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LETTER TO THE EDITOR

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The View of a Dental Sleep Medicine Clinician and Researcher of the Future of the Field

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Sleep apnea diagnosis and treatment has been questioned lately by the Agency for Healthcare Research and Quality Draft Technology Assessment of Continuous Positive Airway Pressure Treatment for obstructive sleep apnea (DRAFT - Continuous Positive Airway Pressure Treatment for Obstructive Sleep Apnea (ahrq.gov) and with no doubt has challenged clinicians and scientist to re-think how to improve diagnosis, treatment, quality of life, and health of patients with sleep apnea.

Starting with the apnea-hypopnea index (AHI), this has been an imperfect but helpful metric. Various studies have shown that the AHI does not correlate with sleepiness or quality of life, and in mild to moderate cases the AHI does not highly correlate with morbidity after adjustment for body mass index, symptoms, and hours of sleep. The AHI will not be abandoned, but additional variables are required to better describe sleep apnea. Malhotra and colleagues[1] have shown differences of patients with the same AHI, but who have very different apnea/hypopnea ratios, oxygen saturation, heart rate response, and sleep architecture/fragmentation, describing the current flaws of AHI as a sole metric to assess obstructive sleep apnea. Although dental sleep medicine seems far away from the description, it should be remembered that the efficacy of oral appliances is also described based solely on the AHI. The future of dental sleep medicine in relation to the diagnostic metrics will be to further understand the effect of oral appliances on these new metrics for defining the disease and thresholds of normality. As an example, if one patient has mostly apneas, and eventually begins to have mostly hypopneas, the apnea/hypopnea ratio will change. What is the effect of this change on oxygen saturation, heart rate response, and sleep architecture/fragmentation? What is the percentage of improvement in those domains that correlate with an improvement in overall health and symptoms and long-term morbidity and mortality?

Patient-centered medicine is a new term in the sleep apnea field, but highly studied in other areas of medicine.[2] With the move to better understand patient preference and values, a lot may change in dental sleep medicine. Oral appliances are easy to use and show a higher adherence rate for the first 2 years of use. The future of sleep apnea treatment will involve the patient in the decision-making process and also will better educate patients for long-term disease management. It has been shown that sleep apnea, as many other diseases, is not static; as patients age, gain or lose weight, or new comorbidities develop, treatment should be adapted. Patients and family doctors need to allow flexibility in treatment strategies to further improve treatment adherence and therefore allow long-term improvement in morbidity and mortality.

To improve treatment strategies, Hamoda and colleagues[3] have shown that the alternating use of continuous positive airway pressure (CPAP) and oral appliance leads to a sustained adherence and efficacy after at least 6 months of treatment when compared with CPAP or oral appliance alone. The major problem with this study is the economic side of treatment, where the cost of CPAP has decreased slightly but the cost of the oral appliance has not decreased. The addition of the two treatments is very costly. If the future of OSA management will include combination therapy, together with or alternating various therapies, the treatment costs needs to decrease on all fronts. Oral appliance laboratories may be able to decrease costs, likely if production volume is higher with more patients using oral appliances. But what about dentists?

Oral appliance therapy has to become cheaper, and simpler rather than more complex. New developments in the field are likely going to help. One of the biggest costs associated with oral appliance therapy is the multiple appointments for treatment titration at the dental office. With the new development of intraoral sensors as well as wearables that have standardized measurements and questionnaires, the patient will receive an appliance that has compliance and efficacy sensors, comprehensive training with good instructional materials, and one or two adjustment appointments for addressing possible side effects. This will be followed by self-titration, where patients will be able to advance the mandible until ideal or close to ideal efficacy and comfort is achieved. At this point, a follow-up appointment with the dentist and physician can help the patient navigate treatment strategies based on the efficacy and comfort of the different treatments recommended. It is important to state that the

efficacy desired be the titration in this case and is not solely based on an AHI, but instead on hypoxia burden, sleep quality, and symptomatic improvement. Also, if a single treatment will not be used alone, but alternating with CPAP for example, some small improvement in objective metrics together with a high symptomatic improvement and high adherence rates may already be enough for the purpose of 2 nights of use per week.

Will the new gadgets be able to do it all? Are the patients going to feel comfortable in driving their treatment? Maybe not all, but for sure, the new generations will, and it is important for health care providers to understand that the public is becoming more educated on how to navigate apps and gadgets that measure sleep and health conditions. An example is the management of diabetes, and with continuous measurement of blood sugar levels, patients have become better able to control their chronic disease. This is likely the future for sleep apnea treatment as well.

In summary, I believe the future will bring new and better diagnostic metrics to improve understanding of disease severity and who should actually require treatment. Patients will then receive education and be presented with treatment options from which to choose, including single or multiple treatment approaches to be used in combination or as alternating approaches. If an oral appliance is an option considered by the patient, a dentist will provide the treatment, address possible side effects, and help the patient progress to the subsequent months of self-titration. Treatment goals will involve more than AHI or the Oxygen Desaturation Index, and the oral appliance together with new gadgets will help patients find the best treatment strategy. When used in combination, a fully effective treatment may not be necessary. The dentist should, in an unbiased approach, help the patient decide on how to combine and decide on treatment strategies. Yearly follow-ups should occur to assess continuation of treatment (not oral appliance adherence only), monitor side effects, and possible changes in the treatment protocol.

CITATION

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