generally improve TMD symptoms with time; however, initially this may not be the case. Appropriate consent will include a frank discussion of TMD risks.

MADs place significant amounts of pressure on the teeth and existing dental restorations. Ill-fitting crowns and bridges or other restorations can be dislodged or fractured as a result of oral appliance therapy. Failing endodontic procedures can be compromised as a result of the pressure placed on these teeth by a MAD appliance. Adult patients with recent orthodontics are at risk of tooth movement. Patients with a minimum number of teeth require a directed discussion that may include a discussion of implants to help secure the MAD. Patients with a history of periodontal disease and attachment loss must be informed of any additional risk.\textsuperscript{4}

Patients can be allergic to the material contained in the MADs. Acrylic allergies and metal allergies are not uncommon. This possibility should be discussed. Additionally, appliances can break or parts may become dislodged. Appropriate warnings are necessary.\textsuperscript{4}

Each patient is unique. Informed-consent discussions must be specific to the clinical presentation of the patient, the severity of OSA, the capacity of the patient to understand the risks of treatment, the existence of extenuating circumstances (arthritis making insertion and removal an issue) and the patient’s ability to understand English. Each of these clinical situations and patient peculiarities necessitates a different consent discussion.\textsuperscript{31} However, a fully informed patient is more engaged in the therapy and more committed to the process. The time spent in obtaining an informed consent reduces clinician liability and results in a more motivated patient.\textsuperscript{4}

**NOTE**

This information is not intended to constitute legal advice and should not be relied upon in lieu of consultation with appropriate legal advisors in your own jurisdiction. It may not be current as the laws in the area of informed consent change frequently.

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2. Smith v. Shannon, 666 P.2d 351 (Wash. 1983). Noting that the doctrine of informed consent is premised upon patient sovereignty and the patient’s ability to intelligently govern the treatment of his/her body. The doctrine of informed consent refers to the requirement that a physician, before obtaining the consent of his/her or her patient to treatment, inform the patient of the treatment’s attendant...
risks. The doctrine is premised on the fundamental principle that “[e]very human being of adult years and sound mind has a right to determine what shall be done with his/her own body.” Schloendorff v. Society of N.Y. Hosp., 211 N.Y. 125, 129, 105 N.E. 92 (1914) (Cardozo, J.), overruled on other grounds, Bing v. Thung, 2 N.Y.2d 656, 667, 143 N.E.2d 3, 163 N.Y.S.2d 3 (1957). A necessary corollary to this principle is that the individual be given sufficient information to make an intelligent decision. See Canterbury v. Spence, 464 F.2d 772, 783 [D.C. Cir. 1972].

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11. Informing a medical procedure without consent constitutes battery. The California Case law has rejected this argument and relied on the law of negligence. See: Cabb v. Grant [S.F. Supreme Court of California, Oct. 27, 1972] In Bank. [Opinion be Mosk, J] 8 Cal. 3d 230
12. In giving its instruction the trial court relied on Berkery v. Anderson (1969) 1 Cal. App. 3d 790, 803 [82 Cal. Rptr. 67], a case in which it was held that if the defendant failed to make a sufficient disclosure of the risks inherent in the operation, he was guilty of a “technical battery” (also see Pedersky v. Bleiberg (1967) 251 Cal. App. 2d 119, 123 [59 Cal. Rptr. 294], Hundleby v. St. Francis Hospital (1958) 161 Cal. App. 2d 800, 802 [327 P.2d 131]). While a battery instruction may have been warranted under the facts alleged in Berkery, in the case before us the instruction should have been framed in terms of negligence.
15. Informing a medical procedure without consent constitutes battery. The California Case law has rejected this argument and relied on the law of negligence. See: Cabb v. Grant [S.F. Supreme Court of California, Oct. 27, 1972] In Bank. [Opinion be Mosk, J] 8 Cal. 3d 230
16. In giving its instruction the trial court relied on Berkery v. Anderson (1969) 1 Cal. App. 3d 790, 803 [82 Cal. Rptr. 67], a case in which it was held that if the defendant failed to make a sufficient disclosure of the risks inherent in the operation, he was guilty of a “technical battery” (also see Pedersky v. Bleiberg (1967) 251 Cal. App. 2d 119, 123 [59 Cal. Rptr. 294], Hundleby v. St. Francis Hospital (1958) 161 Cal. App. 2d 800, 802 [327 P.2d 131]). While a battery instruction may have been warranted under the facts alleged in Berkery, in the case before us the instruction should have been framed in terms of negligence.
18. The doctrine of informed consent does not require the physician to disclose the risk to the patient “where the statistical risk is remote and the severity not great.” 2 D. Louisell H. Williams, supra § 22.13, at 22–34.
19. In giving its instruction the trial court relied on Berkery v. Anderson (1969) 1 Cal. App. 3d 790, 803 [82 Cal. Rptr. 67], a case in which it was held that if the defendant failed to make a sufficient disclosure of the risks inherent in the operation, he was guilty of a “technical battery” (also see Pedersky v. Bleiberg (1967) 251 Cal. App. 2d 119, 123 [59 Cal. Rptr. 294], Hundleby v. St. Francis Hospital (1958) 161 Cal. App. 2d 800, 802 [327 P.2d 131]). While a battery instruction may have been warranted under the facts alleged in Berkery, in the case before us the instruction should have been framed in terms of negligence.
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Pediatric Obstructive Sleep Apnea: An Interdisciplinary Approach to Treatment

Thomas Stark, DDS, LTC(P); Peter O’Connor, MD, COL; and Tracey Fischer, MA, MA, CCC-SLP

ABSTRACT Dentists have an important partnership with the medical community in the recognition and management of obstructive sleep apnea (OSA) in children. OSA negatively impacts the overall health and well-being of children, and an interdisciplinary approach to management may optimize care. Sleep medicine physicians, dentists, otolaryngologists, pediatricians, orofacial myologists and other health care providers have a role in the management of pediatric OSA.

Obstructive sleep apnea (OSA) is a leading cause of sleep disturbance in children. Despite respiratory effort, children with OSA experience recurring episodes of upper airway obstruction that disrupt ventilation and sleep patterns during sleep. According to epidemiologic studies, the prevalence of OSA in children is approximately 1% to 5%. Although OSA can occur from infancy through adolescence, the peak incidence of pediatric OSA is between the ages of 2 and 8. OSA occurs equally in preadolescent males and females but becomes more common in males over time. Although OSA is a chronic disease in adults, it often remits without intervention during certain phases of growth and development in children. However, some pediatric patients will not “outgrow” this disorder and will rely on health care teams for recognition and management.

Structural factors play a significant role in the etiology of pediatric OSA; however, the underlying causes of sleep-disordered breathing are complex and the pathophysiology is not fully understood. For instance, the upper airway lacks rigid support and is vulnerable to periods of complete obstruction (apnea) or partial obstruction (hypopnea) during sleep. In addition to being smaller in size, the airway is more collapsible in children than adults. The smallest cross-sectional region of the pharyngeal airway is the retropalatal area where the tonsils and adenoids overlap. This circumferential area of lymphoid tissue known as Waldeyer’s ring is an anatomic focus in pediatric OSA. Adenotonsillar hypertrophy is the primary structural factor linked with OSA. However, many children with adenotonsillar hypertrophy do not have OSA. Furthermore, OSA can persist despite addressing the...
During wakefulness and sleep, volitional drive, control of muscle tone is different. Adduction to a reduction in ventilatory pressure. Pharyngeal collapse may be more common in children with OSA due to a decrease in upper airway dynamic pressure. Pharyngeal collapse may be more common in children with OSA due to a decrease in upper airway dynamic neuromotor response. Sleep arousals lead to ventilatory instability and obstructive cycling because ventilation is regulated by feedback loops. In addition to a reduction in ventilatory drive, control of muscle tone is different during wakefulness and sleep. Volitional muscle tone is most inhibited during rapid eye movement (REM) sleep. Consequently, the majority of obstructive events occur during REM sleep.

Children are vulnerable to the negative consequences of OSA. When compared with adults, children have a greater metabolic need for oxygen, higher respiratory rate, lower oxygen stores and smaller functional residual capacity. Moreover, hypoxemia and hypercapnia may occur more rapidly even during brief periods of airway obstruction if their reserve is low. Untreated OSA in children leads to somatic growth deficiency and multisystem disease. Metabolic, pulmonary, cardiovascular, gastroenterological, neurologic, neurocognitive and inflammatory disorders have been associated with pediatric OSA. Furthermore, consequences of OSA may persist into adulthood. Fortunately, many of the negative effects of OSA resolve with medical treatment. Early recognition of signs and symptoms of OSA enables children to receive appropriate medical attention and avoid irreversible damage.

Recognizing the signs and symptoms of pediatric OSA is an important competency for health care providers, including dentists. Most children and adolescents with OSA have a history of loud snoring or labored breathing during sleep. Restless sleep, paradoxical breathing, thoracic retractions, hyperextension of the neck, unusual sleep positions, sweating, nocturnal enuresis (bed wetting) and morning headaches also may occur. Young children may exhibit hyperactive behavior while older children and adolescents demonstrate somnolence and excessive daytime sleepiness. High-resolution brain imaging in children with OSA demonstrates tissue damage in the prefrontal cortex and other regions of the brain responsible for executive functioning and learning. OSA-related deficits in executive function lead to irritability, moodiness, disorganization, poor judgement, rigid thinking and impulsivity. Poor academic performance and impaired visual fine motor skills are also common in children with OSA. Studies suggest academic performance, quality of life and behavior tend to improve with treatment.

An important concept is the recognition of different observable traits or phenotypes in patients with OSA. While the phenotyping focus has primarily been investigated in adults, the same conceptual overlay can be applied to children. All patients with OSA are not the same and several phenotypes for pediatric OSA likely exist. Furthermore, the management of OSA in one population or phenotype may differ from another.

Predisposing factors for OSA may include conditions associated with airway inflammation (poorly controlled asthma, gastroesophageal reflux disease, mucopolysaccharidosis, cystic fibrosis and environmental exposure to secondhand smoke or pollution); craniofacial anomalies and malocclusion (craniofacial synostoses, Pierre Robin sequence, midface retragnathia, mandibular hypoplasia, palatal constriction, long and narrow faces, narrow and deep palate, steep mandibular plane angle, anterior open bite and conditions associated with macrognathia or nasal obstruction); conditions associated with decreased neuromotor tone (trisomy 21, Prader-Willi syndrome and neuromuscular disease); and conditions influencing breathing compliance or airway collapsibility.

### Table 1

<table>
<thead>
<tr>
<th>Sleep questions</th>
<th>Medical history</th>
<th>Orthodontic features</th>
<th>Other clinical features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Snoring or noisy breathing?</td>
<td>Attention deficit hyperactivity disorder (ADHD)</td>
<td>Maxillary constriction</td>
<td>Tonsillar hypertrophy</td>
</tr>
<tr>
<td>Mouth breathing?</td>
<td>Learning difficulties</td>
<td>Posterior crossbite</td>
<td>Long soft palate (modified Mallampati classification of 3–4)</td>
</tr>
<tr>
<td>Sweating?</td>
<td>Behavioral problems</td>
<td>“V”-shaped maxillary arch</td>
<td>Mallampati classification of 3–4</td>
</tr>
<tr>
<td>Fizzy sleep?</td>
<td>Hypertension</td>
<td>Retrogнатhic profile</td>
<td>Prader-Willi anomaly</td>
</tr>
<tr>
<td>Unusual sleep position (seated position/neck hyperextension)?</td>
<td>Gastroesophageal reflux disorder (GERD)</td>
<td>Excess overjet</td>
<td>Ankyloglossia</td>
</tr>
<tr>
<td>Sleep bruxism?</td>
<td>Nocturnal enuresis (bed wetting)</td>
<td>Class II malocclusion</td>
<td>Dry lips</td>
</tr>
<tr>
<td>Excessive daytime sleepiness?</td>
<td>Headaches</td>
<td>Class III malocclusion (maxillary deficiency)</td>
<td>Erythematous maxillary gingiva</td>
</tr>
<tr>
<td>Hyperactivity?</td>
<td>Failure to thrive</td>
<td>Long lower one-third of face</td>
<td>Hypernasal speech</td>
</tr>
</tbody>
</table>

Screening questions, medical history and clinical features that suggest a child may be at risk for OSA.
(Marfan syndrome, Ehlers-Danlos syndrome, laryngomalacia). Family history of OSA, African American ethnicity, premature birth and obesity also increase the risk for developing OSA.

Treatment of OSA in children is often directed by physicians with expertise in pediatrics, pulmonology, otolaryngology and sleep medicine. Adenotonsillectomy is typically considered first-line treatment for children with OSA. Unfortunately, OSA persists in many children following surgery. Furthermore, parents may decline surgical procedures because they are not willing to accept risks associated with surgery or general anesthesia. Nonadherence to traditional therapies for OSA, such as positive airway pressure therapy (PAP), has driven advances in the understanding and pathophysiology of upper airway collapse. Management protocols for improving outcomes in children with poor compliance with medical recommendations or persistent OSA following surgical interventions are evolving. As a result, a single treatment modality option has been increasingly abandoned toward a more personalized approach.

Due to the complexity of pediatric OSA, optimal treatment may involve collaboration with several disciplines, including dentists. The aim of this informational paper is to evaluate treatment options for the interdisciplinary management of pediatric OSA.

Screening for OSA in Children

Various screening aids and clinical exam features (TABLE 1) have been used to help identify children who are at risk for OSA. Keating and colleagues described screening and practices among practicing pediatric dentists in the U.S. and found that 41% of respondents were uncomfortable screening for OSA and 61% received no formal training in OSA during residency. Some data suggest screening tools tend to have acceptable sensitivity (in determining those who have the condition) but low specificity indicating a high number of false positives. Patel and colleagues evaluated different pediatric sleep screening tools and determined that current screeners do not accurately predict a diagnosis of OSA. Overland found that neither clinical features nor questionnaires were sensitive enough to detect the prevalence or severity of OSA in a population of children referred for adenotonsillectomy.

Diagnosis and Polysomnography

Sleep-related breathing disorders are on a continuum ranging from occasional snoring to severe OSA. Polysomnography (PSG) is the gold standard for diagnosis of pediatric OSA. (FIGURE 1). PSG evaluates respiratory parameters (respiratory effort, apneas and hypopneas, oxygen saturations), cardiovascular parameters (heart rate, rhythm) and movements (eye, limb, tooth bruxing) and cortical activity during sleep. PSG differentiates OSA from primary snoring, defines severity of OSA and evaluates success of interventions. Utilization of home sleep apnea testing (HSAT) has increased in uncomplicated adult patients with a high pretest probability for OSA, but has been used sparingly in pediatrics. At present, the American Academy of Sleep Medicine (AASM) and the American Academy of Pediatrics (AAP) do not recommend HSAT for pediatric patients.

The AASM Manual for Scoring of Sleep and Associated Events outlines diagnostic criteria for OSA in children. Pediatric OSA applies to patients younger than age 18. However, adult diagnostic criteria for OSA may be used for patients aged 13–18. Pediatric OSA occurs with greater than one obstructive event per hour of sleep as determined by the apnea hypopnea index (AHI). Additionally, pediatric OSA may be diagnosed if obstructive hypoventilation is present (more than 25% of total sleep time with hypocapnia [paCO2 > 50 mm Hg]) along with one of the following: snoring, flattening of inspiratory waveform or paradoxical breathing. Apneas tend to be measured consistently, however, scoring of hypopneas is not homogenous across studies, leaving some children with undiagnosed OSA. Similar to adults,
the severity of OSA is established by the AHI. Because children have a lower threshold for OSA, the corresponding values for mild, moderate and severe OSA are much lower (TABLE 2).

Making definitive conclusions and defining successful treatment for pediatric OSA is challenging due to a lack of consistency across studies. AHI less than 1 is considered resolution of OSA; yet, reductions in $\text{SpO}_2$ nadir or AHI by a specific percentage or benchmark are common measures of success in the literature. There is also a lack of consensus regarding the use of PSGs within the AAP, AASM and the American Academy of Otolaryngology-Head and Neck Surgery. Furthermore, among pediatric otolaryngologists, there is a discrepancy on who and when PSG is required.

**Growth and Development of the Pediatric Airway**

Over time, normal facial growth increases the dimensions of the pediatric airway. Facial growth in children involves bone surface remodeling and translation of the nasomaxillary complex and midface in an anterior and inferior direction relative to the cranium. The mandible translates downward and forward and grows upward and backward, maintaining its contact with the skull. The larynx also descends caudally away from the skull base, which in turn lends to a more collapsible and therefore unstable airway. Lymphoid tissue mass occupying the airway decreases over time. Growth of the tongue closely follows that of the mandible in an anterior direction. Furthermore, postnatal development of the oral airway is influenced by oral function, oral resting posture, tongue position and breathing. Both skeletal and soft tissue changes that occur during normal growth and development result in a remarkable increase in size of the upper airway from childhood through adolescence.

This fact highlights the importance of matched control groups when evaluating interventions for OSA in the pediatric population. A comprehensive review of craniofacial growth and development is beyond the scope of this manuscript and may be reviewed elsewhere.

**TABLE 2**

<table>
<thead>
<tr>
<th>Severity of Adult and Pediatric OSA Based on the Apnea Hypopnea Index</th>
<th>Adult AHI</th>
<th>Pediatric AHI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>5 to 15</td>
<td>1 to 5</td>
</tr>
<tr>
<td>Moderate</td>
<td>15 to 30</td>
<td>&gt; 5 to &lt; 10</td>
</tr>
<tr>
<td>Severe</td>
<td>&gt; 30</td>
<td>10+</td>
</tr>
</tbody>
</table>

**Interdisciplinary Treatment**

**Dental Management (General Dentists, Pediatric Dentists, Orthodontists)**

Recognizing the consequences of untreated OSA, the American Academy of Pediatric Dentistry (AAPD) recently created an oral health policy on OSA. The AAPD policy states that nonsurgical intraoral appliances may be considered after a complete orthodontic/craniofacial assessment of the patient’s growth and development as part of a multidisciplinary approach. The American Association of Orthodontists (AAO) also addressed OSA in a parallel white paper. The white paper states that the primary outcome of orthodontic and dental therapy is to improve occlusion and address underlying skeletal discrepancies. However, benefits such as increasing volume of the nasopharynx and nasal cavity, reducing nasal resistance and improving respiratory parameters during sleep may also be achieved.

**Orthodontic Expansion**

Orthodontic appliances may be used to expand the skeletal boundaries of the maxilla and nasal floor. Rapid maxillary expansion (RME) is commonly used to exert lateral forces at the immature midpalatal suture to correct posterior crossbites, palatal constriction and growth asymmetries. RME appliances are well-tolerated and increasingly utilized as an early treatment option for children with OSA and transverse maxillary deficiencies. RME is an example of distraction osteogenesis and facilitates skeletal expansion, which is typically complete within a few weeks after 0.025 mm to 0.50 mm of expansion per day (FIGURE 2). As a rule, RME should be performed prior to the fusion of the midpalatal suture, which generally occurs near the onset of puberty (12 years in females, 14 years in males). Timing of expansion is critical as the mature suture has increased interdigitation making skeletal separation unlikely without surgical intervention. Although the target of expansion is the midpalatal suture, circummaxillary sutures may also be affected. Furthermore, dentoalveolar expansion may occur, especially with a slow expansion protocol or when a spring-type expander is used. In slow protocols, transverse deficiencies take longer to correct and more dentoalveolar than skeletal expansion is anticipated.

Several studies have demonstrated a reduction in the AHI and lowest oxygen saturation following orthopedic expansion of the maxilla. Two systematic reviews and meta-analyses found an overall reduction in the AHI with the use of RME in pediatric patients. Of note, randomized controlled trials (RCTs) are lacking and would help determine the effect of expansion versus spontaneous resolution of OSA with growth.
The impact of RME on airway dimensions and nasal resistance has been extensively reviewed. Challenges exist standardizing longitudinal airway volume measurements as well as comparing standing upright airway volume with the airway during sleep. Because OSA is complex, a clear link between enlarged awake, upright airway dimension in children and sleep-related breathing parameters has yet to be defined. Fastuca evaluated 15 pediatric patients with posterior crossbite and found increases in total airway volume and respiratory performance verified by CBCT and PSG following expansion. A recent systematic review found RME was associated with short- and long-term increases in nasal airway volume. Conversely, Abdalla and others demonstrated that the narrowest cross-sectional area and pharyngeal airway volume did not differ statistically between RME and matched control groups.

Functional or Mandibular Advancement Appliances

Functional appliances (FA) alter the position and growth of the maxilla and mandible. FA are meant to be worn full time to correct sagittal discrepancies. Since the early 1900s, FA have been used with much controversy regarding their long-term influence on skeletal growth. Sheats describes FA as “tooth movers” that tip mandibular incisors labially and maxillary teeth posteriorly and cautioned against widespread use without an orthodontic reason. Evidence for compliance and efficacy of FA for OSA in children is limited. A systematic review including two studies found customized FA to reduce the AHI in a small sample of children with mandibular retrognathia. Data suggest a case-by-case approach with close monitoring and coordination with a physician when using FA to treat OSA in growing children.

The mandibular advancement device (MAD) is endorsed by the AASM and the American Academy of Dental Sleep Medicine (AADSM) as a valuable treatment option for adult OSA but is not commonly used in children because of the potential to alter growth. MADs bypass airway obstructions during sleep by protruding the mandible. Although not intended to alter permanent occlusion, MADs are essentially class II functional appliances only worn at nighttime. A 2016 Cochrane Review revealed very low quality of evidence and neither supported nor refuted the use of MADs in a pediatric population. The review included results from a single trial of 23 children and the outcome measure was reduction of AHI to less than one event per hour. Another systematic review with limited evidence suggests that MADs could provide short-term improvement in AHI scores in children; however, the authors could not conclude that MADs are effective to treat pediatric OSA. The most recent systematic review and meta-analysis to date suggests appliance therapy may be effective.

How Much Sleep Is Recommended for Children?

A consensus statement by the American Academy of Sleep Medicine described the amount of sleep required for children of all ages (table below). Infants, children and teens routinely sleeping the recommended hours reap many benefits including improvements in attention, behavior, learning, memory, emotional regulation, quality of life and mental and physical health. Conversely, children regularly sleeping fewer than the recommended hours face a multitude of problems, such as problems with attention, behavior and learning, increased risk for accidents, injuries, hypertension, obesity, diabetes and depression. Teens with insufficient sleep are also at risk for self-harm, suicidal thoughts and suicide attempts. Sleep quantity is clearly important; however, sleep quality is also critical. Both cortical arousal and autonomic activation occur during sleep disruption. Although children with OSA may get enough hours of sleep, the quality and architecture may not be ideal. Both the quantity of sleep and the quality of sleep are important to consider.

<table>
<thead>
<tr>
<th>Age</th>
<th>Amount of sleep (hours) per day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infants (4 to 12 months)</td>
<td>12 to 16, including naps</td>
</tr>
<tr>
<td>Children (1 to 2 years)</td>
<td>11 to 14, including naps</td>
</tr>
<tr>
<td>Children (3 to 5 years)</td>
<td>10 to 13, including naps</td>
</tr>
<tr>
<td>Children (6 to 12 years)</td>
<td>9 to 12</td>
</tr>
<tr>
<td>Teens (13 to 18 years)</td>
<td>8 to 10</td>
</tr>
</tbody>
</table>

**TABLE 3**

<table>
<thead>
<tr>
<th>Weight Status Category Based on Body Mass Index (BMI) *</th>
<th>Percentile Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>Less than 5th percentile</td>
</tr>
<tr>
<td>Normal or Healthy weight</td>
<td>5th percentile to less than 85th percentile</td>
</tr>
<tr>
<td>Overweight</td>
<td>85th to less than 95th percentile</td>
</tr>
<tr>
<td>Obese</td>
<td>95th percentile or greater</td>
</tr>
</tbody>
</table>

* BMI is age and sex specific in children and teens and is calculated by dividing the patient’s weight in kilograms by the square of height in meters.

for children with OSA. The meta-analysis demonstrated that MADs were beneficial at reducing AHI in prepubertal children across severity levels. As with adults, MADs may not resolve OSA for several reasons including anatomical variance and poor compliance.

**Considerations for Appliance Therapy in Children or Adolescents With OSA**

It is important for the individual provider to recognize that dental and orthodontic therapy may not be appropriate for all patients with OSA. Furthermore, appliances may not improve OSA to an acceptable level even when the clinical presentation seems favorable. Patients may be referred by medical colleagues for consideration of RME. Palatal constriction appears to be an important prerequisite for expansion in children with OSA. To that point in a systematic review by Vale, all but two of the 137 patients experiencing a significant reduction in AHI after RME had a posterior crossbite. Interestingly, Quo and colleagues conducted the only study to date involving bimaxillary expansion in young children without posterior crossbite. In this study, bimaxillary expansion (expansion of both maxillary and mandibular arches using jackscrew appliances) was performed. Although the sample size was small, AHI actually worsened in 15 of 45 patients following bimaxillary expansion. Patients with more severe OSA (AHI > 10) were more likely to improve while those with mild OSA were less likely to benefit from expansion. At this time, there is a lack of data supporting the use of RME for treating OSA in the absence of a transverse discrepancy.

In a similar manner, a physician may prescribe a MAD for a child or teen with OSA in the absence of a sagittal discrepancy (class II skeletal relationship). In this case, the goal of therapy would be airway maintenance instead of correction of a malocclusion. The device may improve sleep respiratory parameters for children even without mandibular retrognathia; however, studies on the use of MADs in children are scarce. Off-label, short-term use of MADs could be a treatment alternative; however, this treatment requires coordination with medical professionals and close monitoring of occlusion, facial growth and development and sleep-related breathing parameters.

**Passive, Noncustom Appliances**

Passive, noncustom appliances have been marketed for continuous wear to encourage oropharyngeal movements similar to exercises used for myofunctional therapy. The intent of these devices is to facilitate nasal breathing, mobilize oral musculature and reduce maxillary incisor proclination. These appliances may be designed for use in the primary, mixed and young permanent dentitions and are classified as functional appliances because they have the potential to alter occlusion and facial growth. Huang and colleagues refer to this practice as passive myofunctional therapy or passive MFT. A few studies have evaluated the use of noncustom appliances in children with OSA.

Although preliminary data is promising, further RCTs demonstrating efficacy and stability of results are necessary. Furthermore, no longitudinal data exists documenting the effect of noncustom appliances on growth and development.

**Medical Management (Sleep Physician, Primary Care Physician)**

**Watchful Waiting**

According to some sources, watchful waiting up to six months may be appropriate for children with mild to moderate OSA. OSA may also improve with changing sleep position. A retrospective case study with chart review evaluated 101 patients aged 2 to 18 opting for nonsurgical management and watchful waiting. Nonsurgical management included intranasal steroids, montelukast, nasal rinses and humidified air. Based on follow-up PSG data, there were no significant differences in the proportion of patients with resolution of OSA between those treated with medications and watchful waiting. Furthermore, the authors concluded that mild OSA in children has a roughly equal chance of worsening or improving over time without surgical intervention.

**Medications**

Intranasal or systemic medications may be appropriate for some children with OSA. Medications may decrease swelling and inflammation of the airway and/or decrease tonsillar hypertrophy. Therefore, in some patients OSA may also resolve after treating comorbidities such as asthma and allergic rhinitis. Intranasal fluticasone and budesonide have been shown to decrease OSA in children with mild OSA. Montelukast, a systemic leukotriene modifier, may also reduce severity of OSA in children and improve quality of life.
Positive airway pressure (PAP)

Continuous positive airway pressure (CPAP) is a common therapy for OSA that delivers pressurized air through an oral or nasal interface. CPAP acts as a pneumatic stent that maintains patency of the upper airway. Prolonged use may be very beneficial when utilized, but problems with adherence is an issue requiring consideration for different treatment modalities. Nasal masks tend to apply a retrusive molding pressure to the maxilla. Prolonged use may be associated with negative consequences on the developing facial structures of children.

Surgical Management

(Otolaryngologist, Oral and Maxillofacial Surgeon)

Soft Tissue Surgery

Adenotonsillectomy (T&A) is widely considered an effective first-line treatment for OSA in children. It remains an important consideration for many pediatric patients but should not be the sole focus of anatomic assessment or treatment target. Hypertrophy of the tonsils and adenoid tissue is thought to be the most common cause of OSA in children. Objective and subjective improvements in sleep, behavior and quality of life have improved following T&A. According to a Cochrane Review, there is moderate quality evidence that T&A is beneficial for behavior, symptoms and quality of life in nonsyndromic children. However, a meta-analysis by Brietzke showed effective response from T&A was far below 100% and emerging data suggests that T&A may not be curative. To that point, in some studies up to one-third of pediatric patients continue to have residual OSA as demonstrated by PSG. As such, there is an increased focus on alternate or adjunctive treatments that can improve durability of treatment.

Reconstructive techniques of the upper airway soft tissues in adults are not common in pediatric patients with OSA, but select applications may be necessary along with other adjunctive therapies as a more targeted approach is considered.

Orthognathic Surgery

Maxillomandibular advancement (MMA) is the most common orthognathic surgery used to treat adults with OSA. Orthognathic surgery is performed in some children with craniofacial anomalies and comorbid OSA. Unless medically necessary, surgeons may prefer to wait until late teen years for girls and early 20s for boys due to growth concerns.

Adjunct Management (Dietitians, Behavioral Health Providers, Orofacial Myologists)

Weight Loss

Obesity in young patients is a growing public health concern and may lead to OSA in children. Fatty infiltration into the neck and upper airway has been associated with OSA and obesity in adolescents. Obesity is defined differently in children versus adults because body composition varies by age and sex. Childhood obesity is defined as a body mass index at or above the 95th percentile for peers of the same age and sex (Table 3). The Centers for Disease Control and Prevention developed an online calculator to establish the weight status of children and adolescents.

Weight loss improves OSA in overweight children and adolescents; however, the degree of weight loss is unknown. Health care providers trained in prevention and treatment of obesity have a welcome role on an interdisciplinary OSA team. Registered dietitians and behavioral health providers offer nutritional and behavioral guidance respectively. Bariatric surgery to assist with weight loss in morbidly obese adolescents has also been described.

Orofacial Myofunctional Therapy

Anatomic airway narrowing or obstruction and deficits in the musculature within the upper airway contribute to the pathophysiology of OSA. Nasal breathing, suctioning, mastication and swallowing are examples of functional activities that engage orofacial and oropharyngeal muscles. Atypical or maladapted patterns of the oral/orofacial musculature that emerge in the absence of normalized patterns and lead to abnormal facial growth and function constitute an orofacial myofunctional disorder. Atypical patterns (e.g., mouth breathing, tongue thrusting, dysfunctional swallowing, improper lip seal, parafunctional and/or nonnutritive sucking habits) may impact upper airway patency and contribute to the emergence of sleep-disordered breathing patterns or OSA.

Orofacial myofunctional therapy (oral exercises, oropharyngeal exercises, myofunctional therapy) (OMT) has been reviewed as adjunct therapy in both adults and children with OSA. The goal of myofunctional therapy for children with OSA is to provide functional neuromuscular reeducation to correct abnormal breathing patterns and muscular dysfunctions that impair upper airway patency, especially during sleep. Typically, professionals with a speech-language pathology or dental/dental hygiene background who are certified in OMT assist with this adjunctive and noninvasive treatment.
OSA.114,117,118 Treatment is noninvasive, symptomatically improving symptoms of sleep-disordered breathing and may significantly reduce both severity and incidence of OSA as well as AHI. Nonetheless, myofunctional therapy is recommended for children under age 7 or 8. Although myofunctional therapy may be referred for evaluation of consistent nasal breathing, generally OMT is not approved treatment to prevent development of OSA in children. Lingual frenectomy involves the surgical release of a soft tissue band on the underside of the genioglossus muscle in the midline of the floor of the mouth. Recent evidence points to an increase in utilization despite a lack of good quality evidence indicating the need.121,122 Ankyloglossia is associated with deficits in tongue function and mobility that may lead to speech and feeding problems.121,122 Guilleminault described a patient phenotype with a short lingual frenum, narrow hard palate, speech difficulties early in life and sleep-disordered breathing.27 Cohort studies reported improvement in articulation and intelligibility following lingual frenectomy.123 The relationship between tongue mobility as it relates to the pediatric airway during sleep is less clear.124,125 Furthermore, the degree of frenum attachment considered to be a deviation from normal is also controversial.124 Frenectomy is not a recognized intervention for preventing OSA in children or adults; yet, it is possible that dentists may receive referrals to perform this procedure. Consideration for any surgical intervention should be based on best practices with case-by-case consideration.125

### TABLE 4

**Sample Oral Motor Exercises**

<table>
<thead>
<tr>
<th>Target</th>
<th>Exercise</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Jaw</strong></td>
<td><strong>Graded closure/bite</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Place _____ (#) stacked tongue depressors on the lower molars at the left and right. Have your child bite down gently and hold for _____ seconds.</td>
<td>_____ reps each _____ x per day</td>
</tr>
<tr>
<td></td>
<td><strong>Chewing</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Place a semisoft food item (e.g., string cheese) or soft teething toy on the right lower molars. Have your child bite up and down on it _____ times. Switch sides, repeat.</td>
<td>_____ reps each _____ x per day</td>
</tr>
<tr>
<td><strong>Tongue</strong></td>
<td><strong>Tongue base retraction</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Have your child lightly anchor the tongue between the teeth and swallow without letting go of the tongue. Repeat.</td>
<td>_____ reps each _____ x per day</td>
</tr>
<tr>
<td><strong>Tongue elevation</strong></td>
<td><strong>Tongue tip</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Have your child place the tongue tip on the alveolar ridge just behind the upper front teeth. Hold as long as possible, working up to _____ minutes. Your child may swallow as needed but then return the tongue to this position.</td>
<td>_____ reps each _____ x per day</td>
</tr>
<tr>
<td></td>
<td>Place _____ (#) stacked tongue depressors on the lower molars at the left or right. Have your child bite down gently and hold and then move the tongue tip up and down.</td>
<td>_____ reps each _____ x per day</td>
</tr>
<tr>
<td><strong>Tongue surface</strong></td>
<td>Have your child suction the tongue on the roof of the mouth. Hold it there for _____ seconds. Do a tongue pop: Have your child suction the full tongue up onto the roof of the mouth and draw down briskly in a “pop.” Work up to _____ times in a row.</td>
<td>_____ reps each _____ x per day</td>
</tr>
<tr>
<td><strong>Tongue lateralization</strong></td>
<td><strong>Move to one side</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hold a piece of firm candy (e.g., licorice) on the right or left lower molars. Have your child bite down gently onto the candy and then touch the tongue tip to the candy. Switch sides, repeat.</td>
<td>_____ reps each _____ x per day</td>
</tr>
<tr>
<td></td>
<td><strong>Move across midline</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Starting at the right or left lower molars, have your child bite down gently onto a piece of firm candy (e.g., licorice) and touch the tongue tip to it. Move the candy along the surface of the teeth at four spaced-apart locations until reaching the lower molars on the opposite side. Have your child touch the tongue tip to the candy each time. Switch sides, repeat.</td>
<td>_____ reps each _____ x per day</td>
</tr>
<tr>
<td><strong>Lips</strong></td>
<td><strong>Seal</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Have your child puff out the cheeks while keeping lips sealed. Relax and repeat. Place tongue depressor between your child’s lips. Have your child close the lips and press together. Hold for _____ seconds.</td>
<td>_____ reps each _____ x per day</td>
</tr>
</tbody>
</table>

Any oral motor exercise program must be performed under the guidance of a certified orofacial myologist, following a comprehensive evaluation and individualized treatment plan specifically designed to meet the needs of your child.

and techniques of treatment generally include a series of isometric and isotonic exercises structured to engage oropharyngeal and tongue musculature with the aim to restore normative function of the lips, tongue, soft palate and lateral pharyngeal walls (FIGURE 3 and TABLE 4).106 Similar to any physical therapy program, OMT may take several months to solicit normalized orofacial behaviors. Intervention necessitates active parent involvement, and poor compliance with exercises may limit outcomes.109 Although children at age 4 may be referred for evaluation of consistent nasal breathing, generally OMT is not recommended for children under age 7 or 8. Nonetheless, myofunctional therapy has been shown to decrease AHI as well as significantly reduce both severity and symptoms of sleep-disordered breathing and OSA.114,117,118 Treatment is noninvasive, relatively inexpensive and not associated with any major risks.119 Systematic reviews of the literature support myofunctional therapy as an adjunct treatment in the interdisciplinary management of sleep-related breathing disorders.117,118

**Lingual Frenectomy**

The AAO white paper and AAPD oral health policy on the management of the frenulum in pediatric dental patients do not support lingual frenectomy at this time as an approved treatment to prevent development of OSA in children.6,122 Lingual frenectomy involves the surgical release of a soft tissue band on the underside of the genioglossus muscle in the midline of the floor of the mouth. Recent evidence points to an increase in utilization despite a lack of good quality evidence indicating the need.121,122 Ankyloglossia is associated with deficits in tongue function and mobility that may lead to speech and feeding problems.121,122
Summary

Sleep is important for children, and these treatment strategies highlight the opportunities medical and dental professionals have to collaboratively manage OSA in children and teens. Physicians, dentists and other health care providers gain valuable insight into OSA when required to look beyond their individual specialties to recognize the factors that translate into a phenotype for sleep-disordered breathing. Because pediatric OSA is a multifactorial disease, an interdisciplinary approach to management may be preferred. Further research is needed to support management protocols with the best outcomes for children with OSA.

DISCLAIMER

The opinions and assertions expressed herein are those of the authors and do not necessarily reflect the official policy or position of Uniformed Services University of the Health Sciences or the Department of Defense.

REFERENCES


5. Gozal D. Management of PSA beyond. TNA 2018 Sleep Medicine Fellowship Directors Council Webinars.


LOS ANGELES & VENTURA COUNTY

GLENDALE — GP w/ 3 eq ops and 1 plmbd not eq op in a 3 story medical professional bldg. Grossed approx. $544K in 2019. Property ID #5305.
GRANDA HILLS — With 50 yrs of goodwill this general practice grossed approx. $392K in 2019. NET $149K. Property ID #5276.

VENDURA — GP w/ 4 eq ops . PPO & Cash only. 40 years goodwill. Projection approx. $470K in 2019. Property ID #5288.
VENTURA (LH) — GP located in a 2 story med prof. bldg with 2 eq ops. Prop. #5304.
WHITTIER — COMING SOON!!

SAN DIEGO COUNTY

CARLSBAD — This beautiful practice has over 22 yrs of goodwill. Has 4 eq ops in a 1,800 sq ft suite in a 5 story medical professional building. Grossed approx. $440K for 2018. Property ID # 5256.
EL CAJON (GP) — Price Reduced! Consists of 5 eq ops and equipped with 3D Sirona CBCT Digital X-ray. Grossed over $1M in the past 10 years. Property ID # 5265.

RIVERSIDE COUNTY

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. $1.5M for 2019. NET $344K. Property ID #5130.

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Whether it’s oral health care or practice management, it’s generally better to be proactive than reactive. This is certainly the case when it comes to maintaining a healthy, happy workplace. And when addressing employee injuries, being proactive is not just a recommendation—it’s the law in most states.

The Dentists Insurance Company reminds practice owners that employers are obligated to report workplace injuries immediately. Delaying such occurrences has the potential to not only further an employee’s injury, but to also lead to problems should a claim be filed at a later date.

The reasons for delay can be many. In some cases, the employer erroneously believes that reporting an injury will automatically increase their premium. In others, a well-intentioned employer attempts to handle the situation in-house. Most commonly, the employer takes a “wait and see” approach, hoping that the injury remains minor.

In one case reported to TDIC’s Risk Management Advice Line, an employee injured her back while reaching for something at work. The dentist requested the employee see a doctor, but the employee chose to take ibuprofen instead, confident that this would resolve her back pain. The next day, she was still sore, and the dentist again asked if she wanted to see a doctor. She declined and said she was fine.

Employers are reminded that once they become aware of a work-related injury, they should immediately contact their workers’ compensation carrier. The carrier will investigate the injury to determine liability.

The employee should be directed to an occupational medical clinic for treatment or a hospital for severe injuries. Some states allow employees to pick their own treating physician, while other states allow employers to direct medical care for work-related injuries through a network of approved physicians. Contact your insurance carrier for guidance on where your injured employee should seek treatment.

Unless otherwise predesignated, it is best that an employee avoids seeking treating with their own health care provider for work-related injuries. This can delay the claims process, the investigation of the claim and the benefits that the employee may be eligible to receive. Additionally, if an employer knows that their employee was injured at work but the employee refuses to follow state-mandated guidelines on reporting the injury and where to seek treatment, it is recommended that the dentist contact their workers’ compensation insurance carrier for advice. Employers have a legal obligation to report work-related injuries in a timely manner.
As part of the reporting process, it’s important to gather the facts of how your employee was injured. Ask your employee how they were injured, which body parts were injured and the type of injuries they sustained; for example, was the injury a strain, puncture, laceration, etc. This will play a vital role in the investigation of the employee's claim and acceptance for workers’ compensation benefits. Your insurance carrier or assigned third-party administrator will need this information along with objective medical findings to determine the compensability of a work-related injury.

Workers’ compensation laws vary from state to state, but generally speaking, an employer must report the incident to their carrier within one business day of becoming aware of an injury. The U.S. Department of Labor has state-specific contacts and guidelines available on its website. It should also be noted that employers are required to authorize appropriate medical treatment and make medical care available to injured employees, regardless of whether the employers dispute the injury. Workers’ compensation claims are considered “no fault,” meaning the employee is covered regardless of the events that led to the injury.

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In other workplace injury cases, practice owners are unsure of how to handle employees who request time off after becoming injured. TDIC reports a case in which an employee was injured after tripping and falling in the office. During recovery, she had been attending two weekly appointments — one visit to a doctor and the other to a physical therapist. The dentist called the Advice Line for guidance on whether he could ask the employee to take the appointments on certain days or times that didn’t interfere with his business operations.

The Risk Management analyst advised the practice owner that yes, he can ask, but he can’t refuse to allow her to attend her appointments if she is unable to schedule them outside of his business hours. However, if the employee fails to give adequate notice to her employer as outlined in the employee manual, she is subject to the same disciplinary actions as any other employee. In any event, everything should be documented, including the time-off requests, approvals or denials and doctors’ notes. This documentation should be maintained in a medical file separate from the employee’s personnel file.

It’s also important for practice owners to maintain open lines of communication with all parties involved in injuries — the employee, the carrier and, when applicable and appropriate, the doctor or medical staff. In another case reported to the Advice Line, an employee fell to the ground while walking. She said she didn’t know how she fell, but claimed her arm was hurting and went to the doctor. The doctor confirmed there were no broken bones and gave her a note to return to work. The employee refused to return to work, stating that she was in extreme pain and insisting on obtaining an MRI.
Specialties, 2018 GR $747K on 4 days/wk. with 4 equipped Ops, 1 additional plumbed. 2018 Laser. 2018 GR $762K on 4 day/wk. #CA654

ROCKLIN/LINCOLN AREA:

Pleasant Hill:

practice in downtown location, 5,000 sf with 7

REDDING AREA:

on 32 hrs/wk. #CA650

LAKE TAHOE AREA ENDO PRACTICE:

Op practice with opportunity to purchase part of

for purchase. #CA561

Sellers will consider working back P/T. #CA578

by $50K!

EAST BAY:

Goodwill. Buyer must be within 15 miles of

FREMONT:

Spacious 2,900 sf suite with 9 Equip Ops in

#CA547

PMS, Digital X-ray, Diode Laser, I/O Cam.

CONCORD:

Goodwill. Real Estate available. 2018 GR $1.1M+

4,600 sf, 13 hyg days on 4½ day/wk. 42 yrs

YUBA CITY AREA:

6 Ops, 40+ yrs Goodwill, GP

 Romero

46 yrs Goodwill, GP

Real Estate for sale or Lease. Doctor Retiring. #CA544

Cameras, Laser, Dentrix. Both Business & Real

NP/mo.10 hyg days. 6 Ops, Pano X-ray, Dexis,

GREATER MODESTO AREA PEDO

2019 GR $455K on 4 day/wk. Bldg. also

Great opp to purchase successful 30+ yr old practice w/ Ortho/

BAKERSFIELD AREA:

6 Ops, 39 yrs.

SACRAMENTO:

Downtown/Midtown: Hi-

$100K!

MODESTO AREA:

4 Ops,

Dentrix, Digital, I/O Cam, Sensor. 2019 GR $747K.

Great location for

NORTH ORANGE COUNTY:

3 Ops,

associate-run. Digital, cash and PPO in a great

San Mateo

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RRREQUIRES skilled, easy-temperament and great communicator as Successor.

2019 collected $850,000 with Profits of $430,000. 4-days of Hygiene.

6171 SANTA ROSA
6172 SAN FRANCISCO'S EAST BAY

with specialists to perform referred work in-house and take to next level.

Strong patient foundation per 6+ day Hygiene Schedule.  Consistent $1+

$1,315,000.  6-ops.  8-days of Hygiene. 1,500+ active patients.  Contract

SANTA CRUZ

6174 HUMBOLDT COUNTY’S UNIVERSITY COMMUNITY –

ARCATA Special area to raise one’s children and enjoy quality of life. Best location, great foundation, dedicated Team. Seller works 3-day week. 2019 collected $350,000+. Beautiful Victorian building available as optimal purchase. Practice screams to be full-time.

6173 SAN FRANCISCO – “OUT-OF-NETWORK” 2019 collected $1,315,000. 6-ops. 8-days of Hygiene. 1,500+ active patients. Contract with specialists to perform referred work in-house and take to next level.

6172 SAN FRANCISCO’S EAST BAY – “OUT-OF-NETWORK” 2019 collected $850,000 with Profits of $430,000. 4-days of Hygiene. Requires skilled, easy-temperament and great communicator as Successor.

SANTA ROSA Great DNA here for this long-established practice. Strong patient foundation per 6+ day Hygiene Schedule. Consistent $1+ Million in Collections each of last 5-years. Great Team. 4-operators.

MANTECA / RIPON AREA 2019’s revenues totaled $850,000+, 5-days of Hygiene. Practice refers endo, most OS and implant placements. Extensive patient base. Successor should con-tract with specialists to perform work being referred. Office is perfect for making this a full-service practice.

VACAVILLE Long established Delta PPO practice. 5-days of hygiene. 2019 trending $700,000+ with Available Profits of $285,000. Great north side location.

SACRAMENTO’S CAMPUS COMMONS “Bread & butter” Delta PPO practice averages $480,000 in collections per year. Well liked Dentist. 10+ weeks off a year. 4-days of Hygiene. 3-D Cone Beam. Great implant upside as retirees in area require this ser-vice. Practice here and live in Folsom or El Dorado Hills.

DOWNTOWN PALO ALTO – “OUT-OF-NETWORK” Perfect for Skilled Dentist seeking strong patient relationships and insurance independency! 2019 trending $825,000+ on Owner’s 3-day week. Office has been upgraded and charting is paperless.


ROSEVILLE ORTHO – “OUT-OF-NETWORK” Stanford Ranch. $455,000 invested in build-out, furnishings, computers and equipment. 3-chair Bay. Digital Pan with Ceph. Averages 3 New Patients per month. Full Price $125,000.

SAN FRANCISCO’S UNION STREET - “OUT-OF-

NETWORK” Highly regarded as evidenced by 25+ new patients per month. Collections topped $2 Million each of last 3-years with Profits averaging $1 Million. Paperless. 3-D Cone Beam.

LAKEPORT Attractive option to practice in competitive areas in expensive housing markets. 6-op facility completely net-worked. 2019 collected $969,000.

FORTUNA Relaxed lifestyle in Humboldt County’s Banana Belt. Adjacent to Ferndale. Perfect for Dentist seeking small town living. 2019 collected $379,000. 6-weeks off. Lots of work referred.
In this case, the analyst advised the dentist that unless the employee has paid time off, she must have a note from her doctor restricting her from work. Some dental practices allow employees to take unpaid leave; this is dependent on the office’s internal policy.

The dentist considered allowing the employee to take the time to obtain an MRI, as he was concerned that she would be unable to perform her duties at work. The analyst informed the dentist that he should refer the employee back to the workers’ compensation doctor for reevaluation to determine if work restrictions were necessary or if she should not be working at all.

Keeping open communication is also essential while the employee is on leave. The onus is on the employee to provide updates to the employer throughout the period of disability, and they should keep the employer apprised of an expected return-to-work date.

It’s also important that employers engage in open discussions with their employees regarding work modifications and accommodations. It is a good practice to allow employees to be on modified duty while they heal, if appropriate and approved by the patient’s medical doctor. All of these discussions should be documented in writing.

Even with the most careful precautions, employee injuries are an unfortunate reality in any workplace. Should an injury occur in your practice, expedient reporting to your workers’ compensation carrier is essential. Maintaining open lines of communication with your employee not only helps the claim process go smoothly, it is critical to mitigate further injury and ensure your employee is back to work quickly.

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.
QUESTIONS MOST OFTEN ASKED BY SELLERS:

1. Can I get all cash for the sale of my practice?
2. If I decide to assist the Buyer with financing, how can I be guaranteed payment of the balance of the sales price?
3. Can I sell my practice and continue to work on a part time basis?
4. How can I most successfully transfer my patients to the new dentist?
5. What if I have some reservation about a prospective Buyer of my practice?
6. How can I be certain my Broker will demonstrate absolute discretion in handling the transaction in all aspects, including dealing with personnel and patients?
7. What are the tax and legal ramifications when a dental practice is sold?

QUESTIONS MOST OFTEN ASKED BY BUYERS:

1. Can I afford to buy a dental practice?
2. Can I afford not to buy a dental practice?
3. What are ALL of the benefits of owning a practice?
4. What kinds of assets will help me qualify for financing the purchase of a practice?
5. Is it possible to purchase a practice without a personal cash investment?
6. What kinds of things should a Buyer consider when evaluating a practice?
7. What are the tax consequences for the Buyer when purchasing a practice?

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Earlier this year, a patient filed a complaint against a Florida dental practice for allegedly violating the Telephone Consumer Protection Act (TCPA) of 1991 by sending texts to the patient without permission. It is one of many complaints consumers have filed against businesses for contacting them via their cellphones without obtaining their consent. Given the importance of communicating with both current and future patients, a dentist should be aware of the rules for communicating with them via texts, cellphone calls, emails and websites.

Texting or Calling a Patient’s Cellphone

The Federal Communications Commission in 2015, using the authority of the TCPA, issued an order that requires a business to obtain an individual’s consent prior to placing a call or sending a text message to that individual’s cellphone number. A health care exemption to the order applies if the communication:

- Is sent only to the cellphone number provided by the patient to the health care provider.
- States the name and contact information of the health care provider (information must be at the beginning of a voice call).
- Does not include telemarketing, solicitation, advertising, billing or financial content (including insurance information requests).
- Complies with the HIPAA Privacy Rule.
- Is short (one minute or less for voice calls and 160 characters or less for text messages).

A health care provider must:

- Limit communication to one per day and three per week for each individual.
- Provide individuals with a simple method to opt out of receiving communications.
- Immediately honor the opt-out requests.

However, when an individual initiates contact with a business and provides a cellphone number, the business is not limited in the number of calls made to the individual’s cellphone number to complete the requested communication.

To initiate contact with a patient via the patient’s cellphone to discuss any topic other than treatment and appointment reminders, a dental practice must obtain the patient’s consent to do so. Refer to the FIGURE for sample language to use to obtain consent.

Email

The federal CAN-SPAM Act and California law apply to all email messages, including business-to-business communications that are advertisements or promotions of a commercial product or service or that promote content on commercial websites. Unsolicited commercial emails may not be sent to or from California email addresses. An example of a marketing email is a promotion for teeth whitening sent to a dental practice’s patients of record. Appointment reminders are not considered commercial communications.

It is a good idea to obtain an individual’s consent prior to sending them email, even if the email is not a commercial message. Verbal consent to receive emails is allowed, but the consent should be documented.

Following is a summary of the main requirements for marketing email:

- Header information — “From,” “To,” “Reply To” and the originating domain name and email address — must accurately
- and clearly identify the person or business initiating the message.
- The domain name used must be publicly registered to the person or business initiating the message or to the company contracted to do the marketing.
- Subject line should accurately reflect the content of the message.
- Message must be clearly and conspicuously identified as an ad.
- Emails must include a valid physical postal address of the person or business initiating the message. This can be a current street address, a post office box with the U.S. Postal Service or a private mailbox registered with a commercial mail-receiving agency established under postal service regulations.
- Emails should provide a clear and conspicuous explanation of how the recipient can opt out of getting future emails. The opt-out method should be internet based.
- A menu to allow a recipient to opt out of certain types of messages can be offered, but the option to stop all commercial messages must be included in the menu.
- Opt-out requests must be promptly honored; 10 business days is the maximum period to comply. The recipient cannot be required to pay a fee or provide additional information in order to have an opt-out request honored.
- Once a recipient has opted out, the email address may not be sold or transferred, even in the form of a mailing list, except if it is being used by a third party to assist with CAN-SPAM compliance.
Add the following to a patient information collection form. The patient should initial or sign this section of the form. If a dental practice intends to contact the patient on their cellphone for marketing purposes, the practice should add appropriate language to the consent.

I consent to the dental practice using my cellphone number to (choose one or both)

☐ call
☐ text

regarding appointments and to call regarding treatment, insurance and my account. I understand that I can withdraw my consent at any time. My cellphone number is

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**FIGURE.** Sample language for patient information collection form.

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When sending a group email to patients, a dental practice should ensure email addresses are entered only in the “BCC” field so as not to impermissibly disclose protected health information (PHI). If a dental practice hires a third party to send marketing communications and the recipient list includes patient email addresses, the practice should sign a HIPAA business associate agreement with the third party.

**Website Chats and Information Collection**

A dentist considering adding a chat feature to their practice website should ensure chat sessions are secure and in compliance with HIPAA Security Rule safeguards. If a third party is utilized to operate the chat feature, the third party should sign a HIPAA business associate agreement with the dental practice.

If a commercial website operator, such as a dental practice, collects personal information on California residents through the website, the operator must post online and comply with its privacy policy, as required by the California Online Privacy Protection Act. The privacy policy must contain certain elements, and the policy is in addition to the HIPAA Notice of Privacy Practices required to be posted on the website. ■

**REFERENCE**


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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 benefit plans and regulatory compliance.
4408 SONOMA COUNTY  Beautiful 2,100 sq. ft., 6 op practice, 4 doctor-days & 3 hygiene days per week. Average gross receipts $1M+. Asking $590K. 23-year perio practice, also ideal for GP; loyal, seasoned staff and great location.

4407 SAN MATEO GP  Exceptional 5-operatory San Mateo practice in popular health provider neighborhood generating significant daily business draw. Beautiful 2,200 sq. ft. seller-owned facility, handsomely equipped to highest standards. Average GR $1.4M, average overhead 61%. Seasoned and loyal staff. Seller willing to help for a smooth transition.

4387 SF GP  50 year Nob Hill neighborhood practice with approximately 1,000 active patients. Almost no Delta Premier patients. Average GR $600K. Seller transitioning into retirement. Asking $315K.

4381 SOUTH SF GP  23 year practice close to Kaiser Hospital; phenomenal shopping and residential mix area. 4 op facility with new/recently upgraded equipment. Great location in desirable neighborhood. Owner willing to help for smooth transition of the practice. Average gross receipts approximately $250K with average 60% overhead. Asking $170K. Retiring seller very motivated. Contact us for more detail.

4359 SANTA CRUZ GP  30+ years of goodwill within walking distance of the beach! Located in a well-known, attractive, single story professional building with ample parking, good visibility and easy access. 2 doctor days/week, 2 hygiene days/week. 380 active patients with approx. 1,500 new patients/mo. 3 fully equipped ops in 850 sq. ft. Average GR $250K with adj. net of $135K. Asking price $150K.

4394 SANTA CRUZ GP  Retiring seller offering 33+ years of goodwill in stunning 1,534 sq. ft. facility with 4 fully-equipped ops. Pristine leasehold improvements/gorgeous cabinetry make this a must-see! Prime corner location with dedicated parking lot, situated in one of the most desirable areas of Santa Cruz, close to shoreline and tourist attractions. 2019 GR $887K with adj. net of $353K. 1,500+ active patients with average of 19 new patients/month. Seller works 3+ days/week with 5+ days of hygiene. Asking $729K.

4376 SANTA CRUZ GP  High revenue opportunity in 31-year practice. Average GR $1.6M with average adj. net of $756,029.00. Owner/Doctor works 4 days/week. Hygiene 6 days/week. 1,200+ active patients. Easy freeway access and parking; close to all amenities. Nicely appointed 1,200 sq. ft office with 4 ops. Owner/Doctor will help for smooth transition. Asking $1,206,000.00

4382 MONTEREY COUNTY GP  Established practice in Monterey County, California Coast. Multiple ops can expand, approx. 900 active patients, 4 days of hygiene per week. Ideal for a mature, experienced dentist for this adult-focused practice in an Extraordinary location. Periodontal emphasis with communicative technology in each operatory for multiple crown and implant restorative procedures. Loyal, committed staff will remain through transition. Future opportunity to purchase office building.

4366 SONOMA COUNTY GP  Fabulous practice and location in a stellar North Bay town. Beautiful, well-appointed office with 4 ops in 1,425 sq. ft. Excellent storefront location on a well traveled road, walking distance to pedestrian-friendly downtown center. 900+ active patients, all fee-for-service. 4 doctor days/week and 4 hygiene days/week. Last two years' average GR $786K with average adj. net of $341K. Asking price $450K. Seller will help for smooth transition.

4362 MARIN COUNTY GP  36 years of goodwill, Seller-owned 1,550 square foot facility with 5 fully-equipped ops. Prime position in charming town; desirable area known for temperate weather, easy, outdoor living and natural beauty. No Delta Premier patients. Excellent reputation and word-of-mouth referrals. Retiring seller will help for smooth transition. Average Gross Receipts last 2 yrs is $450K. Asking $248K for the practice. Bldg condo is available for purchase.

4360 SALINAS GP  Seller transitioning into retirement and offering well-established practice located near downtown Salinas and Salinas Valley Memorial Hospital. Average Gross Receipts $250K. Asking $133K.

4389 SALINAS GP  Stable, 2400+ patient base. Seasoned and dedicated staff. Practice with an emphasis on Restorative treatment. 4 doctor days & 5 hygiene days per week. Average GR $910K. Asking $670K. Retiring owner.

4375 LOS GATOS DENTAL FACILITY  Unique opportunity in highly desirable area! Seller offering two full suites of state-of-the-art equipment and modern, 2-operatory facility including furniture, fixtures and leasehold assets in medical office building adjacent to Los Gatos Community Hospital. Asking $250K.

4351 SEBASTOPOL AREA GP & BLDG.  Beautiful, modern practice in seller-owned building (available for purchase); 3 fully-equipped ops, room for a 4th. Pristine equipment including digital X-ray, most purchased 2016-2018. 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. 70+ years of goodwill = long-standing, loyal patient base in scenic vineyard country. Asking $305K for practice, $425K for building. Owner/doctor willing to help for smooth transition.

UPCOMING SJ GP grossing over $900K plus Redwood Shores, Redwood City, and Los Gatos GPs.

“Matching the Right Dentist to the Right Practice”

Mike Carroll
Panola Carroll-Gardiner
Mary McEvoy Carroll

CalRE# - 00777682
<table>
<thead>
<tr>
<th>Location</th>
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<th>Operations</th>
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<tbody>
<tr>
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- R. Adames, DDS
What Would You Do If Your Patient Cheated on You?

Teresa Yang, DDS

“Before my high school reunion, I want to get veneers on my two front teeth,” announced my patient of a couple years. We were both excited about this topic, as if we were planning a shopping expedition for the perfect dress for the event.

I launched into the narrowness of the lateral incisors next to her much wider centrals — and suggested the patient consider restoring four teeth. I pointed to the unevenness of the gingival heights — and symmetry being the foundation of beauty. I showed her the cant of her occlusal plane. I discussed color at the outset, not wanting the question, “Should I bleach my teeth?” on the day of delivery.

The patient came in a year later, after the reunion, with her new veneers on teeth Nos. 8 and 9. “I only wanted to do my two front ones,” she confessed, like a teenager displaying her hidden piercing. The patient had gone elsewhere to have her veneers placed — and now she was back in my office.

I felt betrayed. Wasn’t I her dentist? Or did we have an open patient-dentist relationship like an open marriage, giving her the freedom to seek care elsewhere? My ego was bruised. Didn’t she realize I was just as competent as the “cosmetic dentist” she chose for her veneers? After all, I had spoken to her about symmetry.

And I thought: Do I need to keep seeing this patient?

The CDA Code of Ethics discusses autonomy: “Patients have the right to determine what should be done with their own bodies … Respect for patient autonomy affirms this dynamic in the doctor-patient relationship.” Obviously, the patient does not belong to the dentist. She can go to a Beverly Hills cosmetic dentist or a clinic in Mumbai.

Still, what are my ethical obligations in continuing care for this patient?

The Code of Ethics further states: “In serving the public, a dentist may exercise reasonable discretion in accepting patients into the dental practice. However, in keeping with the core value of justice, it is unethical for a dentist to refuse to accept a patient into the practice, deny dental service to a patient or otherwise discriminate…”

There is no hard-and-fast rule. In my exercising “reasonable discretion,” I could argue that trust has been eroded in this relationship and I can no longer provide the patient with the optimum level of care. Every time I see the centrals, I will feel like I’m back in dental school and told to “do over” a procedure.

Or I can set aside my feelings of hurt or loss of confidence and put myself in the patient’s position. If I needed a hip replacement, would I seek care from a surgeon who exclusively works on hips and knees or someone who operates on shoulders, hands, hips, knees and any other joint? If a lower cost option was necessary, would I travel to Mumbai for implant dentistry? Could I overcome this? Clearly, by her presence, the patient wished to persist in our relationship.

I decided to continue treating the patient. I admired the naturalness and intended imperfection of her smile. She said the cosmetic dentist recommended a mouthguard, to which she responded, “Well, my dentist can do that.”

Over the years, she has referred many friends and family to my practice. I even attended her daughter’s wedding recently. Had I ended our association, it would have been my loss.

Teresa Yang, DDS, is a guest author for the Judicial Council. She is a past member and chair of the Council on Peer Review, currently serves on the CDA Foundation Board, is a trustee for the Western Los Angeles Dental Society and editor of its newsletter.

Have an ethical question you’d like to have addressed by the Judicial Council? Email lori.alvi@cda.org.
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WESTERN PRACTICE SALES

AC-989 SAN FRANCISCO [Facility]: Busy Retail Shopping Plaza w/ major anchor tenants! 3 ops $99k
AC-1059 DAILY CITY: Amazing practice w/ seasoned staff in highly desirable neighborhood. 1500 sf w/ 4 ops $345k
AC-1072 DAILY CITY: Seller to work back until May 2022! 1045 sf w/ 3 ops. Plumbed for 1 add'l $450k
AC-1075 DAILY CITY: Rare 2 DR Practice in Daly City. One seller would like to work back. $795k
AG-944 SAN FRANCISCO: An opportunity like this does not come along very often! ~998 sf w/ 3 ops Reduced $495k
AG-993 WEST PORTAL AREA: Desirable area w/ easy commute to downtown San Francisco. ~1000sf w/ 3 ops Reduced Price $395k
AG-1079 SAN FRANCISCO: Quality Practice in Heart of City! 1800 sf w/ 5 ops offering in-house specialists $685k
BC-949 ALBANY: Desirable commercial/residential area. Medical Prof Bldg w/ good frontage. 3200sf w/ 4 ops $695k Real Estate: $1.8
BC-1010 ANTIOCH: Amazing Opportunity in Health Prof. Complex 2118 sf w/ 2 equipped ops + 3 add'l $225k
BC-1022 OAKLAND: “Pill Hill” Area adjacent to hospital! 1064 sf & 2 ops. Plumbed for 1 add'l $150k
BC-1056 SAN RAMON [Facility]: Move-in ready facility in well maintained professional complex. 1698 sf w/ 4 ops $60k
BG-1085 BERKELEY: Stay young and on the cutting edge as you practice in this UC collegiate town! ~ 1,600 sf w/ 4 ops $975k
BN-1023 RICHMOND: This is a rich opportunity for the astute dentist! 1450sf w/2 ops + 2 add’l $50k/Real Estate $750k
BN-1060 LAFAYETTE: Imagine living, practicing & raising your family here in this community! 1400sf w/3 ops. Seller Motivated $225k
BN-1067 SAN LEANDRO: Imagine owning this family-oriented practice with a large patient base. 1495sf w/ 3 ops 2 + 1 add’l. $325k
CC-846 SAN RAFAEL: Prof/Retail Building Complex. 3 ops 640 sf Collections $433k in 2017 $275k
CC-963 SANTA ROSA: Practice & Real Estate Available! 1765 sf w/ 5 ops Practice $395k & Real Estate $735k
CC-979 NOVATO: Seller Retiring. 803 sf w/ 3 ops near downtown and Old Town Novato. $195k (Real Estate $215k)

BAY AREA CONTINUED

CC-1030 SANTA ROSA: Extraordinary practice in prime location. 30k+cars drive by per day! 1683sf w/5ops. Great opportunity! Only $325k
CC-1049 SANTA ROSA: Fully Remodeled, Amazing Location. 2000 sf w/ 5 ops $500k Real Estate Also Available
CC-1096 VACAVILLE: Little Gem located in Retail Shopping Center. 1500 sf w/ 4 ops ONLY $89k
CG-1048 SONOMA: This highly successful family-oriented practice has it ALL! ~1500 sf w/ 4 ops $630k
CN-911 SANTA ROSA: This fabulous practice is the heart of the Wine Country! 2250 sf w/4 ops + 1add’l. Seller Motivated $465k
CN-1090 VACAVILLE: This amazing, state-of-the-art practice is an outstanding opportunity! 2400 sf w/ 7 ops + 1add’l. $695k / Real Estate $780k
DC-1080 ALAMEDA: Established for 25 years. Seller retiring from this amazing practice. 1200 sf w/ 3 ops $575k
DC-1094 LOS GATOS Facility: Unbeatable location! 2 story Med/Prof Bldg near Netflix Headquarters! 1059 sf w/ 2 ops $200k
DG-986 CAMPBELL: The ideal opportunity to practice in this community! ~988 sf w/ 3 ops Seller Motivated $288k
DG-1006 MONTEREY AREA: This practice is one which every dentist aspires to! ~3400 sf w/ 8 ops Reduced $1.2M
DG-1009 CARMEL: Amazing fee-for-service practice w/ no contracts! ~1150 sf w/ 4 ops $575k
DG-1014 MONTEREY: Don’t miss your opportunity to live and practice in beautiful Monterey! ~1125 sf w/ 4 Ops. $650k
DG-1081 SAN JOSE: Located in popular retail shopping center. Spacious 2800 sf office w/ 8 fully equipped ops $295k
DG-1099 SANTA CRUZ: Consistently voted as the BEST DENTIST in Santa Cruz! ~ 1,547 sf w/ 4 Ops. $550k
DN-1031 CUPERTINO: This remarkable practice awaits only your talent and skill! 1500sf w 3 ops + 1 add’l $1.25M
DN-1041 SAN JOSE: This stunning practice is an excellent opportunity for new grads! 1207sf w 2ops + 1 add’l! Reduced! $175k
DN-1059 PLEASANTON Facility: An excellent opportunity for a graduate or a dentist seeking a Satellite location. 1000sf w/3ops. Now Only $60k

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**BAY AREA CONTINUED**

**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. $559k / Real Estate: $1.1mil

**DN-1084 SAN JOSE:** Built-out in 2015, this beautiful, spacious, modern office is conveniently located! 2204sf w/ 4 ops + 2 add’l. Now Only $495k

**DN-1107 SAN JOSE:** Quality, family-oriented practice. Hesitate & you may miss out on the best decision of your life! 1200sf w/ 3 ops, $535k

**NORTHERN CALIFORNIA**

**FG-1012 EAST SACRAMENTO:** A practice like this one does not come available very often! ~2900 sf w/ 8 Ops $2.5M

**FG-1016 LINCOLN:** Look no further than this growing community to springboard into your success! ~1800 sf w/ 4 Ops Reduced $560k

**FG-1039 SIERRA FOOTHILLS:** The ideal opportunity to practice in this community! ~1100 sf w/ 4 Ops $330k

**FG-1061 SOUTH AUBURN VICINITY:** Come live, play and practice in the heart of this pristine town! ~1100 sf w/ 4 Ops $330k

**FG-1092 GRASS VALLEY/AUBURN:** If you’ve always wanted to live in Gold Country, look no further! ~1500 sf w/ 4 Ops $295k

**FG-1093 AUBURN:** Envyable location, stable patient base and located in the heart of town! ~1000 sf w/ 3 Ops $120k

**FG-1100 CARMICHAEL:** Be rewarded for your talent and skill at this proven location. ~2,271 sf w/ 5 Ops $535k Real Estate Available

**FG-1104 ROSEVILLE:** Spacious, modern office is equipped with mostly new, state-of-the-art equipment. ~1500 sf w/ 4 Ops $295k

**EN-1055 ROCKLIN Facility:** Build your own success here in this family-oriented community! 1650 sf w/ 4 ops + 1 add’l! $95k

**EN-1077 DAVIS:** Imagine living and practicing here! Hesitate and you may miss out on your dream! 1100sf. w/ 5 ops. $57k

**EN-1095 SACRAMENTO:** Outstanding Growth Potential! Seller retiring and refers out most specialties. 1000 sf w/ 3 Ops. $75k

**EN-1108 GRANITE BAY Facility:** Perfect for a satellite office or start-up practice! Updated & equipped with high-tech equipment! 1,500 sf w/ 5 ops. $195k

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

**FG-1086 UKIAH:** This excellent opportunity awaits your talent and skill! ~1200sf w/ 4 ops $550k

**FN-855 NO. HUMBOLDT:** Seller relocating! Long-established, 100% FFS practice! 1600 sf w/3 ops + 1 add’l. $190k / Real Estate Available

**GN-1071 REDDING:** Streamlined policies & loyal patient base, this quality practice is your springboard to success! 2264sf w/ 4 ops. $525k

**GN-1073 PARADISE:** Quality, fee-for-service practice with a stellar reputation! 1800sf w/ops. Reduced! $325k / Real Estate Available

**HG-1068 LAKE TAHOE AREA:** Imagine living and practicing in the majestic Sierra Nevada's. ~2500 sf w/ 3 Ops. $315k / Real Estate Available

**HG-1088 CALAVERAS COUNTY:** Est. 25 yrs w/ Stellar Reputation! 3000+ sf w/ 6 ops $465k/Real Estate Also Available

**NORTHERN CALIFORNIA CONTINUED**

**HG-815 TRUCKEE AREA:** Amazingly priced at 50% of Collections! ~1000 sf w/ 3 ops $150k / Real Estate Available

**HG-983 GRASS VALLEY:** Newly remodeled office in highly desirable neighborhood! ~1250 sf w/ 3 ops. Reduced Price $185k / Real Estate Available

**HG-987 LAKE TAHOE AREA:** LIVE THE DREAM! The mountains are calling you to this Alpine Paradise! ~ 3,400 sf w/ 6 Ops $785k / Real Estate Available

**HN-879 SONORA:** Great Cash-Flow for Only 3 Days a Week! 2950 sf w/ 3 ops Reduced Price: $265k

**HN-991 PLACERVILLE:** Quality, conservative and compassionate practice! Will consider work back. 1.654 + 473 sf w 5 ops. $675k

**CENTRAL VALLEY & SOUTHERN CALIFORNIA**

**IG-1007 GREATER MODESTO AREA:** Combines a quality learning environment with relaxed rural living. ~3000sf w/ 6 ops. $645k

**IN-1091 TRACY:** Spacious, beautiful, modernly equipped, well-designed and is a fully digital office! 2,200sf w/ 6 ops. $490k

**JC-811 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

**JC-823 LOS BANOS:** Heavy emphasis on hygiene. 1000 sf w/ 3 ops $80k

**JC-1054 VISALIA:** Practice AND REAL ESTATE! Prof Bldg on major thoroughfare. 2,260 sf w/ 6 ops $275k/ Real Estate $517k

**SPECIALTY PRACTICES**

**BG-843 WALNUT CREEK Perio:** Priced at 50% of collections! ~1085 sf w/ 4 ops $390k

**DG-1078 SARATOGA Ortho:** One-of-a-kind, modern, high-tech orthodontic boutique practice! ~ 1400 sf w/ 5 Ops $980k

**IC-1102 MERCED Endo:** Strong Referral Base, Professional Corridor, Highly Desirable Neighborhood. 2500 sf w/ 5 ops. Plumbed for 2 add’l $210k

* Western Practice Sales is a member of American Dental Transitions (ADS Transitions), a nationally recognized organization of dental practice brokers throughout the United States. ADS members have a strategic alliance & combined marketing efforts with other practice brokerage firms, financial companies & lending organizations. All ADS companies are independently owned and operated.

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Tech Trends

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

Lockdown Firewall & Privacy Protection (Free, Confirmed Inc.)

Lockdown is a simple, free open-source app available for iPhones, iPads and Macs that creates a firewall to block many of the hidden trackers and ads that people encounter daily.

Lockdown is an easy-to-use, set-it and forget-it app that works seamlessly in the background. Once installed from the App Store, users go into the app and grant permissions for it to create a virtual private network (VPN) profile. The app works by creating a local VPN server that resides on the device and not in the cloud. When the VPN profile setup configuration is complete, users simply tap on the big power button to turn the firewall on. All internet traffic on the device is then routed through its VPN service, which blocks access to domains that are commonly used by trackers. Users can add their own domains to block or enable preconfigured suggestions by tapping on the Block List button. A history of blocked domains can be found by tapping on the View Log button. The main screen also provides statistics of the number of trackers the app has blocked daily, weekly and for all time. If a user encounters a website or app that is malfunctioning, users can simply tap the big power button to turn the firewall off and determine if the firewall is the cause. For a truly private browsing experience, users can upgrade to a Lockdown VPN subscription via an in-app purchase. This enables Secure Tunnel, which provides bank-level encryption of all internet traffic so that browsing histories and private locations are anonymized.

Data privacy has become an important topic among consumers as they become more aware of how companies use their personal information. Although it may not be possible to prevent all tracking of personal information when interacting with websites and apps, consumers can exercise their rights to privacy by using firewall apps, such as Lockdown, to stop the majority of data trackers from collecting information on a daily basis.

— Hubert Chan, DDS

Travor Photo Light Box Kit ($103.89, Travor)

To place emphasis on the product itself, photographers often employ small, portable enclosures with built-in lighting and interchangeable backdrops. In this era of online shopping, the product photo is often the only visual connection the consumer has to something they are buying. Clinical dentistry appears to have little use for such techniques because patients themselves cannot be fit into such enclosures. What can fit, however, are casts, surgical guides and a plethora of customized occlusal devices. For those moments when high-quality images of such items are needed (e.g., presentations, publications, marketing materials), the Travor Photo Studio Light Box could be of great help, allowing practitioners to control backgrounds and lighting to best highlight their work.

This review evaluated the 32-inch by 32-inch light box with a Nikon D90 and iPhone XI as cameras.

The Travor Photo Studio Light Box is a simple device. It is a collapsible cube lined with reflective fabric and sporting dimmable LED lights built into the top to provide up to 13,000 lumens. Four different plastic backdrops are included (red, black, white and blue), along with a host of hollow metal tubes to give the cube structure. Assembly of the Travor is not the easiest of tasks as its modular construction does not give it a great deal of stability until it is put together. Once assembled, however, the Travor is easy to operate: Slip on the backdrop of choice, turn on the light and photograph an object from the front or top via closable flaps secured by Velcro. Whether using a DSLR or mobile phone, every object photographed and filmed looks clean, unmarred by excessive shadows or distracting backgrounds. When not in use, the light box fits into the included carry bag, which unfortunately does not protect the product at all. Caution should be used when storing the Travor because the plastic backdrops can be easily folded and damaged, which could result in the backdrops casting unwanted shadows. For the clinician who has a need for the highest quality of photographs, the Travor is an affordable, albeit fragile and fickle, option for product photography.

— Alexander Lee, DMD
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