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COMMENTARY

It's possible: why don't we do it?

Commentary on Dupuy-McCauley KL, Mudrakola HV, Colaco B, Arunthari V, Slota KA, Morgenthaler TI. A comparison of 2 visual methods for classifying obstructive vs central hypopneas. *J Clin Sleep Med*. 2021;17(6):1157–1165. doi:10.5664/jcsm.9140

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Sleep medicine currently faces substantial challenges: health care insurers and providers of treatment devices urge simple and cheap sleep studies to reduce costs and manage more patients in shorter periods, respectively. In addition, the SARS-CoV-2 pandemic has led to essential reductions in sleep medical services both in staff and in available beds.[1] All these aspects focus on 1 point: simplification of diagnosis and usage of polygraphy rather than polysomnography. Despite some indisputable benefits—reduction in waiting lists, faster services for severely affected patients, and implementation of telehealth into the portfolio—this approach implies the concentration of 1 single question: does the patient fit into the scheme of obstructive sleep apnea (OSA) and should they be treated with continuous positive airway pressure? It is obvious that this approach thwarts the idea of personalized medicine and individualized therapy, which currently refaces almost all medical fields. This paradigm shift has also brought major developments to sleep medicine in recent years. In particular, the concept of understanding and discriminating pathophysiological traits of OSA allows increased opportunities to select and combine optimally tailored solutions for individual patients. Similar considerations can be described in the broad spectrum of central breathing disturbances.[2]

Precision sleep medicine means registration of patients' symptoms, analysis of polysomnographic patterns such as rapid eye movement sleep OSA or positional OSA, and accurate description and interpretation of respiratory events. Preconditions of personalized sleep medicine include the differentiation and recognition of OSA phenotypes, the description of subtypes of central sleep apnea without or under positive airway pressure therapy, and the knowledge of benefits and harm of central sleep apnea treatment. This simple enumeration indicates that a precise analysis of obstructive and central breathing disturbances during sleep is of crucial importance.

One must therefore consider the largest portion of disturbances—the hypopneas. However, current practice in many sleep laboratories and automated analyses of polysomnography systems often do not differentiate the various disturbances. This is not only of academic interest but may lead to substantial misdiagnosis and mistreatments. For example, if central hypopneas remain undiscovered in the baseline study, then the application of positive airway pressure may uncover the central component. Although the central disease is pre-existing in this case, it could erroneously be diagnosed as treatment-emergent central sleep apnea. The recognition of central hypopneas has a huge clinical impact as it may guide and underline the necessity of devices, which sufficiently eliminate these events.

Therefore, the paper of Dupuy-McCauley et al[3] published in this issue of the *Journal of Clinical Sleep Medicine* is more than valuable as it points out the discrimination of obstructive and central hypopneas. The authors compared the American Academy of Sleep Medicine criteria with our step-by-step algorithm.[4,5] The most important message of the paper is that both algorithms allow differentiating 60%–70% of hypopneas. The specific strength of both procedures is that they precisely detect nonobstructive events as nonobstructive and identifying central events as central events. The authors therefore confirmed that the detection of central hypopneas is feasible noninvasively (ie, without measurement of the esophageal pressure) based simply on the standard procedures of sleep laboratories. In other words, the differentiation of the vast majority of respiratory disturbances is possible with a routine armamentarium; it is helpful to avoid misdiagnoses and therefore essential for optimal treatment. We just have to do it.

Both algorithms show important similarities and some differences. Parameters focusing on the limitation of the airflow through the upper airways (flattening) and on breathing effort (paradoxical breathing) play an important role in both algorithms, thus causing very similar efficacy of the algorithms. However, snoring within the event complements the American Academy of Sleep Medicine algorithm, while our algorithm includes parameters focusing on respiratory drive (termination of the event, position of the arousal, sleep stages). The interrater reliability shows room for improvement in both algorithms. This underlines that training and experience are required to interpret the respiratory events optimally.

The question arises if the combination of the "best of 2 worlds" might allow for optimal sensitivity and specificity of a noninvasive algorithm. It is worth studying if the addition of the termination of the event and the electroencephalogram

parameters to the American Academy of Sleep Medicine algorithm might improve the results. This is in line with current approaches to detect the pathophysiological traits of OSA based on easily accessible polysomnography parameters, which nevertheless include the neurologic part. Eckert et al[6] elucidated the 4 components: upper airway collapsibility, muscle responsiveness, arousal threshold, and respiratory drive. These insights might guide clinicians to differential treatment, such as continuous positive airway pressure or mandibular advancement devices for patients with overwhelming mechanical components, stimulation of upper airway muscles for those with impaired responsiveness, and pharmaceutical approaches to optimize arousability or respiratory drive.[7] However, before these concepts can be implemented broadly into clinical practice, tools for noninvasive evaluation are required. Several investigators addressed this need and described patterns of breathing disturbances or simple tools, applicable during daytime or sleep, to analyze the pathophysiological components.[8–18] This is especially advantageous regarding the arousability and the loop gain, 2 aspects that have not been considered in the interpretation of polysomnography so far.

We may cautiously state that all these works provide a base for integrating precision sleep medicine into daily routine. They advocate for individualized and specific rather than simplified and general approaches.

CITATION

Randerath W. It's possible: why don't we do it? *J Clin Sleep Med*. 2021;17(6):1149–1150.

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