Provincial Dental Board
of Nova Scotia

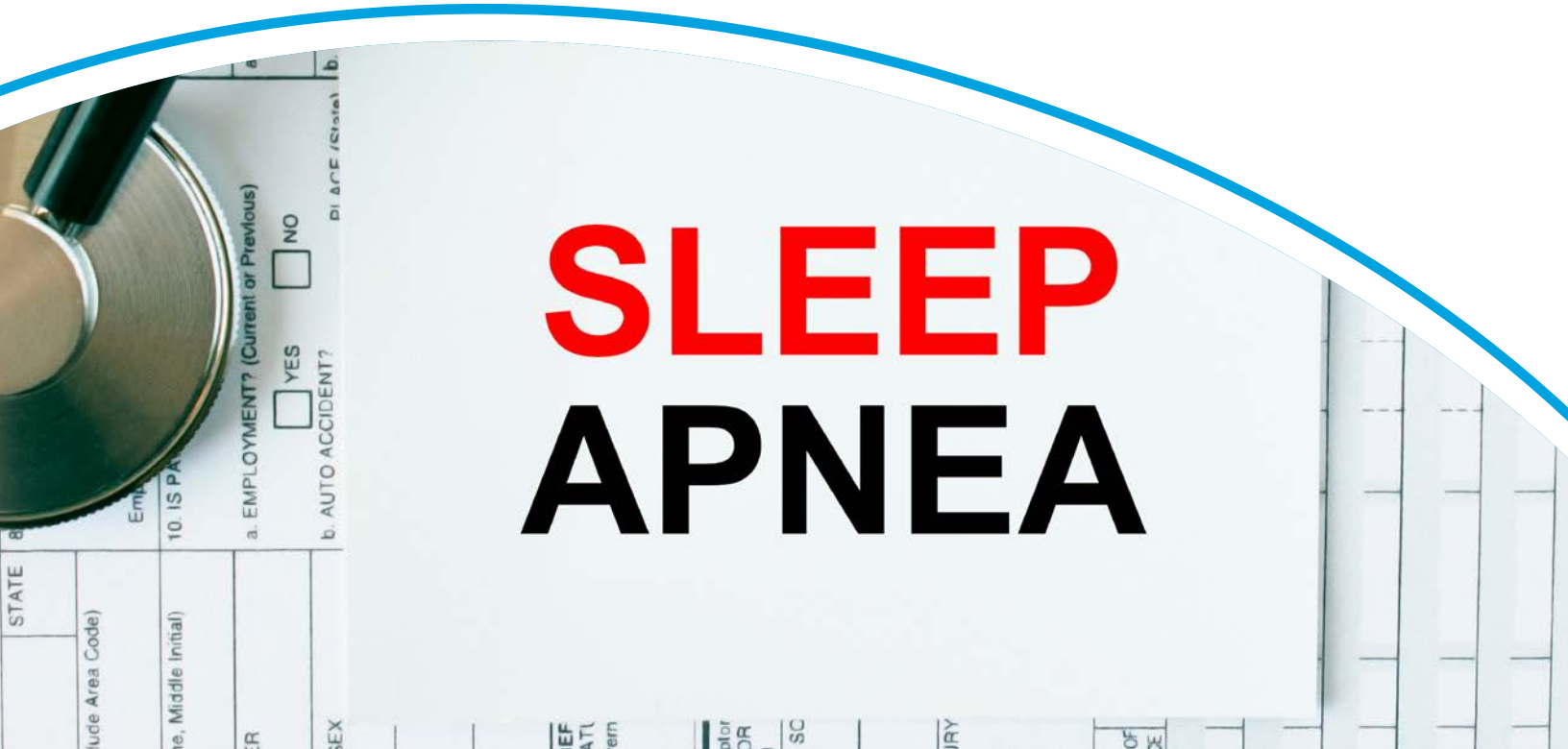
STANDARD OF PRACTICE

Treatment of Snoring and Obstructive Sleep Apnea with Oral Appliances

May 2021

This document is the standard of practice in relation to the use of oral appliances in the treatment of snoring and obstructive sleep apnea (OSA). Since contravention of the standard may be considered professional misconduct, dentists employing oral appliances must be familiar with its content, be appropriately trained, and regulate their practices accordingly.

This document indicates the minimum standards for the use of oral appliances in dentistry.



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Introduction

Obstructive sleep apnea is a medical syndrome characterized by recurrent episodes of partial or complete upper airway obstruction during sleep. Obstructive sleep apnea is common and is associated with reduced quality of life, decreased cardiovascular health and increased healthcare utilization, motor vehicle accidents and mortality.[2 3] There are a variety of treatment options currently available for OSA including lifestyle modifications, continuous positive airway pressure (CPAP), corrective upper airway/jaw surgery, and OAs such as mandibular advancement splints (MAS).

The diagnosis of OSA syndrome is confirmed if the number of obstructive events per hour of sleep (apneas, hypopneas /hour of sleep; called apnea and hypopnea index – AHI) on polysomnography is greater than 15 events/hour or greater than 5/hour in a patient who reports any of the following: unintentional sleep episodes during wakefulness; daytime sleepiness; unrefreshing sleep; fatigue; insomnia; waking up breath holding, gasping, or choking; or the bed partner describing loud snoring, breathing interruptions, or both during the patient's sleep. Obstructive sleep apnea severity is defined as mild for AHI ≥ 5 and < 15, moderate for AHI ≥ 15 and ≤ 30, and severe for AHI > 30 per hour.[4]

According to the guidelines of the American Academy of Dental Sleep Medicine (AADSM) and the American Academy of Sleep Medicine (AASM),5 OAs in the adult population are recommended as a first-line therapy option for patients with primary snoring (without apnea) and for patients suffering from mild to severe OSA who are intolerant to CPAP or prefer an OA as a therapy.[5 6 7]

Patients, however, should be aware the success of treatment is less predictable in the severe group. A more detailed description can be found in the AASM article.[5]

Oral appliances are divided in 2 main categories, the mandibular advancement splints and the tongue retaining devices. This document will focus primarily on mandibular advancement splint type of OA. MAS are also called dental orthotics, mandibular advancement appliances (MAA), or mandibular advancement devices (MAD). Oral appliances improve OSA because of an increase in the patency of the upper airway during sleep reducing the collapsibility of the upper airway, the provision of a stable and consistent anterior position of the mandible, advancement of the tongue, and possibly by an increase in upper airway volume and/or shape and a change in genioglossus muscle activity.[8]

An effective MAS has been described by the AADSM as a custom fabricated using digital or physical impressions and models of an individual patient's oral structures. As such, it is not a primarily prefabricated item that is trimmed, bent, relined, or otherwise modified. It is made of biocompatible materials and engages both the maxillary and mandibular arches. The OA can be a monobloc or ideally has a mechanism that allows the mandible to be advanced in increments of 1 mm or less with a protrusive adjustment range of at least 5 mm. In addition, reversal of the advancement must be possible. The protrusive setting must be verifiable. The appliance is suitable for placement and removal by the patient or caregiver. It maintains a stable retentive relationship to the teeth, implants or edentulous ridge and retains the prescribed setting during use.[9]

Thermoplastic/prefabricated/boil and bite devices have not been properly tested as a screening tool to identify good candidates for mandibular advancement therapy at this point. These appliances have shown inferior efficacy compared to custom made OA. [10]

STANDARD: The dentist's role in the treatment of OSA is adjunctive, supplementary and/or collaborative to that provided by the sleep specialist. A diagnostic report confirming that a Level 1 or Level 3 sleep study is required before OA therapy is initiated. Because of the increased rates of morbidity and mortality associated with OSA, a physician (family physician or sleep clinician) must assess the potential for other medical conditions, including OSA, before a dentist provides any treatment for primary snoring.1 8

Role of the Physician

In cases where OA treatment is planned, the specialist's collaborative role with the dentists is described below. This description is not intended to fully describe the role of physicians in the field of medicine, sleep or OSA.

A medical assessment (with an overnight polysomnogram or sleep study) is interpreted by an accredited physician with advanced training in sleep medicine, referred to here as a sleep physician.* The sleep studies which use an unattended portable monitor devices should be performed in conjunction with a comprehensive sleep evaluation and supervised by a physician trained in sleep medicine.[11] A prescription is required to order a portable monitor for testing for OSA; therefore, OSA diagnosis should always be determined by a physician who also has seen the patient clinically.

After a physician decides that OA therapy can be the treatment option for the patient, a written referral or prescription and diagnostic report should be sent to a dentist who has training in this field of treatment.

A sleep physician is a practitioner with a specialization in respirology; neurology; psychiatry; internal medicine; or ear, nose and throat and with training in sleep medicine who holds a license to practise in Nova Scotia. Family physicians may belong in this group if they hold board certification in sleep medicine or the equivalent. All the above-mentioned clinicians are responsible for their own acts.

Role of the Dentist

The dentist's role in the management of snoring and OSA is to:

- Screen for potential OSA, utilizing appropriate tools, by recognizing symptoms of OSA;
- Refer patients with either primary snoring or snoring with potential OSA to their family physician or a sleep physician for a review of the overall medical history and to rule out the presence of OSA; and
- Provide therapy with OAs and behavioural therapy after receiving a written request or prescription from a physician. Dentists should never start treatment for snoring or OSA without a physician's assessment of the patient. Because OSA is a disease with increased mortality risk, OAs treatment should be provided by a qualified dentist.

Qualifications

STANDARD: Dentists who offer therapy for OSA must be competent in this field. Knowledge and indications for use of various devices is required. Due to the rapidly developing changes in this area of dentistry, dentists must continuously update their expertise through continuing education on sleep disorders and sleep apnea.

Treatment Sequence

A flow chart showing the overall sequence of treatment is shown in Figure 1. A more detailed treatment sequence is described below. After a patient has received a sleep clinician's evaluation and request for an OA, the dentist will be responsible for the patient's treatment as follows.

Dental Exam Requirements

- A medical-dental history that includes:
  - age
  - weight
  - height

  Plus: - malocclusion classification (including overjet and overbite measurements)
  - presence of tooth erosion or tooth wear
  - medications
  - presence of other medical diseases (similar to a general detailed medical history)
- Assessments of sleepiness and sleep main complaints
- Soft tissue/ intraoral assessment
- Periodontal evaluation
- Temporomandibular joint examination
- Assess concomitant bruxism (tooth grinding and/or clenching), orofacial pain, and/or headaches
- Examination of occlusion, teeth and restorations
- Initial dental radiographs as indicated if patients don't have a recent assessment of their dental health by a dentist. Cephalometric and panoramic radiographs as a pre-treatment record may be used. Cone-beam computed tomography and/or other computed tomography at this time are not indicated.
- Diagnostic dental models

Treatment Plan for Obstructive Sleep Apnea

- Provide patients with explanations and information on sleep behavioural therapy including sleep hygiene, sleeping position, weight control and alcohol intake along with the type of device considered and all alternatives (e.g., CPAP therapy, surgery, or positional therapy).
- Propose various OAs to the patient, according to the patient's oral health status and craniofacial morphology (MAS, tongue retaining device, or equivalent). Appliance design, fabrication, fitting and placement should be completed as indicated in the section on OA therapy on page 8. Dentists should provide positional therapy information on treatment options for patients with positional OSA.

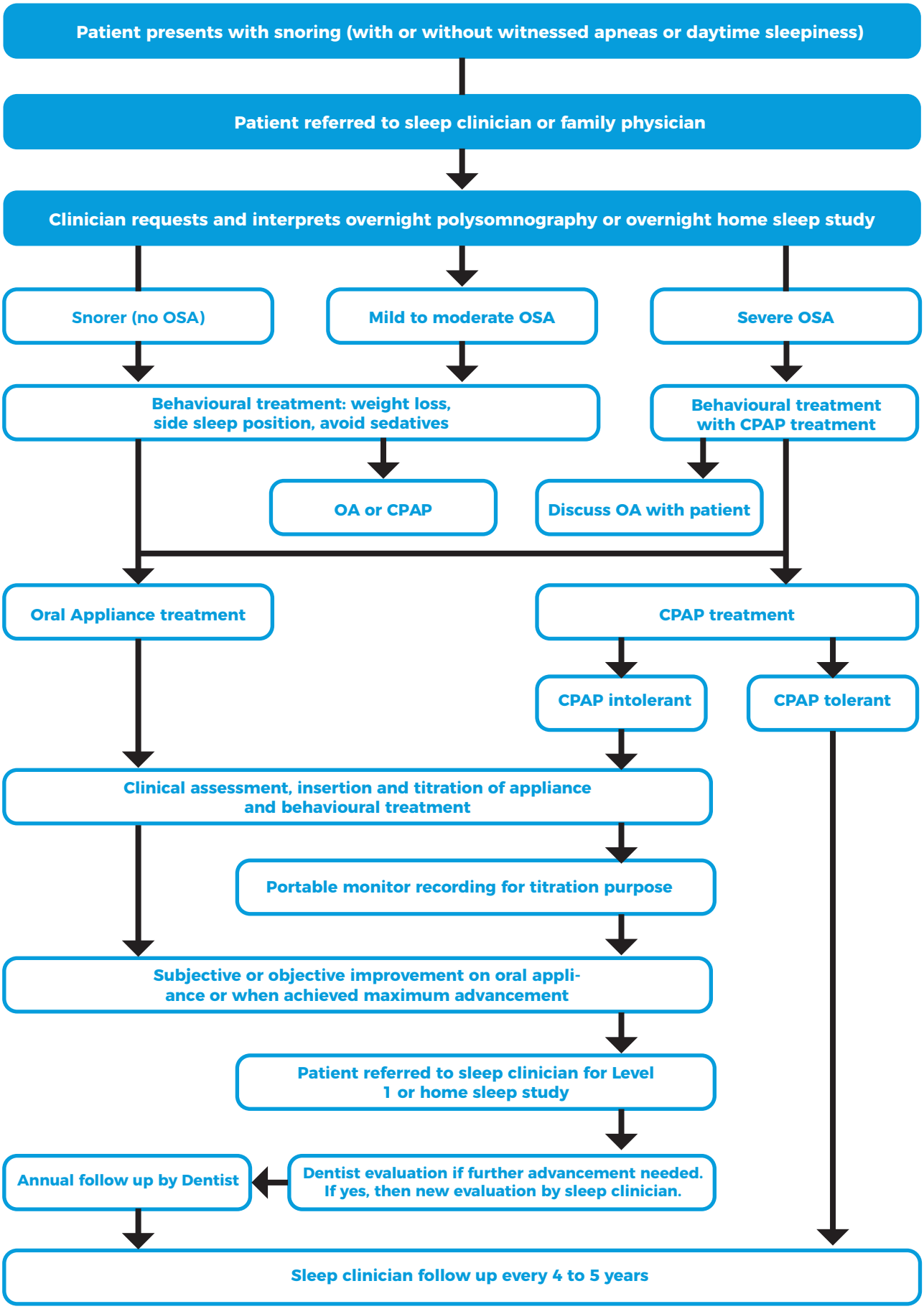
Patient Consent and Side-Effects of Oral Appliances

The dentist should explain the proposed treatment, with long-term follow-ups, to the patient and obtain the patient's consent in writing before fitting the appliance. The consent form should clearly indicate the potential and probable side-effects of using the OA and appliance longevity.

The patient should be informed that the life span of the OA is only two to three years. Consent should include that predictability of outcomes is not high and decreases as severity increases. The patient may still have OSA even if they no longer snore.

Significant and persistent temporomandibular joint problems are rare. Long-term side-effects have been described with all appliances studied mainly related to occlusal changes:

- Changes observed in craniofacial structures are mainly related to significant tooth movement. As an example, about 80% of patients who use an OA every night over a period of seven years will experience occlusal changes.
- These changes are most commonly characterized as an average 2.5 mm decrease in overjet and overbite after 10 years which may be favourable or unfavourable for the occlusion.
- Although these occlusal changes may be undesirable in certain patients, the effective treatment of a life-threatening disease such as OSA may supersede the maintenance of a baseline occlusion.
- If the patient decides that occlusal changes are undesirable, the treatment should be discontinued and the patient may accept another form of therapy from their attending sleep physician or the patient understands the risks of the discontinuation of therapy and their physician is informed.
- The correction of the occlusion with restorations, crowns and/or orthodontic treatment should be considered only if the patient has discontinued treatment and is able to use another OSA treatment, as these changes will continue, although at a slower pace, as long as the patient wears the device.
- Professional Requirements


Patient presents with snoring (with or without witnessed apneas or daytime sleepiness)
Patient referred to sleep clinician or family physician
Clinician requests and interprets overnight polysomnography or overnight home sleep study
Snorer (no OSA)
Mild to moderate OSA
Severe OSA
Behavioural treatment: weight loss, side sleep position, avoid sedatives
Behavioural treatment with CPAP treatment
OA or CPAP
Discuss OA with patient
Oral Appliance treatment
CPAP treatment
CPAP intolerant
CPAP tolerant
Clinical assessment, insertion and titration of appliance and behavioural treatment
Portable monitor recording for titration purpose
Subjective or objective improvement on oral appli-ance or when achieved maximum advancement
Patient referred to sleep clinician for Level 1 or home sleep study
Annual follow up by Dentist
Dentist evaluation if further advancement needed. If yes, then new evaluation by sleep clinician.
Sleep clinician follow up every 4 to 5 years

Pediatric OSAs

Pediatric OSAS is a form of sleep disordered breathing characterized by reduced or absence of airflow during sleep.[12] Risk factors are similar to those for adults and include adenotonsillar hypertrophy, craniofacial anomalies, obesity and certain neuromuscular disorders. The most commonly prescribed treatment for pediatric OSAS is adenotonsillectomy which is a relatively invasive procedure, may be contraindicated in certain patients and may not be effective in eradicating the condition.[12]

Oral appliances and functional orthopedic appliances have been used to treat patients with OSAS and who have a craniofacial deformity. They typically work by advancing the mandible resulting in an increase in the diameter of the upper airway leading to less risk of collapse of the soft tissues.

A Cochrane review published in 2016evaluated the effectiveness of oral appliances and functional orthopedic appliances for obstructive sleep apnea in children.[12] The authors found 686 trials most of which were of poor quality and were not included in their review. In fact, only a single study was found to meet the level of evidence required for inclusion in the review. Based on the study, the authors determined there is insufficient evidence to support or refute the effectiveness of oral appliances and functional orthopedic appliances for the treatment of OSAs in children.

Behrents et al.[13] published a comprehensive paper intended to provide guidance to practicing orthodontists in the management of adult and pediatric OSA. They concluded that in specific cases mandibular anterior repositioning appliances can produce a decrease in AHI however long-term stability of these changed have not been studied. They suggested orthodontists use these types of appliances only when a retrognathic condition exists. [13]

Based on these two papers, the position of the PDBNS is that oral appliances and functional orthopedic appliances may be considered in specific cases where orthodontics is already recommended, as an auxiliary treatment for the treatment of OSAS in children by a dentist who has advanced training in this discipline. It is mandatory to keep accurate and complete records pertaining to the diagnosis and treatment of children with oral appliances and functional orthopedic appliances. Informed consent must be obtained and clearly documented in the patient's treatment records.

Oral Appliance Therapy

The steps involved in the provision of an OA for a patient with OSA are as follows::

- Oral appliance insertion, adjustments, titration and evaluation
- Referral of patient for follow-up evaluation by the referring sleep physician and polysomnography or sleep studies that are required to verify treatment efficacy and benefits.
- Maintenance of regular written communication with the patient's sleep clinician and other healthcare professionals concerning the treatment plan, progress, and follow-up is required. The dentist should obtain a follow-up report on the treatment efficacy from the sleep clinician.
- Further titration, modification, redesign or remake of the OA, as required.
- At least annual follow-up and reassessment to assess treatment adherence and efficacy.

References

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Appendix (Informed Consent)

Important Disclaimer: The Informed Consent form does not protect you from liability generally for malpractice or negligence in the performance of medical/dental services. The Informed Consent form is only a model or guideline as informed consent is governed by the statutes and case law of individual provinces where members practice.

INFORMED CONSENT FOR THE TREATMENT OF SLEEP-RELATED BREATHING DISORDERS WITH ORAL APPLIANCE THERAPY

You have been diagnosed by your physician as requiring treatment for a sleep-related breathing disorder, such as snoring and/or obstructive sleep apnea (OSA). OSA may pose serious health risks since it disrupts normal sleep patterns and can reduce normal blood oxygen levels. This condition can increase your risk for excessive daytime sleepiness, driving and work-related accidents, high blood pressure, heart disease, stroke, diabetes, obesity, memory and learning problems, and depression.

What is Oral Appliance Therapy?

Oral appliance therapy (OAT) utilizes a custom-made, adjustable appliance specifically made to assist breathing by keeping the tongue and jaw in a forward position during sleeping hours. In order to derive the benefits of OAT, the oral appliance must always be worn when you sleep.

Benefits of Oral Appliance Therapy

OAT has effectively treated many patients. However, there are no guarantees that it will be effective for you. Every patient's case is different, and there are many factors that influence the upper airway during sleep. It is important to recognize that even when the therapy is effective, there may be a period of time before the appliance functions maximally. During this time, you may still experience symptoms related to your sleep-related breathing disorder. Additionally, durable medical equipment such as your oral appliance requires specific homecare, maintenance and periodic replacement.

Possible Risks, Side-Effects and Complications of Oral Appliance Therapy

With an oral appliance, some patients experience excessive drooling, difficulty swallowing (with appliance in place), sore jaws or teeth, jaw joint pain, dry mouth, gum pain, loosening of teeth, and short-term bite changes. It is possible to experience dislodgement of dental restorations, such as fillings, crowns and dentures. Most of these side-effects are minor and resolve quickly on their own or with minor adjustment of the appliance.

Long-term complications include bite changes that may be permanent resulting from tooth movement or jaw joint repositioning. These complications may or may not be fully reversible once OAT is discontinued. These changes are likely to continue to worsen with continued use of the device.

It is mandatory for you to complete follow-up visits with the dentist who provided your oral appliance to ensure proper fit and optimal positioning. If unusual symptoms or discomfort occur or if pain medication is required to control discomfort, it is recommended that you cease using the appliance until you are evaluated further. Follow-up assessments are necessary to assess your health and monitor your progress.

Once your oral appliance is in an optimal position, a post-adjustment assessment by your physician is necessary to verify that the oral appliance is providing effective treatment.

Alternative Treatments for Sleep-Related Breathing Disorders

Other accepted treatments for sleep-related breathing disorders include positive airway pressure (PAP) therapy, various surgical and implant procedures and positional therapy (which prevents patients from sleeping on their back instead of on their side). The risks and benefits of these alternative treatments should be discussed with your physician who diagnosed your condition and prescribed treatment.

It is your decision to choose OAT alone or in combination with other treatments to treat your sleep-related breathing disorder. However, none of these may be completely effective for you. It is your responsibility to report the occurrence of side-effects and to address any questions to this office (address below), or to your physician. Failure to treat sleep-related breathing disorder may increase the likelihood of significant medical complications and/or accidental injury. Patient's Privacy and Confidentiality

I acknowledge receipt of the office's privacy policies.

Patient Obligations and Acknowledgments

1. I understand the explanation of the proposed treatment. Further additional communication tools such as videos, pamphlets or articles may be available at my request.
2. I have read this document in its entirety and have had an opportunity to ask questions. Each of my questions has been answered to my satisfaction. If I do not understand this document, I have been offered this document in a different language or have been offered a language interpreter. My family alone is not acceptable to be my interpreter.
3. I agree that regularly scheduled follow-up appointments with my dentist (oral appliance provider) are essential. These visits will attempt to minimize potential side-effects and to maximize the likelihood of management of my OSA.
4. I understand that I must schedule a post-adjustment assessment with my physician to verify that the oral appliance is providing effective treatment.
5. I will notify this office of any changes to the OAT, my teeth and my medical condition(s).
6. I understand that I must maintain my oral appliance through regularly scheduled follow-up appointments with my general dentist and my oral appliance provider dentist, if not the same.
7. I understand that if I discontinue OAT, I agree to inform and follow up with my physician and dentist (oral appliance provider).
8. I understand that refusing to participate and cooperate as stated herein will put my health at risk.
9. I consent to treatment with a custom-made, adjustable, oral appliance to be delivered and adjusted by my dentist (oral appliance provider). I agree to follow all post-delivery and homecare instructions.
10. I understand oral appliances may need to be remade and/or repaired.
11. I understand the predictability of oral appliances decreases as the severity of the OSA increases.

Please sign and date this form to confirm your agreement with the above statements.
You will receive a copy of this document for your records, and it will be included in your patient records.

Patient Signature: _____ Date: _____

Print Name: _____

If the patient is a minor, please sign as the parent or legal guardian.

Signature: _____ Date: _____
PARENT OR LEGAL GUARDIAN

Print Name: _____

Witness Signature: _____ Date: _____

Print Name: _____

Dentist Acknowledgment

Signature: _____ Date: _____

Print Name: _____

Office Name, Address and Contact Information:

_____

_____

The Standard of Practice for Treatment of Snoring and Obstructive Sleep Apnea with Oral Appliances, developed by the College of Dental Surgeons of British Columbia (CDSBC) and approved by Council in September 2013, has been modified with permission for use by the Provincial Dental Board of Nova Scotia (PDBNS).

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