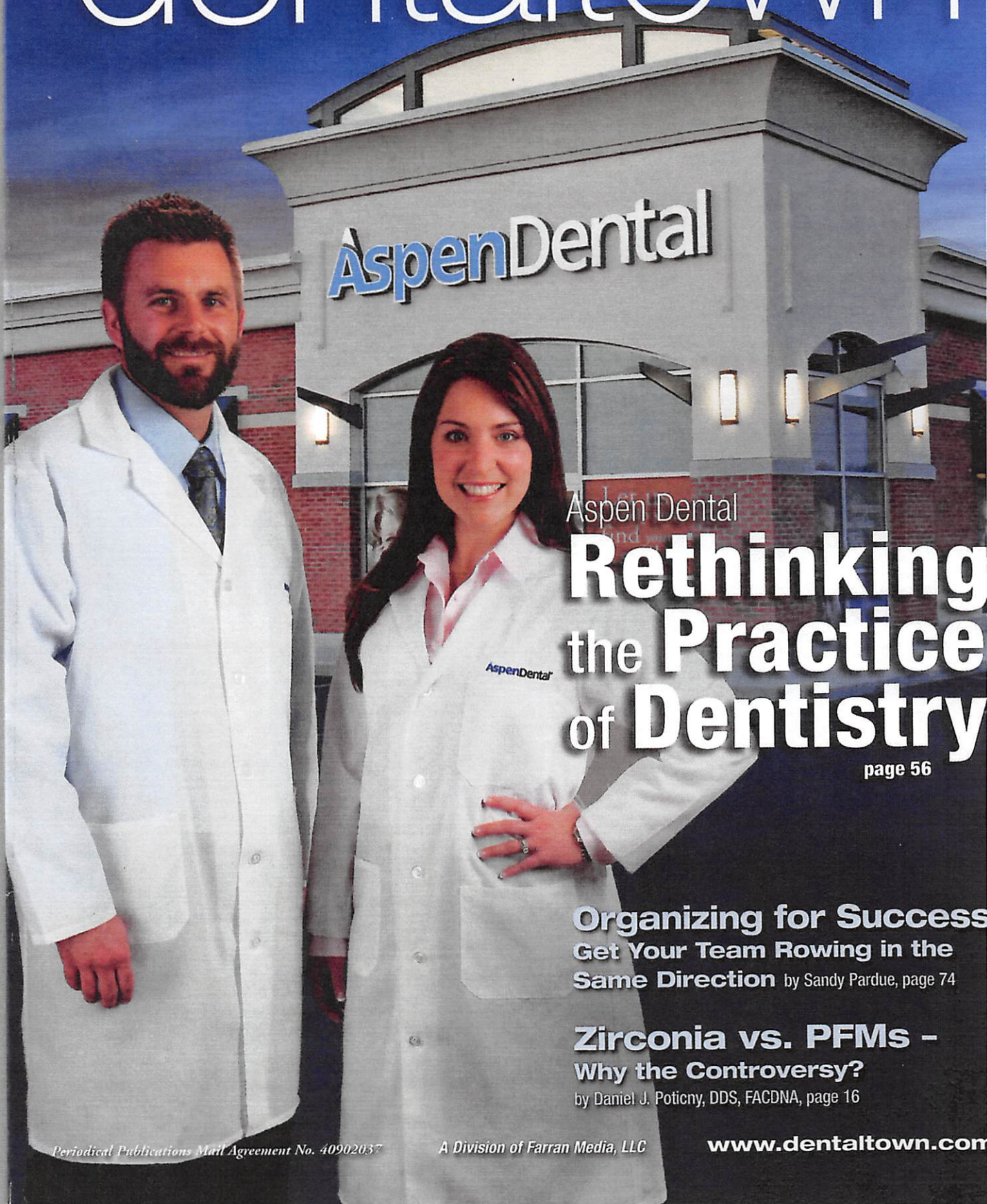


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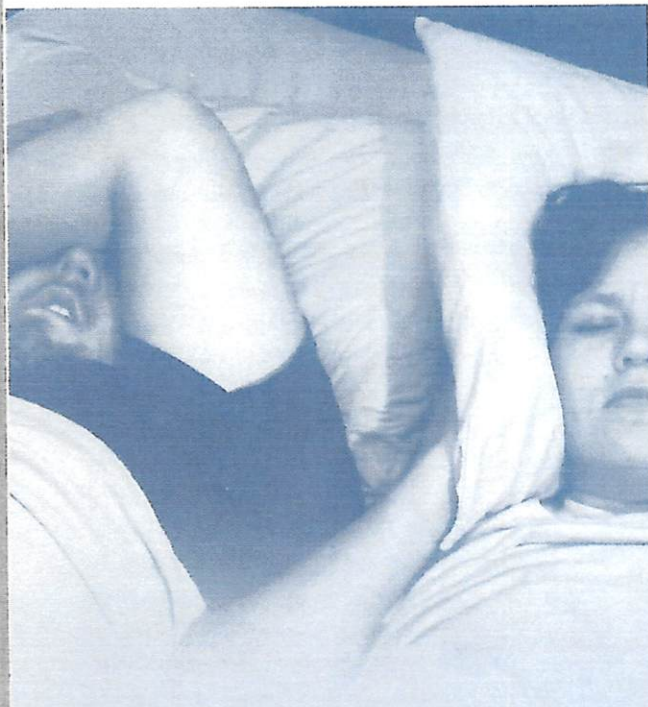
Rethinking the Practice of Dentistry

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Organizing for Success
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Why the Controversy?**
by Daniel J. Potichny, DDS, FACD, page 16

Dental Sleep Medicine - From Snoring to Sleep Apnea



by Michael Simmons, DMD
Private Practice

Educational objectives: Upon completion of this course, participants should be able to achieve the following:

- List the prevalence of sleep disorders in the US
- Understand the causes and definitions of SDB events
- Recognize the main treatments offered for SDB
- Identify the two approaches dentists can take in addressing sleep disorders
- List the therapies dentists can provide in treating SDB
- List morphometric features to help identify a restricted upper airway
- Take the next steps in developing competency in co-managing SDB conditions
- Access useful Web sites to discover more information about SDB

Dentists are in a unique position to provide limited medical therapy for patients with Sleep Disordered Breathing (SDB), a condition ranging from mild intermittent snoring to severe Obstructive Sleep Apnea (OSA) and beyond. There is currently a ground swell of public awareness of this medical problem which is more prevalent than diabetes and carries significant medical morbidities and mortalities. OSA has gained recognition as one of the most common and under-diagnosed chronic diseases.^{1,2} The National Sleep Foundation (NSF)³ reports about 70 million sufferers with sleep disorders, which are primarily made up of SDB and insomnia. Of these, a very conservative estimate of 20 million adults in the US suffer from OSA syndrome, and there are many more with the other forms of SDB. Additionally since research has shown even snoring, a less severe form of SDB, is associated with systemic medical complications^{4,5,6} we must recognize this is not a trivial issue. Unfortunately, less than 15 percent of patients with OSA are identified and even less receive ongoing effective treatment.

The potential medical consequences of untreated OSA are not just an annoyance. Michael Twery, Director of the National Center on Sleep Disorders Research – part of NIH stated OSA is “A condition that erodes your health over time.” Such “erosions” include metabolic disorders from hypercholesterolemia to insulin resistance and onto diabetes type 2. But it does not stop there as research shows some startling correlations with other major medical conditions including hypertension, arrhythmias, coronary artery and ischemic heart disease amongst various other heart and circulatory disorders from heart failure. Additionally there is increase in stroke and more recently a USC dental school colleague and I published a literature review on OSA associated brain damage attributable to the intermittent hypoxia seen in SDB.⁷ Other associated disorders with SDB include depression, GERD and even impotence. Some statistics are listed in Table 1 showing the percent of a particular medical condition

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associated with SDB. This table also illustrates a small sample of the diversity of medical specialties and subspecialties with interest in their co-morbidities to SDB.

The effect of SDB on mortality is also significant and has been addressed in long-term follow-up population studies. One recently published study followed 1,522 US subjects (ages 30-60) during a period of 18 years,²³ and showed an increase in all cause death rate from 2.85/1000 person years in non OSA controls to 14.6/1000 in severe OSA subjects. A second recently published study²⁴ of 380 Australian participants followed for 14 years in a slightly older population (ages 40-65) showed an increased mortality percentage from 7.7 percent in the non OSA subjects to 33 percent in the moderate to severe OSA category.

Aside from the hardly trivial medical consequences of untreated OSA, the psychosocial aspects of untreated SDB can be rather significant. They include fragmented sleep with excessive daytime sleepiness (EDS), depression, cognitive impairment, poor work performance, damaged relationships from second hand snoring effects, and the enormous problems associated with drowsy driving, which might be more damaging than driving drunk. The statistics in this regard are startling. According to a 2006 landmark 461-page report by the Institute of Medicine titled "Sleep disorders and sleep deprivation: An unmet public health problem"²⁵ the cost estimate of Excessive Daytime Sleepiness (EDS) alone is \$150 billion annually in lost productivity and mishaps. The increase in motor vehicle accidents (MVA's) is reported to be two-to-eight times^{26,27} more prevalent in those with OSA than in non-apnic controls and drowsiness be a component factor in around 20 percent of all MVAs. The same 2006 extensive report attributed an additional \$48 billion in annual medical costs related to these MVAs.

A ground-breaking 1993 large cohort study on the middle aged workforce²⁸ showed an incidence of OSA with daytime somnolence of four percent in men and two percent in women. However 28 percent of men and nine percent of women in the same study had AHI (apnea hypopnea index) greater than 5, which is consistent with OSA. If, as noted sleep research experts have published,²⁹ there are 17 percent of U.S. adults with mild or worse OSA, we could be concerned with about 45 million subjects in the United States. A recent analysis of two California dental practices³⁰ showed prevalence rates of sleep apnea in 331 patients (175 male) who chose to answer a questionnaire, with more than 33 percent of the men and six percent of the women predicted to have moderate or severe sleep apnea. Both a screening questionnaire³¹ for all subjects and a home sleep study for

Table 1

Percentage of the listed medical conditions associated with SDB

Medical Condition	SDB	Ref #	Journal	Pub. Yr
Hypertension	30%	8	JAMA	2000
Drug Resistant Hypertension	83%	9	Hypertension	2001
Congestive Heart Failure	85%	10	J. of Cardiac Failure	2007
Chronic Heart Failure	76%	11	Eur J Heart Failure	2007
Coronary Artery Disease	54%	12	Circulation	2008
Atrial Fibrillation	49%	13	Nat Clin Pr Cardio Med	2005
Ischemic Heart Disease	38%	14	Am J Resp Crit Care Med	2001
Stroke	92%	15	Singapore Med J	2006
Medically Refractory Epilepsy	33%	16	Neurology	2000
Metabolic Syndrome	50%	17	J Cardiovasc Med	2006
Type II Diabetes	48%	18	Endocrin Practice	2007
Impaired Glucose Tolerance	79%	19	Sleep Medicine	2007
Obese Diabetics	70%	20	J Clin Endocrinol Metab	1994
Morbid Obesity Male 90%/Female	50%	21	Obes Surg	2007
GERD (same for snoring asOSA)	60%	22	Chest	2002

more than 100 of these subjects were included to validate accuracy. This was just one of several validated screening questionnaires used in the field of sleep medicine. *These authors concluded that dentists could provide a valuable service to their patients by incorporating sleep apnea screening and treatment into their practice.* It behooves us as dentists to be in partnership with our physician colleagues to help address this epidemic health issue. However the protocols must be clarified for dentists to ensure credible and scientific approaches, patient protection and best outcomes.

The two avenues for dentists to address SDB are through both early detection via screening exams and through a collaborative diagnosis/ treatment with physician colleagues.

Early Detection Via Screening Exams

There are many written screening exams available to the interested dentist in order to catch SDB in its early stages. Often the bed partner's input, if asked, provides important information. This would include snoring frequency and volume as well as momentary or extended pauses in breathing. The most commonly used screening written exams include the Epworth, David White, Berlin and the shortest of all, a two question exam recommended by Kapunia³² in 1988. However recent validation has been shown for other screening questionnaire exams such as the STOP³³ and ARES.³¹ In addition, the STOP has increased predictability by adding several objective measures such as BMI, Age, Neck size and Gender becoming the STOP-Bang questionnaire. Some of these exams take only 30 seconds and could help save a life. Screening exams are an important aspect of dental practices. They include medical history and updates, the taking of blood pressure and also the oral cancer screening exam. Dentists should continue to fulfill their obligation to their

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patients by adding SDB screening to these other potentially life saving screening activities.

Collaborative Diagnosis and Treatment with Physician Colleagues

Collaborative diagnosis includes the dentist catching signs of SDB in an objective fashion. Observing a snoring patient in the chair, noting excessive daytime somnolence and restricted breathing responses to sedation or general anesthesia are all obvious signs. However the trained dentist may also readily evaluate parts of the upper airway including Mallampati scores, tongue size and position, excessive tonsillar, soft palate, uvula and pharyngeal wall tissues, as well as the more customary viewing of mandibular size and position. Nasal breathing can also be easily tested as well as clinical screening exam of the nares, checking turbinates and for obvious septal deviations.

Treatment Options Provided by Dentists

The dentist-provided treatment option of Oral Appliance Therapy (OAT) has many advantages. It is convenient, portable and many patients prefer and benefit from this treatment as compared to other medical and surgical options available. OAT was considered in 1995 to be the best alternative conservative treatment to the gold standard therapy, known as CPAP (continuous positive airway pressure) for mild to moderate OSA, by the ASDA (American Sleep Disorders Association).³⁴ Indeed as of 2005 the AASM (American Academy of Sleep Medicine) published updated guidelines which supported OAT as a first line therapy for mild and moderate OSA.³⁵ OAT has proven to benefit patients both in terms of the direct OSA complaints (snoring, daytime somnolence etc.) and also has shown evidence of improvement with long term use in some medical parameters that measure cardiovascular and brain function changes.^{36,37} The surgical options by oral and maxillofacial surgeons are also helpful although across the board success rates are argued based upon definition of success.³⁸ For example the MMA procedure, an orthognathic surgery to advance the mandible and maxilla, is considered efficacious albeit more involved than other soft tissue surgical options commonly provided by otolarngologists. Additionally orthodontic approaches to address this challenge incorporate increased expansion techniques into treatment plans with the concept of improved upper airway anatomy. Few studies validate this approach, except in children^{39,40} although it would appear reasonable to create more space for the tongue. However while disproportionate anatomy indicating a narrowed

airway when awake and upright are helpful indicators for a high suspicion index, they do not reveal the functional effects of sleep and its associated muscle relaxation and positional affects. In other words the most prognathic occlusal scheme along with wide dental arches in a non overweight individual does not preclude SDB.

Education

Although there are many avenues for dentists to receive basic education in the area of sleep medicine and dental sleep medicine there are few advanced educational opportunities, without applying to university-based oral medicine, oral biology and orofacial-pain programs. However, as discussed below, there are many reasons for dentists to become involved in this exciting field and receive at least the minimum training to screen for the condition. It should be the goal of our educators to enable den-

tists to make an enormous impact on their patients and save more than a tooth... perhaps a marriage... and perhaps even a life.

On the bright side, there are some significant changes in the world of DSM (Dental Sleep Medicine). For example, the premier DSM group in the U.S. is the American Academy of Dental Sleep Medicine (AADSM). They now have more than 1,600 members, of the approximately 181,700 active

"It should be the goal of our educators to enable dentists to make an enormous impact on their patients and save more than a tooth... perhaps a marriage... and perhaps even a life."

dentists in the U.S. (ADA Survey Center) and are the fastest growing group in the entire field of sleep medicine. Educating our future dentists to this type of care is critical if we are to have significant impact as dentists. To illustrate this point it is helpful to review past educational experiences of pre-doctoral training in both fields of medicine and dentistry. Several published articles illustrate a marked educational process shortcoming in the field of sleep medicine as defined in the classifications {41} listed in Table 2. During the total four year pre-doctoral MD program the trend in U.S. medical schools went from less than one hour spent in 1980,⁴² to found only 2.11 hours in a U.S. taskforce 2000 survey⁴³ for pre-doctoral and 4.8 hours for graduate education in sleep. The U.S. is not alone with this problem and in the United Kingdom education in sleep medicine fared worse at about 20 minutes total.⁴⁴ While it is hoped that this number of educational hours has recently increased, with the development of the field of sleep medicine, there is little evidence to support it. Dentistry has little better record in sleep medicine training up until recently and the one previous report⁴⁵ found the teaching of OAT for SDB occurred in 42 percent of the 43 dental schools responding to the survey. No commentary was made on sleep education other than

oral appliance fabrication or the number of hours spent in this education. A second study on US dental school education is now completed by a UCLA colleague and myself. Results will be presented at this year's AADSM meeting in June.

On another and important note however, is the interest level in the topic of Somnology and the self awareness of doctors of their need for further education. For example one study of 580 U.S. primary care physicians (PCPs)⁴⁶ revealed the majority rated their own knowledge of sleep disorders as fair or poor. Another study of Scottish dentists showed their interest in obtaining more education in the field of sleep.⁴⁷

Table 2

Categories within the International Classification of Sleep Disorders

1. Insomnia
2. Sleep Related Breathing Disorders
3. Hypersomnias of Central Origin
4. Circadian Rhythm Sleep Disorders
5. Parasomnias
6. Sleep Related Movement Disorders
7. Isolated Symptoms, Apparently Normal Variants and Unresolved Issues
8. Other Sleep Disorders

What Care Can Dentists Provide?

One caution however to recommend to dentists interested in treating SDB is regarding the apparent focus in treating the symptom of snoring without medical colleague collaboration or adequate testing. *There is a world of difference between the symptom "snoring" and the diagnosis of "primary snoring."* The symptom "snoring" is often the harbinger of more serious and potentially life threatening medical conditions. Such medical conditions should be discerned prior to treatment by dentists. The precise diagnosis of "primary snoring", confirmed by sleep monitored lab polysomnography (PSG), home sleep testing devices, and medical examination may in some cases be legally treated by dentists without further medical collaboration, provided such diagnosis is revisited on a regular basis. The concern here is that primary snoring often progresses towards OSA with increased body mass index (BMI)⁴⁸ and independently also with aging. The caution is therefore to clarify that all SDB should be evaluated adequately, in collaboration with physicians, prior to any dentist intervention. Additionally it can be argued that even treating a well diagnosed condition of primary snoring without physician collaboration may well be ignoring the evolving evidence that demonstrates medical complications may also be associated with non OSA snoring.

Currently Defined Status of OAT in Dental Sleep Medicine

The current status of Dental Sleep Medicine using OAT can be currently defined by three items, the 2005 parameters of

the AASM on OAT published in *Sleep* 2006,³⁶ an extensive literature review of OAT published around the same time⁴⁹ and the AADSM treatment protocols for dentists providing OAT which are listed on its Web site www.aadsm.org and more recently published in its membership newsletter *Dialogue*, October 2009.

While dentists are gradually awakening to the idea of early screening for SDB, and providing coordinated medical care to patients with SDB, they are generally unprepared for the task. Dentists require guidelines to enable them to provide an adequate framework to co-diagnose and co-treat with physician sleep specialist colleagues. If we do not do this ourselves we may be taken out of the equation by non-dentist professionals treating with OAT⁵⁰ or even by unproven self help protocols driven by internet based sales.

Five Reasons Why Dentists Become More Involved in SDB:

1. SDB is a societal epidemic with far reaching consequences both medically and psychosocially as well as carrying an enormous economic burden. Catching and managing this epidemic problem has been unmet by current approaches in medicine.
2. Current medical training in this area is severely lacking, resulting in a slow creep of medical and public awareness over the past 28 years.
3. Dentists (properly trained) were acknowledged by the AASM in a position paper in 2006 as being able to provide first line therapy for treatment of mild to moderate sleep apnea.
4. Only dentists specially trained are able to choose, fabricate, fit, adjust and monitor oral appliance therapy (OAT) used in managing SDB and manage the possible untoward stomatognathic side effects of OAT.
5. Dentists are in a unique position to catch early SDB illness with use of screening tools since dentists see patients on a regular maintenance schedule during wellness dental and dental hygiene care.

A final reference and quote⁵¹ from the Report of the Task Force on Medical School

Curriculum sums it up well: *"No complete and truly global understanding of human health and disease is possible without an understanding of sleep and its recognition as a system on a par with circulation, digestion, and reproduction."* Let us, within the field of dentistry, commit to making an enormous difference in society, to improve the quality of life for some, perhaps to save some marriages and even prolong or save some lives for others. Together we can demonstrate to society in general, our physician colleagues, and in particular the public, to whom we serve, that organized dentistry is proactive, engaged and integrated in the health-care system. ■

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Author's Bio

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Disclosure: Dr. Simmons declares that neither he nor any member of his family have a financial arrangement or affiliation with any corporate organization offering financial support or grant monies for this continuing dental education program, nor does he have a financial interest in any commercial product(s) or service(s) he will discuss in the presentation.

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