ADSM Position Paper:

Dental Sleep Medicine & Portable Monitoring

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Introduction

The Academy of Dental Sleep Medicine (ADSM) often receives requests for medical and dental opinion on procedures and practices employed by our members. In most instances, the ADSM and/or the American Academy of Sleep Medicine (AASM) has no official clinical practice guideline or standard of practice on the matter and is unable to develop such a standard due to a paucity of evidence in the existing literature. However, the importance of rendering an opinion is recognized. The following report has been generated by a consensus panel of dental sleep medicine experts as a response to emerging trends in the field of dental sleep medicine and has been accepted by the Board of Directors of the ADSM as a position statement.

Over the course of the past three years, dental sleep medicine practitioners have been inundated with a high volume of information regarding the use of portable monitoring in the assessment of sleep-related breathing disorders and in the evaluation of the efficacy of oral appliance treatment. As information and services available to dentists have proliferated, the ADSM has issued no official statement or protocol for the use of portable monitoring devices by a dental sleep medicine practitioner (but has followed the published recommendations and practice parameters of the AASM[1, 2]).

Position

It is the position of the ADSM that a dentist, whether a Diplomate of the American Board of Dental Sleep Medicine (ABDSM) or not, is not qualified to diagnose sleep-related breathing disorders, including obstructive sleep apnea (OSA)[3]. All patients presenting sleep related breathing disorder symptoms must be referred to a qualified physician for formal evaluation prior to initiating oral appliance therapy or any oral surgical therapies. Use of polysomnography, portable monitoring, or any other objective measurement of respiration during sleep to assess severity of sleep-related breathing disorders is at the discretion of the sleep medicine physician. The use of portable monitoring in the diagnosis of sleep disorders is not within the scope of dental sleep medicine and the ADSM will not provide any additional comment on the use of this type of equipment or any other equipment for the diagnostic testing of sleep disorders. However, other uses for portable monitoring exist, some of which could potentially be employed by a dental sleep medicine professional.

Overview of Sleep Studies

Reading and subsequent interpretation of any type of sleep study (including full overnight polysomnography and level II, III, and IV portable monitoring[4]), requires special training in the interpretation of polysomnography and knowledge in the field of sleep medicine[5, 6, 7]. While the membership of the ADSM and Diplomates of the ABDSM have been exposed to polysomnography and have a basic understanding of the role of polysomnography, full interpretation of a polysomnogram or other sleep study is the role of a qualified practitioner (preferably a Diplomate of the American Board of Sleep Medicine (ABSM) within an AASM accredited sleep disorders center). The recommended treatment protocol and practice parameters for oral appliance therapy accepted by the ADSM state that referral to a sleep physician is mandatory for proper diagnosis of OSA (including ruling in and ruling out). Further, the ADSM recommends that any patient presenting symptoms of sleep disordered breathing be referred to an AASM accredited sleep disorders center for evaluation[1, 3, 8].

Formal in-lab attended polysomnography is considered the "gold standard" for the diagnosis of most sleep disorders including both breathing related and non-breathing related disorders. Polysomnography monitors numerous channels of physiologic data. According to the AASM, minimal requirements of polysomnography include recording of electroencephalogram (EEG), electrooculogram (EOG), chin electromyogram (EMG), electrocardiogram (ECG), airflow, respiratory effort and oxygen saturation. Body position must be documented or objectively measured. Trained personnel must be in constant attendance and able to intervene. Leg movement recording (EMG or motion sensor) is desirable but optional[4, 5, 6, 7].

In addition to the above, a medical history, physical examination, and evaluation all clinical data is necessary in allowing the sleep physician to diagnose the more than eighty various disorders of sleep. The EEG in particular is necessary to determine the type of brain wave electrical activity suggestive of the depth or stage of sleep. Without the EEG, one is not aware if the patient obtained REM sleep, which is the stage where the upper airway is often considered most vulnerable to obstruction.

However, it is recognized that polysomnography is not without its problems. Many authors have noted significant night to night variability in readings, the lack of standard parameters from lab to lab, and the significant "first-night effect," in which patients typically do not achieve normal sleep on the first night in a sleep lab[5, 6, 7]. Another concern is that the number of sleep labs in this country performing polysomnography (even accounting for number of beds running 7 nights a week) is grossly inadequate to diagnose the raw numbers of people who suffer from sleep-related disorders (breathing disorders and otherwise). Recent data suggest that this is not necessarily the case[10]. Even considering these shortcomings, polysomnography is currently still considered by the ADSM the best available testing mechanism in the diagnosis of sleep-related breathing disorders.

Current Assessment of Portable Monitoring

In regards to sleep-related breathing disorders, it is important to realize that newer technologies have recently been produced which allow monitoring of only the channels which specifically relate to upper airway breathing disorders. Noting the problem of "first night effect" as seen in polysomnography, these devices are intended as "screening devices" – as the patients can easily use them at home, therefore overcoming the "first-night effect". Utilizing the algorithms and protocols developed by the manufacturers, when a significant reading is achieved with the portable monitor the patient is sent for formal polysomnography. Negative results (assuming sensitivities and specificities similar to polysomnography) are interpreted as inferring the absence of clinically significant upper airway obstruction. Such devices will normally monitor respiratory parameters, but exclude the EEG and hence, potentially lack critical data regarding sleep staging (some of these devices are designed to collect data from multiple nights in order to mitigate this deficiency).

Importantly, the sensitivity and specificity of these devices has not achieved the level of that which polysomnography has attained[9], and for that reason, portable monitoring is still not endorsed by the AASM, American College of Chest Physicians, or the American Thoracic Society for the purpose of obtaining a formal diagnosis of upper airway breathing disorder (ie: ruling in or ruling out)[5, 6, 7]. Furthermore, the Centers for Medicare and Medicaid Services (CMS) recently published a decision memorandum for reimbursement of continuous positive airway pressure (CPAP) therapy for OSA (CAG-00093R). The decision memo states the following conclusion about unattended portable multi-channel sleep testing: "The evidence is not adequate to conclude that the use of unattended portable multi-channel sleep testing with a minimum of 7 monitored channels including EEG, EOG, EMG, ECG or heart rate, airflow, respiratory effort, and oxygen saturation (Type II Devices based on the 1994 AASM classification) is reasonable and necessary in the diagnosis of OSA and these tests will remain noncovered for this purpose. The evidence is not adequate to conclude that the use of unattended portable multi-channel sleep testing with a minimum of 4 monitored channels including ventilation or airflow, heart rate or ECG, and oxygen saturation (Type III Devices based on the 1994 AASM classification system) is reasonable and necessary in the diagnosis of OSA and these tests will remain noncovered for this purpose[11]." Very little recognition of newer technologies utilizing Peripheral Arterial Tone monitoring (as a means of diagnosing upper airway obstructive pathology) were mentioned within these publications. The reported correlation of this technology to polysomnography is high, with favorable sensitivity and specificity.

Evolving Uses of Portable Monitoring Screening

Aside from its intended use as a definitive diagnostic tool for sleep related breathing disorders, portable monitoring may be effectively used in alternate capacities. One evolving indication for use of portable monitoring devices is as a screening tool to identify patients requiring overnight polysomnography for diagnosis of their disorder from among those with milder forms of upper airway involvement (i.e.: to differentiate simple snorers from those with OSA). While the ADSM does not currently endorse this indication for use of portable monitoring devices for dental sleep medicine practitioners, it is recognized that newer technologies focusing solely on diagnosing upper airway obstructive pathology via portable monitoring are currently being sought within the field of sleep medicine, and may play an increasing role in the future.

One important caution is indicated: by screening patients with these technologies, dental sleep medicine practitioners who may be utilizing these devices for this purpose are making a de facto diagnosis (ruling-in or ruling-out) of obstructive sleep apnea- and may be placing themselves at some degree of legal risk. Reliance upon "black-box" technologies which allow very little (if any) observation of the raw data (or variance of interpretation of the data on the part of the testing doctor) - along with reliance upon proprietary software algorithms- (to the exclusion of a board-certified sleep physician) may increase the potential for false positive and false negative readings and, hence, use of this technology for this purpose is not endorsed by the ADSM at this time.

The ADSM is aware that some of its membership may be using portable monitoring devices as a means for screening patients who may need formal polysomnography. These dentists (except if working intimately with and under the auspices of a treating sleep physician) are not practicing within the recommended treatment protocol of the ADSM. Future developments may alter the current status, but there is currently not sufficient evidence to support the isolated use of portable monitoring devices to rule in or rule out the presence of sleep-related breathing disorders.

Evaluating Response to Treatment

Another evolving indication for use of portable monitoring devices (which the ADSM is particularly interested in) is the ability to evaluate response to treatment following placement of an oral appliance or Oral & Maxillofacial surgical procedure. Portable monitoring devices are sometimes used within a dental sleep medicine practice to assess the short-term efficacy of oral appliance use, and results may be helpful in the titration of adjustable appliances before referral back to the referring sleep physician for medical follow-up and overnight polysomnography if indicated. The ADSM is aware that some of its membership

may be using portable monitoring devices as a means for evaluating treatment. While this is currently not officially a part of the ADSM recommended treatment protocol, the Academy is interested in exploring the legitimacy of this indication for use and is hopeful that future scientific publications will assist in providing evidence to its validity (or lack thereof). The ADSM will encourage future research of this topic from within its membership, as well as from the AASM and Sleep Research Society.

Qualified Practitioners

The dentist who renders therapy with OAs or surgical procedures for the management of sleep-disordered breathing should have adequate knowledge and skill levels relating to safe and effective treatment. Therefore, the dental clinician must be thoroughly familiar with the sleep-induced changes in the physiology of various organ systems including, but not limited to, the neurological, musculoskeletal, cardiac and respiratory systems, as well as possess a working knowledge of the behavioral aberrations associated with sleep-related breathing disorders. In addition, the dental practitioner should be proficient in understanding various diagnostic and follow-up testing modalities including, but not limited to, the polysomnographic evaluation, multiple sleep latency test, maintenance of wakefulness test, Epworth sleepiness scale and pulse oximetry and be adept at interacting with medical sleep specialists and other attending physicians for the purposes of proper diagnosis, treatment and follow-up.

Furthermore, the dentist who renders therapy with OAs should understand the functional characteristics and design variations of many different OAs and must be able to recognize and manage all side effects and complications associated with MRAs and TDs, especially in regard to occlusal changes, tooth movement and temporomandibular joint symptoms. In this regard, the prudent practitioner understands the implications of life-long therapy and the importance of regular, periodic, follow-up examinations.

Qualified practitioners are those who are board-certified as Diplomates of the American Board of Dental Sleep Medicine or a dentist who demonstrates the following: documented affiliation with a board-certified sleep physician, documented ten hours spent in a sleep lab, fifteen hours per year of ADSM-approved continuing education, and a valid license to practice dentistry. Treatment rendered by individuals who have little or no training and education in this unique area should be discouraged.

Summary

It is the position of the ADSM that a dentist, whether a Diplomate of the American Board of Dental Sleep Medicine (ABDSM) or not, is not qualified to diagnose sleep-related breathing disorders, including OSA. All patients presenting sleep related breathing disorder symptoms must be referred to a qualified physician for formal evaluation prior to initiating oral appliance therapy or any oral surgical therapies. Use of polysomnography, portable monitoring or any other objective measurement of respiration during sleep to assess severity of sleep-related breathing disorders is at the discretion of the sleep medicine physician and is (unless working closely under the auspices of and in concert with a treating board-certified sleep physician) not a function of dental sleep medicine. The evolving use of portable monitoring by a dental sleep medicine professional for the purpose of evaluating response to treatment (prior to sending the patient back for follow-up polysomnography) may be an appropriate use of this technology. Additional research within this clinical field is needed.

Disclaimer: *The ADSM recognizes that the topics and devices (and uses thereof) discussed within this paper represent an evolving science. The ADSM will continue to monitor the medical, dental, and scientific literature related to this topic, and reserves the right to modify its position based upon evolving evidence.*

References

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