

MedSleep's network of clinics is committed to providing the highest quality sleep medicine services across Canada.

We provide clinical consultation, diagnostic services (sleep testing) and treatment for the full spectrum of sleep disorders.

The initial clinic, Toronto Sleep Institute, was founded in 2004 with the goal of bringing together a multidisciplinary medical team to provide comprehensive diagnosis and integrated treatments for sleep disorders. With the success of the initial clinic, additional sites were opened in Thornhill, Edmonton, Calgary, Halifax and Moncton.

In 2011, the Niagara Snoring and Sleep Clinic and Queensway Sleep Laboratory were added to the organization, and in April of 2012, Limestone City Sleep Lab in Kingston, Ontario also joined the Medsleep team.

In BC, the Nanaimo Sleep Clinic joined in 2013, and we also opened an office in Duncan to serve the southern part of Vancouver Island.

Prince George, BC was opened in December 2014, quickly followed by Vancouver in March 2015.

We joined forces with the Pembroke Regional Hospital and opened a new 3-bed state of the art lab in May 2015. This was followed up with the addition of the Don Mills, Ontario lab in July 2015. Our Victoria, BC clinic opened in March 2016 and quickly followed by our new 6-bed lab in Milton, Ontario which opened in July 2016.

In 2017, we added our newest overnight PSG sleep lab in Penticton, BC, and have also expanded our footprint in the Vancouver/Lower Mainland BC area.

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## Risk Factors for CPAP Non-compliance

### ① Lack of subjective improvement

A general improvement in daytime activity after the implementation of CPAP has been associated with four-fold improvement in CPAP compliance. Despite the many health-related benefits that are described to our patients, if they don't generally feel better, they are more likely to abandon therapy.

### ② The absence of daytime sleepiness

Patients with significant premorbid sleepiness are almost twice as compliant as those with no significant daytime impairment prior to the implementation of CPAP.

### ③ Anxiety & depression

Premorbid personality plays an important role. It has been shown that anxious, depressed, and socially inhibited patients have a lower adherence to CPAP and mandibular advancement devices (oral appliances).

These individuals are more likely to have medical comorbidities, a decreased personal view of their own health, decreased physical functioning and poor psychosocial functioning. Their subjective perception of a symptom or side-effect does not always adequately reflect the actual severity, and they

are more likely to complain of dry throat, mask leaks, congestion and low treatment efficacy.

### ④ The use of antidepressant medications

Studies have shown that the use of antidepressants is associated with long-term non-compliance. These patients require more careful and frequent monitoring.

### ⑤ Lack of a bed partner

Patients with witnessed apneas and snoring complaints by the bed partner are four times more likely to remain compliant with their CPAP therapy. Single patients sleeping alone require more careful monitoring.

### ⑥ Dissatisfaction with the CPAP provider

Professionals working in these retail environments can often resolve small issues and provide useful tips to make the CPAP experience more comfortable and acceptable to the patient. Although the patient is generally responsible for choosing a CPAP provider, they can shop around to find the best fit.

In the end, all patients on CPAP therapy require follow-up in the Sleep Clinic (especially in the early days of therapy). The continued monitoring and encouragement from the family health-care team is also an important element to maximize long-term compliance. ♦

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See all our locations across Canada at [www.medsleep.com](http://www.medsleep.com) or call 1-877-544-1418

# Caffeine is an adenosine antagonist

- caffeine causes inhibition of histamine projections
- histamine is an inhibitory neurotransmitter in the brain thus caffeine produces an alerting effect

- Onset of action: 15-45 minutes
- Maximum blood levels: 1 hour
- Duration of action also quite variable
- Half-life: 3-7 hrs (but extremely variable)
  - smoking cuts in half
  - oral contraceptives double it
  - pregnancy can increase it 5-fold

**BOTTOM LINE: caffeine after 12 noon may negatively affect sleep!**

## CAFFEINE CONTENT OF COMMON BEVERAGES

Beverage	Caffeine Content	Serving Size
Instant coffee	66-74 mg	150 ml
Brewed coffee	146 mg	150 ml
Decaffeinated brewed coffee	3-9 mg	150 ml
Weak tea (1-min brew)	19-28 mg	140 ml
Strong tea (5-min brew)	38-70 mg	140 ml
Green tea	15 mg	140 ml
Iced tea	22-36 mg	240 ml
Cola soft drink	47 mg	360 ml
Cocoa	0-16 mg	217 ml

## COMPARISON OF MAJOR CANADIAN CHAINS: CAFFEINE CONTENT/COST PER CUP

Company	Size	Oz.	Mg of caffeine /oz.	Mg of caffeine	\$ Price	\$ Price /Mg of caffeine	Average
Second Cup	S	16	312	19.5	1.60	0.08	10 cents/ Mg of caffeine
	M	20	391	19.55	1.85	0.09	
	L	24	468	19.5	2.05	0.11	
Starbucks	Short	8	180	22.5	1.60	0.07	9 cents/ Mg of caffeine
	Tall	12	260	21.67	1.80	0.08	
	Grande	16	330	20.63	1.95	0.09	
	Venti	20	415	20.75	2.30	0.11	
Tim Hortons	S	8	80	10.0	1.17	0.12	14 cents/ Mg of caffeine
	M	10	100	10.0	1.27	0.13	
	L	14	140	10.0	1.50	0.15	
	XL	20	200	10.0	1.64	0.16	
Timothy's	S	12	200	16.67	1.72	0.10	12 cents/ Mg of caffeine
	M	16	272	17.0	1.96	0.12	
	L	20	320	16.0	2.15	0.13	



## Blue Light Filtering Glasses



Blue Light Filtering Glasses are most commonly used to help advance the onset of sleep in those who have difficulty falling asleep at a desired time, whether due to genetic or environmental factors. These people complain of suffering from excessive sleepiness in the morning and daytime fatigue.

Recently, blue light filtering glasses have shown the ability to mitigate the effects of night time light exposure in such individuals (Van der Lely et al). It is now known that evening blue light has a direct alerting effect and also suppresses the normal rise of melatonin at that time that helps to trigger the onset of sleepiness. This effect is because the circadian system in the hypothalamus is cued by input from a specific set of photosensitive ganglion cells that are highly sensitive to blue light.



MedSleep has recently been exploring the use of such glasses with a local company called Somnitude, which produces the blue blocking glasses. This may represent an interesting additional and inexpensive option for the treatment of patients with chronic sleep onset insomnia or sleep disruption related to shiftwork. ♦

# In-Home Sleep Studies: WHAT YOU NEED TO KNOW

**I**N 2014, THE CANADIAN MEDICAL ASSOCIATION JOURNAL published a summary of research comparing the diagnostic accuracy of level three portable sleep tests versus level one polysomnography for sleep-disordered breathing.

The Level I sleep study is an in-laboratory (overnight) polysomnogram with a health care professional in attendance; Level I sleep studies measure sleep stages and many other physiological parameters. They are required to diagnose many non-respiratory sleep disorders and involve monitoring multiple channels. They also provide more comprehensive information on sleep disordered breathing than Level III studies. The Level III sleep study is an in-home, unattended sleep study using a portable monitoring device that monitors at least 4 channels, including at least 2 respiratory channels, heart rate or single channel electrocardiogram, and pulse oximetry (not on all systems).

Although the in-home testing sounds ideal, the Level I in-lab study is still considered to be the gold standard, and remains the cornerstone for the diagnosis in patients suspected of having comorbid sleep disorders, unstable medical conditions or complex sleep disordered breathing disorders. In-home testing is best for

detecting straight forward severe (and perhaps moderate) obstructive sleep apnea only.

Although some claim that the Level III devices give all of the information required to initiate treatment with continuous positive airway pressure (CPAP) therapy, it is essential that these studies be reviewed by a qualified sleep technician and the results interpreted by a sleep-trained physician, in conjunction with additional patient data from screening questionnaires and a clinical history.

As technology moves forward, Level III sleep studies may eventually rival Level I sleep studies in terms of comprehensive data collection. However, as the testing becomes easier to implement, the analysis and interpretation of the data must remain in the hands of health care professionals with comprehensive training in sleep disorders medicine in order to minimize the risk false positive and negative findings. ♦



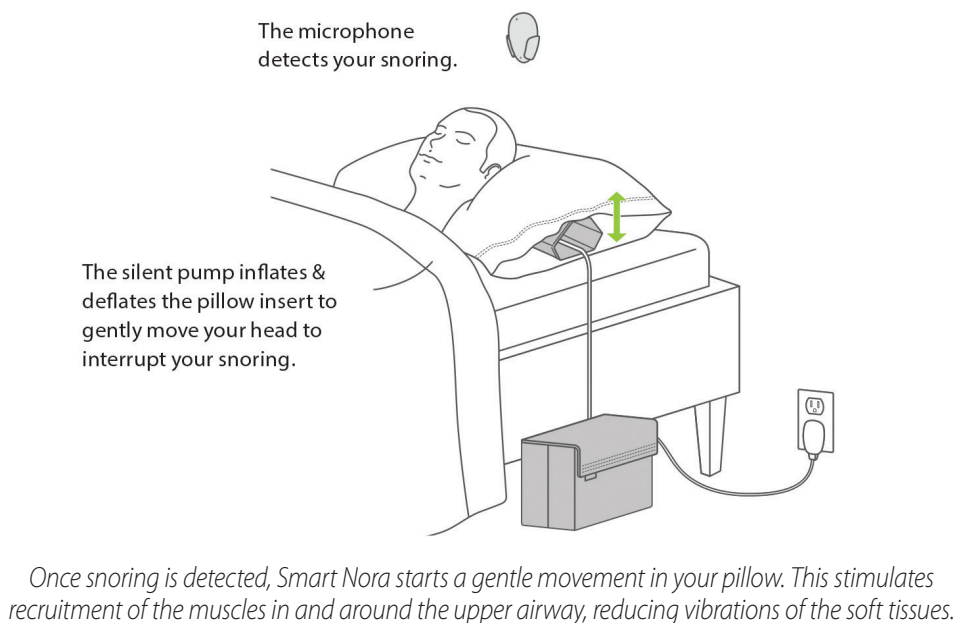
# Primary (non-apneic) Snoring

## QUICK REVIEW AND POSSIBLE NEW SOLUTION

There are several factors which facilitate snoring. First, the normal aging process leads to reduced muscle tone of the muscles in and around the airway, thus increasing airway vibration. Anatomical abnormalities of the nose and throat, such as enlarged tonsils or adenoids, nasal polyps, or deviated nasal septum cause exaggerated narrowing of the throat during sleep and can worsen snoring. Functional abnormalities (e.g., inflammation of the nose and/or throat as may occur during respiratory infection or during allergy season) will result in snoring. Sleep position, especially supine, may lead to snoring in some people, although head position may also be an influence. Alcohol relaxes the muscles around the upper airway, and ingestion close to bedtime will exacerbate snoring. Muscle relaxants taken in the evening may lead to or worsen snoring in some individuals. One of the most important risk factors is obesity, especially when associated with a large neck girth.

Snoring is known to cause sleep disruption, both to the snorers and those around them. This can give rise to non-restorative sleep, associated with daytime sleepiness and lack of focus. It has also been suggested that it can have a significant psychological and social impact on those that snore. Multiple studies reveal a positive correlation between loud snoring and risk of heart attack (about +34% chance) and stroke (about +67% chance). However, snoring may be less of a cause, and more of a co-morbid feature.

Though snoring is often considered a minor affliction, snorers can sometimes suffer severe impairment of lifestyle. Several studies have a statistically



significant improvement in marital relations after snoring was effectively managed.

New studies associate loud snoring with the development of carotid artery atherosclerosis. It has been demonstrated that snoring vibrations are transmitted to the carotid artery, identifying a possible mechanism for snoring-associated carotid artery damage and atherosclerotic plaque development. These researchers also found amplification of the snoring energy within the carotid lumen at certain frequencies had a compounding influence. Vibration of the carotid artery with snoring also lends itself as a potential mechanism for atherosclerotic plaque rupture and consequently ischemic stroke. Researchers also hypothesize that loud snoring could create turbulence in carotid artery blood flow. Excessive turbulence irritates blood cells and has previously been implicated as a cause of atherosclerosis. Although causation is implied, further research is required to clarify this hypothesis.

There have been many devices brought to market for the management of primary snoring. These included mandibular advancing devices, tongue retainers, nasal valves, chin straps, lubricants, and vibrational alarms. All of these solutions have been shown to be of limited benefit, too expensive, or too uncomfortable to tolerate. Surgical options are notoriously ineffective in the long run.

A new device is getting very good reviews by the users, and by some of our patients. Although it has not been rigorously tested in the sleep lab, the reported subjective benefit, both from the snorers and the bed partners, is encouraging.

Equipped with a smart sensor, Smart Nora listens for early sounds of snoring throughout the night before they become loud enough to wake the sleeping partner. Once snoring is detected, Smart Nora starts a gentle movement in your pillow. This stimulates recruitment of the muscles in and around the upper airway, reducing vibrations of the soft tissues. ♦

# Pros and Cons of Dental Sleep Apnea Treatment Devices

**C**ONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP) continues to be the gold standard therapy for the treatment of clinically significant obstructive apnea.

For a variety of reasons, some patients are unable to adapt to CPAP therapy. It's always worth carefully following up with these patients, as an incorrect pressure setting or poor mask choice can be an essential factor. Most patients are less concerned about the medical benefits, and focus more on subjective benefits, as well as relief from bed-partner interference from snoring seem to be the biggest determinants of compliance. In the end, there are still those patients who just cannot tolerate any of the various CPAP modalities. This is usually the point at which alternative therapies are recommended, and oral appliances (mandibular advancing devices) are the next best thing for some patients.

## How do oral appliances treat sleep apnea?

Oral appliances (OAs), fit by qualified dentists, can be an efficacious alternative treatment. A recent review article published in *Chest* (Hamoda M, et al. 2018) found that OAs were an effective therapy and significantly improved patients' sleep apnea. However, in all studies, CPAP was superior to OAs in terms of reducing obstructive events on polysomnography, and improving nocturnal oxygen saturation and arousals. Although CPAP consistently demonstrates normalization of AHI, this is not necessarily the case with OAs. However, this greater efficacy of CPAP does not necessarily translate into better health outcomes. Randomized controlled trials comparing CPAP with OAs and varying in baseline OSA severity from mild to severe have shown similar results in improving symptoms such as sleepiness, quality of life, and simulated driving performance. In terms of cardiovascular outcomes, there were no differences between the two treatments with respect to short-term effects on blood pressure and reducing the risk of mortality in patients with severe OSA. This comparable effectiveness has been attributed, in theory, to differences in adherence rates. However, to our knowledge, no trial has objectively compared adherence to both treatments and the effect of this adherence on long-term effectiveness.

Different OA designs currently exist, and more are constantly emerging. Additionally, state-of-the-art technologies are being used in the fabrication of many; however, all the currently available OAs employ the same mechanism of action by targeting

the anatomical component involved in the pathogenesis of the disease, that is, keeping the airway open during sleep by advancing the mandible and/or stabilizing the tongue, thereby preventing it from collapsing and blocking the normal flow of air during breathing. Furthermore, the scope of use of OAs is expanding to include patients who are edentulous. For patients with OAs, the dentist is a member of an interdisciplinary team managing OSA, and constant communication and follow-up with the sleep physician and other team members is necessary for optimal management.

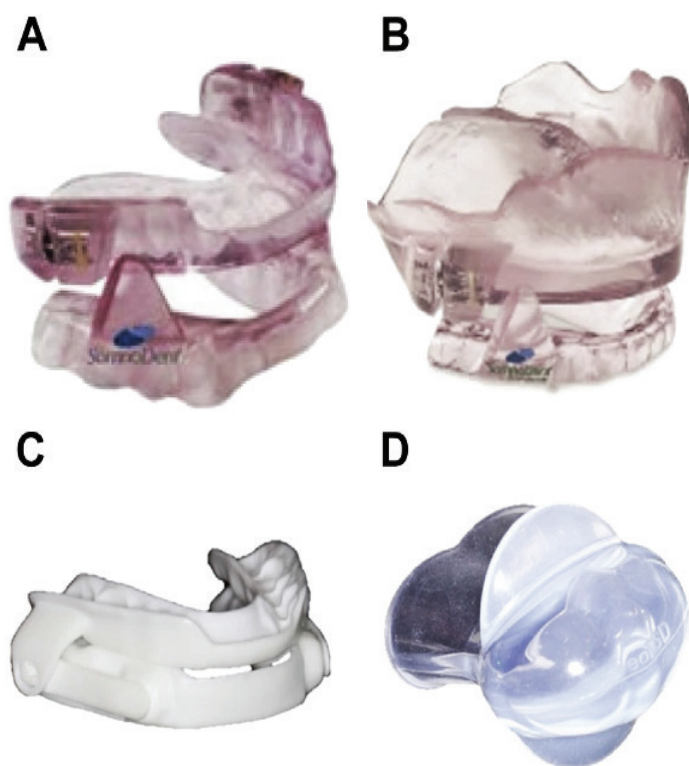


Figure 1 – Examples of commercially available oral appliances.

**A - SomnoDent Flex**, a custom-made oral appliance that moves the mandible forward (OAm) for the dentate patient.

**B - SomnoDent Edentulous**, a custom-made OAm for patients with an edentulous maxilla.

**C - Narval**, a custom-made OAm for the dentate patient.

**D - AveoTSD**, a prefabricated Tongue Stabilizing Device (TSD).

– See Pros and Cons page 6 ... /

## Pros and Cons of Dental Sleep Apnea Treatment Devices

*/... Continued from page 5*

### The two most general categories of dental devices can be broken down into:

1. Mandibular (lower jaw) advancing devices
2. Tongue retaining devices

### 3 things apnea dental devices do to treat sleep apnea symptoms:

1. Hold the airway open by bringing the lower jaw slightly forward
2. Hold the tongue in such a manner that it is prevented from falling backwards during sleep, causing airway obstruction
3. Or doing both of these actions simultaneously

### Pros of Sleep Apnea Dental Appliances:

- Effectively works for those who travel a lot and require portability
- Provides a non-electrical option for camping
- Great for mild obstructive apnea, especially where snoring is a major issue

### Cons of Sleep Apnea Dental Appliances:

- Can be uncomfortable to wear
- Less effective at treating severe obstructive sleep apnea
- May cause problems with the temporomandibular joint
- May cause tooth migration or changes in bite
- May cause excessive salivation (particularly tongue retaining devices)
- Most of the time, oral appliances are not covered by extended medical plans, and they are never covered by any of the provincial insurance plans. Since a dental professional is required to properly fit most devices, they are fairly costly (\$1000 to \$2500 on average).
- Unlike CPAP, patients cannot be provided with a loaner trial to determine compliance and efficacy.

Even though many different treatment modalities are available for managing OSA, CPAP and OAs are the most commonly used disease-specific therapies. CPAP has the advantage of greater efficacy, yet OAs remains a viable and promising treatment option that in some cases has better patient adherence and acceptance.

There is currently no single variable that can reliably predict treatment outcome with OAs (e.g., radiographs, oral examination, ENT assessments, etc). There is also no sole determinant of treatment success.

However, a constellation of features exist that, if present or absent, can possibly give an indication of treatment response.

Similarly, there is no single ideal OA design; an ideal appliance is custom made, protrudes the mandible, keeps the vertical opening to a minimum, and can be adjusted to achieve the optimum efficacy whilst being comfortable and well tolerated. ♦

# MedSleep

## IMPROVING HEALTH THROUGH BETTER SLEEP

**MedSleep's network of clinics is committed  
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