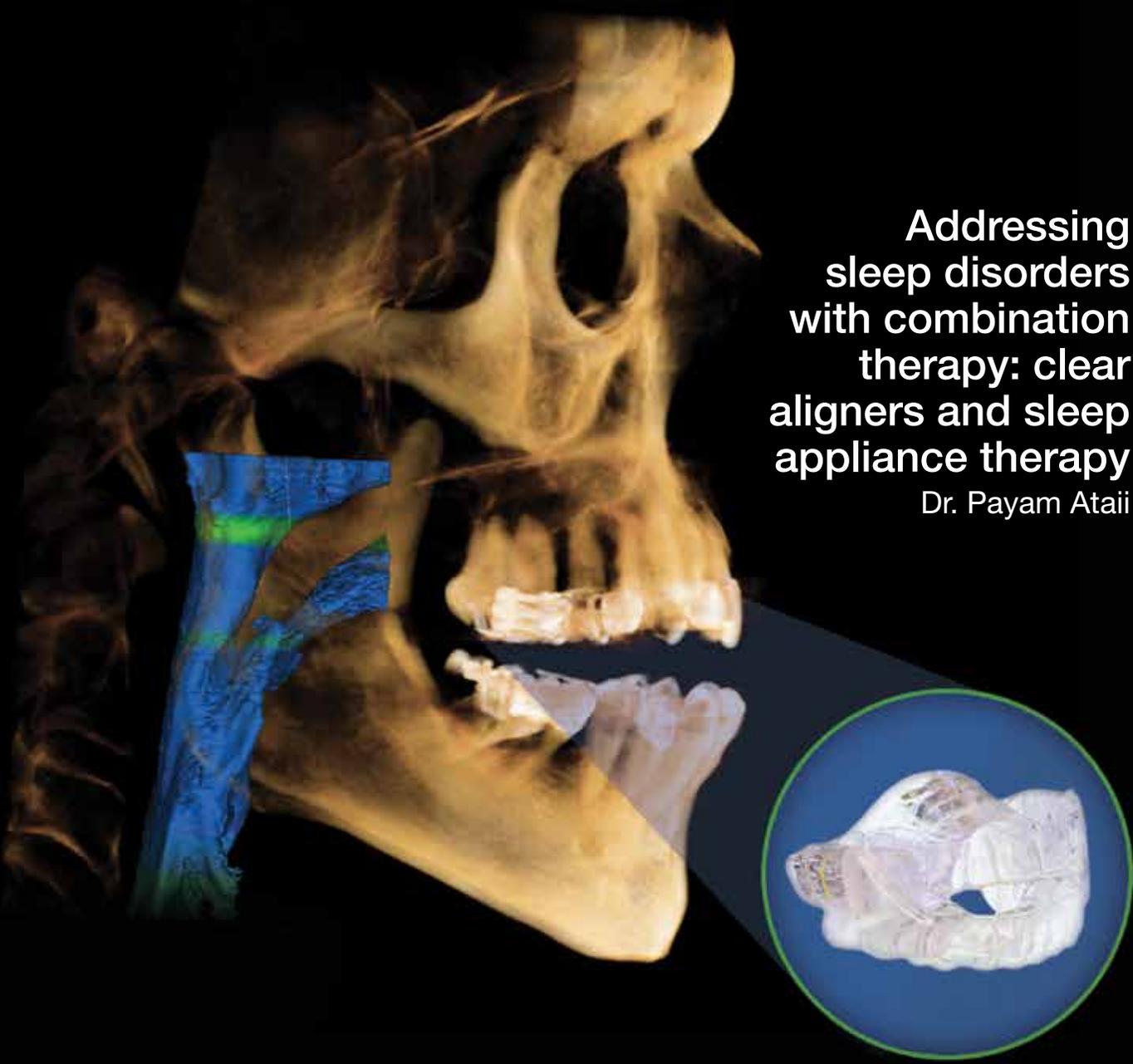


Orthodontic

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PROMOTING EXCELLENCE IN ORTHODONTICS



**Addressing
sleep disorders
with combination
therapy: clear
aligners and sleep
appliance therapy**

Dr. Payam Ataii

Addressing sleep disorders with combination therapy: clear aligners and sleep appliance therapy

Dr. Payam Ataii discusses a sleep appliance specifically designed to be used in conjunction with clear aligners

Two parallel and related trends

Two parallel and related growth trends are occurring in the United States: the growth of clear aligner treatment and the rise of diagnoses for sleep-disordered breathing. Over the past year, over 650,000 patients in North America sought clear aligner treatment, and the market is growing by 28% per year.^{1,2,3} New indications for clear aligners are being introduced, and patients increasingly see the esthetic benefits of clear aligners. At the same time, another trend in the U.S. is growing as strongly as clear aligners — the diagnosis of sleep-disordered breathing. Approximately 3.5 million sleep tests are ordered each year in the U.S., a number growing at nearly 13% annually.^{4,5}

The prevalence of sleep-disordered breathing is astonishing. The National Center on Sleep Disorders Research (NCSDR), an organization within the National Institute of Health (NIH), states that about 70 million Americans suffer from sleep problems, with approximately 60% of these having a chronic disorder.⁶ Given the prevalence in the U.S. population, it is not surprising that orthodontists and general practitioners see many patients in their practice who show signs of sleep disorders that need to be treated. This problem cannot be ignored. The NCSDR cites that “Sleep disorders, sleep deprivation, and sleepiness add an estimated \$15.9 billion to the national health care bill.”⁶ A variety of sleep appliances have been available for years to treat these patients, but the question has always been, “How do we treat patients with sleep disorders while addressing their chief complaint

Educational aims and objectives

The purpose of this article is to present the complexities and the solutions for combining clear aligner therapy with a new, FDA-approved custom dental sleep device.

Expected outcomes

Orthodontic Practice US subscribers can answer the CE questions online at orthopracticus.com/ce-articles to earn 2 hours of CE from reading this article.

Correctly answering the questions will demonstrate the reader can:

- Realize some trends in the growth of clear aligner treatment and the rise of diagnoses of sleep-disordered breathing.
- Realize the integration between orthodontics and dental sleep medicine.
- Identify the clinical benefits of the design of the Aligner Sleep Appliance in conjunction with clear aligner therapy.
- See a case where a patient's orthodontic needs and medical needs were both accounted for during the treatment process.



— to fix their smile?” Traditional sleep appliances cannot be used in conjunction with clear aligners since both appliances need to be worn while the patient sleeps. Now, there is a solution to this problem — the Aligner Sleep Appliance (ASA)[®] is an FDA-cleared, custom device specifically designed to address this issue.

Integrating dental sleep medicine within a clear aligner practice

Dental sleep medicine and orthodontic practices go hand in hand. The correlation between malocclusions and sleep disorders has been established in the journals for some time now.⁷ Malocclusions can compromise the space within the oral cavity, limiting the capacity and functionality of the tongue. Especially when patients lie on their back during sleep, if malocclusions are limiting the tongue from properly resting at the roof of the palate, there is a high likelihood that these patients will suffer from compromised

airways. These compromised airways can present themselves as snoring, as chronic fragmented sleep (Upper Airway Resistance Syndrome), or as complete obstruction by the tongue and/or soft tissues (Obstructive Sleep Apnea). With the advent of CBCT technology, practices may better identify mid-facial developmental deficiencies that may be contributing factors to collapsed airways and sleep disorders.

Given these complexities, choosing the right service partners for both clear aligners and dental sleep is important for orthodontic practices. For clear aligners, working with a reputable clear aligner company can be helpful to make the process simple and gain access to the necessary tools. On the dental sleep side, proper diagnosis of the patient's sleep disorder as well as a comprehensive treatment plan that identifies the orthodontic considerations and type of appliances that may address the patient's airway is critical. SleepArchiTx is an example of a dental sleep services company that provides this type of expertise with integration of board-certified sleep physicians, orthodontists, and general sleep practitioners.

When treating dental sleep patients, it is important to work with board-certified sleep physicians who may diagnose these conditions through high-quality home sleep tests or in-lab sleep tests. Most diagnostic companies or sleep laboratories are



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develop solutions to improve and simplify how dentistry is delivered to patients. He serves on multiple company boards and is a recognized key opinion leader.

Disclosure: Dr. Ataii is the co-inventor of the Aligner Sleep Appliance (ASA)[®].

focused on identifying patients who suffer from Obstructive Sleep Apnea — and that is good — however, there are other breathing disorders that patients will present with. A diagnostic partner should also be able to properly identify the other possible disorders that orthodontists and general practices could treat, such as, Upper Airway Resistance Syndrome or sleep bruxism.

Given the correlation between malocclusions and sleep disorders, working with companies that have orthodontic expertise in treatment planning for sleep cases is imperative. The choice of which appliances to use affects the patients' comfort and their clinical outcome. Often, dental labs or sleep services companies offer only one or few appliance options and expect those to work with every patient. Orthodontists should not be limited to a single appliance or small handful of choices because factors such as cranio-facial structure and degree of malocclusion will dictate the attributes of the sleep appliance that is needed. In addition, chosen custom sleep appliances must be FDA-cleared and fabricated by an FDA-approved laboratory.

Aligner Sleep Appliance (ASA)[®]

The Aligner Sleep Appliance (ASA)[®], available exclusively through SleepArchiTx,

is an innovative option that concurrently treats sleep-disordered breathing in patients undergoing clear aligner treatment. The ASA is designed to support the jaw in a slightly forward, protrusive position to help maintain an open airway while the orthodontic tooth movements are being addressed with the clear aligners.

Sleep test results have shown that this combination therapy is an effective treatment option for snoring and Obstructive Sleep Apnea patients who are being treated with Invisalign[®] or any other clear aligner treatment.⁸

How do the appliances work together?

The Aligner Sleep Appliance is a patented, FDA-cleared, custom-made appliance designed to fit over the patient's clear aligners throughout the course of treatment. To fabricate the ASA, practices submit either a 3D intraoral scan or physical impressions of upper and lower arches. These impressions must be taken while the patient is wearing his/her current clear aligner trays. It should be noted that some intraoral scanners are not able to accurately detect the clear aligners when fitted over the teeth. If that is the case, instead, submit poured cast models, or PVS impressions to SleepArchiTx.

The ASA is fabricated with a proprietary process of calibrating the patient's final aligner ortho stage. This process allows the patient to use the same sleep appliance during the entire clear aligner treatment. This means that while the patient's malocclusion is being resolved, and the programmed clear aligner trays are changed every 1-2 weeks, the ASA is designed to accommodate for the estimated tooth movements without being loose or flimsy. During follow-up visits, dentists may also perform chairside titration adjustments to the ASA by controlling the position of the mandible using the bilateral acrylic fins and/or the customized sagittal and horizontal calibration screws.

ASA Case Study

A 29-year old female presented to the practice seeking a better looking smile. During patient evaluation, it was determined that patient felt tired throughout the day, suffered from headaches, and was almost involved in vehicle accident due to being drowsy while driving. The patient's intraoral evaluation presented with a high palate, narrow dental arches, upper anterior overjet, and lower anterior dental crowding. A sleep study was prescribed, and the patient was diagnosed with Upper Airway Resistance Syndrome (UARS).

SLEEP DISORDER ASSESSMENT

Full Name: _____

Phone: _____ E-mail Address: _____

Date of Birth: _____ Gender: _____

Has anyone told you that you stop breathing while asleep?	Y	N
Have you ever been involved in any type of accident because you nodded off or fell asleep?	Y	N
Have you ever nodded off or fallen asleep while driving?	Y	N
Have you woken up suddenly gasping for air, heart racing or with shortness of breath?	Y	N
Do you grind your teeth?	Y	N
Do you snore or has someone ever told you that you snore?	Y	N
Does anyone in your family have a history of snoring or sleep apnea?	Y	N
Do you feel tired or sleepy throughout the day?	Y	N
Does it take you less than 10 minutes to fall asleep?	Y	N
Does it take you more than 20 minutes to fall asleep?	Y	N
Once you fall asleep, do you have trouble staying asleep?	Y	N
Do you find it difficult to manage your weight?	Y	N
Do you suffer from headaches during the morning or during the night?	Y	N

Note: Over for medical assessment questions

Patient Signature: _____

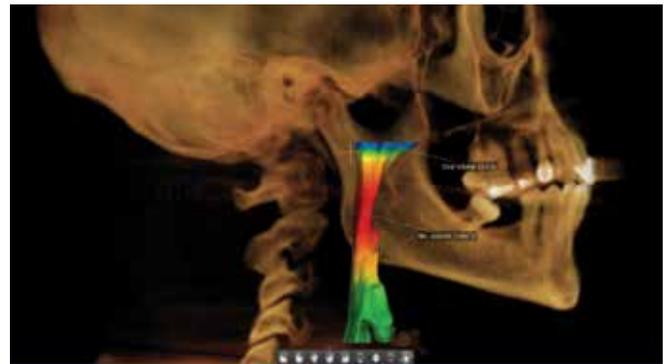


Figure 2: Preoperative CBCT image showing airway



Figure 3: The Aligner Sleep Appliance (ASA)[®] is an FDA-cleared dental sleep appliance that fits with clear aligners to enable simultaneous clear aligner and dental sleep treatment, co-invented by Dr. Payam Ataii and Dr. Rob Veis

Figure 1: Office patient assessment form

Treatment

Combination therapy with Invisalign trays and Aligner Sleep Appliance. The Invisalign trays were changed weekly during the 6-month course of treatment. The patient was concurrently custom fit with an ASA that repositioned the mandible. Proper positioning was verified with CBCT. One ASA was custom fabricated to adjust to all Invisalign trays. The patient's constricted arch — caused in part by her tipping teeth — was addressed using Invisalign clear aligners on both upper and lower arches. This helped to upright posterior teeth and round out upper and lower anterior teeth for better tooth position and alignment. The ASA was adjusted up to 4 mm during treatment and used post-treatment in combination with the Vivera® Retention System on the upper arch and a fixed retainer on the lower arch. The patient's postoperative instructions were to wear the ASA at night both during orthodontic phase as well as post-retention. The same appliance was used throughout the treatment along with stabilization and retention period of the patient's treatment.

Treatment outcome

The malocclusion was corrected while maintaining a patent airway. The patient's sleep symptoms of daytime sleepiness, fatigue, and even neck posture showed significant improvement along with better intraoral occlusion and tongue space. A follow-up sleep study confirms that the patient no longer suffers from UARS while wearing the ASA.

Conclusion

The Aligner Sleep Appliance was used to successfully treat this patient's sleep disorder while enabling simultaneous clear aligner treatment. Neither the patient's orthodontic needs nor her medical needs were compromised during the treatment process. This case highlights how the practices can offer clear aligner treatment and dental sleep treatment that work in tandem. **DP**

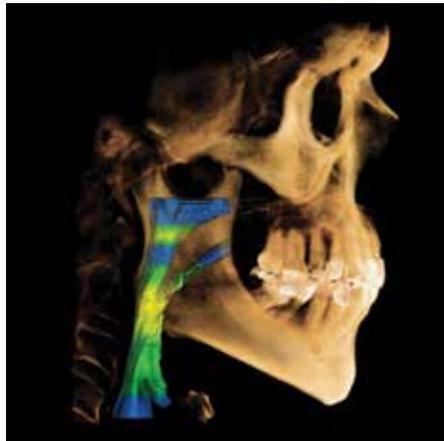


Figure 4: Patient without ASA

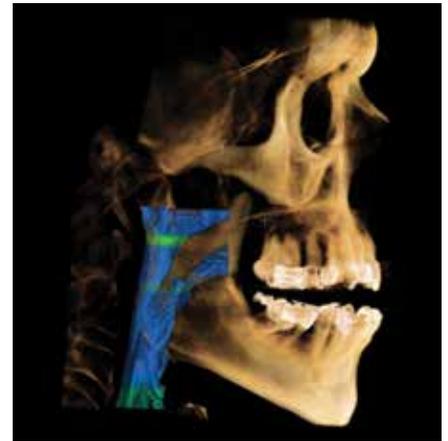


Figure 5: Patient with ASA



Figure 6: Before



Figure 7: Invisalign® and Aligner Sleep Appliance (ASA)® treatment



Figure 8: After

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