

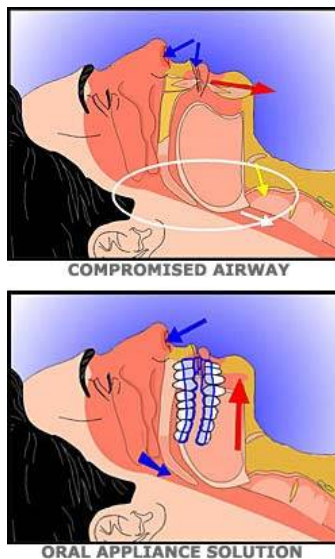
DENTIST'S INVOLVEMENT IN SNORING AND SLEEP APNEA PART 2

Dr. Brock Rondeau, D.D.S., I.B.O., D.A.B.C.P

Oral Appliances

Oral appliances are extremely effective in eliminating snoring and OSA particularly in the patients with mild to moderate OSA¹⁸. They function by moving the lower jaw and consequently the tongue forward to open up the airway¹⁶. They hold the lower jaw forward when the patient sleeps on their back which keeps the airway open all night. The literature is replete with articles regarding the effectiveness of different oral appliances¹⁹. It should be stressed to the patient that oral appliances are extremely comfortable to wear.

SLEEP APNEA



Three different oral appliances that are utilized to prevent snoring and OSA include Dorsal, EMA and Silent Nite Appliance. The appliances all work essentially the same way by gradually moving the lower jaw forward in small increments and increasing the vertical dimension which ultimately increases the size of the pharyngeal airway.

In the case of the Dorsal appliance, the mandible is gradually and painlessly moved forward by turning the two side screws. The EMA appliance is adjusted by changing the straps on the side of the appliances. The Silent Nite appliance is adjusted by changing the arm size and arm length which gradually advances the mandible comfortably. When a thorough examination of the nasal airway and oropharyngeal airway (mouth area) reveals that there are no obstructions, oral

appliances are extremely effective. The reason for this is that in approximately 66% of the cases the obstruction occurs at the base of the tongue.

**DORSAL APPLIANCE
TWO PIECE APPLIANCE**



**EMA
ELASTIC MANDIBULAR
ADVANCEMENT APPLIANCE**

It is imperative that dentists learn to treat patients with mild to moderate OSA and those who cannot tolerate the CPAP device²⁰. There are thousands of patients who have been diagnosed with OSA and cannot wear the CPAP. The health of these patients is continuing to deteriorate and their life expectancy shortened and the dental profession holds the key to their treatment.

I have treated many patients with severe OSA who could not wear the CPAP device and successfully reduced their apneic events below 5 times per hour, which is normal. This treatment certainly improves their health and prolongs their life by reducing their blood pressure and their susceptibility to heart attack, stroke and Type 2 Diabetes²¹.

Opportunity for dentists to make highways safer for everyone.

Crashes involving commercial truck drivers are a significant health hazard causing thousands of deaths and injuries each year, with driver fatigue and sleepiness being the major causes.

In the American Journal of Respiratory and Critical Care Medicine it was reported in 2004 that as many as 41% of the major crashes of commercial vehicles were due to driver sleepiness. In 2001 large trucks were involved in 429,000 crashes and nearly 5,000 were fatal²². Due to the obesity epidemic today, if the study was done in 2010 the incidence, I am certain, would be much higher indeed.

Today there is an increasing awareness that drowsy drivers suffering from obstructive sleep apnea cause more traffic accidents than drunk drivers. Many years ago the laws regarding drinking and driving were not as stringent as they are today. Organizations such as MADD (Mothers Against Drunk Driving) have helped convince the police and driver licensing agencies to send drivers to jail

who are guilty of this offence. In the U.S. and Canada there is some discussion about mandatory testing for sleep apnea for all commercial truck drivers.

There has been numerous sleep studies done on commercial drivers with results ranging from 12% - 80% of the drivers being diagnosed with OSA. Obesity and age are two important factors. The older and more obese the drivers the higher incidence of OSA and in particular, severe OSA.

The problem is one of education and compliance. In one study they found 17% of the drivers were diagnosed with OSA. Of the 53 drivers that were confirmed to have OSA only 1 driver complied with the treatment recommendations²³. The drivers are obviously worried that if diagnosed with OSA they could lose their drivers license which is essential for their livelihood. It is important for the medical and dental professions to educate the truck drivers that OSA is a treatable medical disorder. Someone needs to educate them regarding the consequences of not being treated.

1. Their own health can be seriously compromised if they do not get the problem resolved. In cases of severe obstructive sleep apnea, life expectancy is reduced by 8-18 years. They have an increased risk of high blood pressure, heart disease, strokes, type 2 diabetes and acid reflux.
2. If they fall asleep at the wheel they could kill or injure themselves or other drivers or passengers.

Dr. Philip Parks, medical director of Lifespan employee health and occupational services stated "It is well known that obesity, a leading risk factor for obstructive sleep apnea is on the rise in the United States. Truck drivers with sleep apnea have a seven-fold increased risk of being involved in a motor vehicle crash."²⁴

It has been estimated that as many as 3.9 million licensed commercial drivers in the U.S. have OSA. As mentioned previously, the problem is that commercial drivers are not educated or motivated to seek treatment for this medical condition. Is it any wonder when you consider how well the average medical or dental school has educated its students in the past. Many medical schools reported less than 1 hour of training in sleep disordered breathing in 4 years of medical school. I am encouraged by the fact that this is changing in more recent medical school curriculums. Most dental schools do not teach anything in this extremely important subject. Based on the above, Dr. Park's conclusion was that "It is possible that many of the 14 million truck drivers on American highways have undiagnosed and untreated sleep apnea."

Obviously this problem is extremely serious and needs to be addressed immediately in order to save more lives and prevent injuries. The employers of truck drivers in my opinion should encourage all of their drivers to get an overnight sleep study (PSG) to diagnose the absence or presence of OSA.

Employers must be aware of the liability issues and the potential repercussions that could occur if one of their drivers fell asleep at the wheel while driving one of their trucks that was involved in a fatal MVA (Motor Vehicle Accident). Perhaps dentists involved in Sleep Disorder Dentistry should approach trucking companies in their area in order to encourage them to educate, diagnose and treat their drivers if they have OSA.

One of the main problems today is that if the government ordered all 14 million truck drivers in the U.S. to be tested for OSA, there are not enough available sleep labs to do the sleep studies. Similarly, there are not enough dentists to treat all the patients. At the present time there are 165,000 dentists in the U.S and Canada of which approximately 1,800 are members of the American Academy of Dental Sleep Medicine. Dentists who take courses now and increase their skill level in this area I think will be extremely busy when the government decides to proceed with mandatory OSA testing for commercial drivers. Commercial airline pilots have mandatory testing now and I think that in the near future you will see this also applied to commercial truck drivers.

While this problem is being solved I would recommend the following.

1. Encourage all your patients who are commercial truck drivers to get a sleep study to see if they are diagnosed with OSA. If they do have sleep apnea, encourage them to get treated.
Mild to moderate OSA recommend oral appliances.
Severe OSA recommend CPAP as their first option.
Remind them that OSA is a completely treatable medical disorder.
2. Encourage all your patients who snore or who have a score higher than 7 on the Epworth Sleepiness Scale to have a sleep study to diagnose the presence of OSA.
3. If you are on the highway, particularly at night, do not drive too closely to trucks due to the high incidence of truckers with OSA which causes significant sleepiness and more accidents.

Conclusion

The prevalence of obstructive sleep apnea is exceedingly high in all first world countries including the U.S. and Canada due to the obesity epidemic. An estimated 25% of males and 9% of females will develop OSA (Obstructive Sleep Apnea) in their lifetime²⁵. I believe it is the obligation of the dental profession to

learn how to diagnose and treat these patients. As I mentioned previously, there are only 3 ways to treat OSA; oral appliances, CPAP and surgery. While some patients may need a combination treatment, oral appliances are certainly the preferred option chosen by most patients (Non-Invasive, Reversible). The problem with the CPAP and BiPAP devices is that the compliance rate is only 60% after 1 year²⁶. Therefore, literally thousands of patients are seeking alternate forms of treatment. Compounding this enormous problem is that it is estimated that 85% of the patients with OSA are undiagnosed.

Dentists who wish to treat this medical disorder seriously must utilize various sleep health questionnaires including the Epworth Sleepiness Scale (enclosed with article). I recommend interested dentists to take courses and learn how to utilize various diagnostic devices including the rhinometer, pharyngometer and Embletta 100 as previously discussed. Patients with whom you are suspicious of possible OSA must be referred to their primary care physicians and sleep specialists for overnight sleep studies in order to make a diagnosis. For mild to moderate cases of OSA, oral appliances are the first treatment option.

The compliance rate for oral appliances is extremely high in our office at over 95%. Many of the patients who fail with CPAP are not even made aware by some sleep specialists and medical doctors of the existence or efficacy of oral appliances. It is the dental professions responsibility to help educate our medical colleagues regarding oral appliances and also to work with them to help solve obstructive sleep apnea which has truly become a health epidemic.

EPWORTH SLEEPINESS SCALE

The Epworth Sleepiness Scale (ESS) was developed and validated by Dr. Murray Johns of Melbourne, Australia. It is a simple, self-administered questionnaire and widely used by sleep professionals in quantifying the level of daytime sleepiness.

(Johns, M.W. "A new method for measuring daytime sleepiness: The Epworth Sleepiness Scale." *Sleep* 14 (1991): 540-545.)

NAME _____ DATE _____

How likely are you to doze off or fall asleep in the following situations, in contrast to feeling 'just tired'? This refers to your usual way of life at present and in the recent

past. Even if you have not done some of these things recently, try to work out how they would have affected you.

Use the following scale to choose the most appropriate number for each situation:

0 = Would never doze
1 = Slight chance of dozing

2 = Moderate chance of dozing
3 = High chance of dozing

<i>SITUATION</i>	CHANCE OF DOZING
Sitting and reading	_____
Watching television	_____
Sitting, inactive in a public place (e.g. theatre, meeting)	_____
As a passenger in a car for an hour without a break	_____
Lying down to rest in the afternoon when circumstances permit	_____
Sitting and talking to someone	_____
Sitting quietly after lunch without alcohol	_____
In a car, while stopped for a few minutes in traffic	_____
TOTAL SCORE	_____

0-7

It is unlikely that you are abnormally sleepy

8-9

You have an average amount of daytime sleepiness

10-15

You may be excessively sleepy, depending on the situation, and may want to consider seeking medical attention

16-24

You are excessively sleepy and should consider seeking medical attention

1. Fanfulla F, Malaguti S, Montagna T, et al. Erectile dysfunction in men with obstructive sleep apnea: An early sign of nerve involvement. *Sleep*. 2000;23:775-81.
2. Lee SA, Amis TC, Byth K, Larcos G, Kairaitis K, Robinson TD, Wheatley JR, "Heavy snoring as a cause of carotid artery atherosclerosis", *SLEEP* 2008;31(9):1207-1213.
3. Lacasse Y, Godbout C, Series F. Health-related quality of life in obstructive sleep apnea. *Eur Respir J*. 2002;19:499-503.
4. Harris MI, Flegal KM, Cowie CC, et al. Prevalence of diabetes, impaired fasting glucose, and impaired glucose tolerance in U.S.

adults. The third national health and nutrition examination survey, 1988-1994, *Diabetes Care*. 1998;21:518-24.

5. Somers VK, White DP, Amin R, Abraham WT, Costa F, Culebras A, Daniels S, Floras JS, Hunt CE, Olson LJ, Pickering TG, Russell R, Woo M, Young T. Sleep apnea and cardiovascular disease: an American Heart Association/American College of Cardiology Foundation scientific statement from the American Heart Association Council for High Blood Pressure Research Professional Education Committee, Council on Clinical Cardiology, Stroke Council and Council on Cardiovascular Nursing Council. *J Am Coll Cardiol* 2008;52:686-717.
6. Babu AR, Herdegen J, Fogelfeld L, et al., "Type 2 diabetes, glycemic control and continuous positive airway pressure in obstructive sleep apnea", *Arch Intern Med*, 165, 447-452, 2005
7. Jean-Louis, G, Zizi, F, Clark LT, Brown, CD, McFarlane, SI, "Obstructive Sleep Apnea and Cardiovascular Disease: Role of the Metabolic Syndrome and Its Components", *J. Clin Sleep Med* 2008: 4(3):261-272.
8. Young t, Finn L, Kim H. Nasal obstruction as a risk factor for sleep disordered breathing. *Journal of Allergy and Clinical Immunology* 1997;99(2):S757-S62.
9. Austin C, Foreman J,. Acoustic rhinometry compared with posterior rhinomanometry in the measurement of histamine-and bradykinin-induced changes in nasal airway patency. *British Journal of Clinical Pharmacology* 1994;37(1):33.
10. Hilberg O, Jackson A, Swift D, Pedersen O. Acoustic rhinometry: evaluation of nasal cavity geometry by acoustic reflection. *Journal of applied physiology* 1989;66(1):295-303.
11. Austin C, Foreman J,. Acoustic rhinometry compared with posterior rhinomanometry in the measurement of histamine-and bradykinin-induced changes in nasal airway patency. *British Journal of Clinical Pharmacology* 1994;37(1):33.
12. Gelardi M, del Giudice A, Cariti F, Cassano M, Farras A, Fiorella M, et al. Acoustic pharyngometry: clinical and instrumental correlations in sleep disorders. *Evista Brasileira de Otorrinolaringologia* 2007;73:257-65.

13. Taché, D., Utilizing Acoustic Pharyngometry to Improve Efficacy of Hybrid Therapy in the Management of an Unresponsive Severe CPAP-intolerant Patient, *The Sleep Magazine*, 2010, 9-14.
14. Cistulli PA, Gotsopoulos H, Marklund M, Lowe AA. Treatment of snoring and obstructive sleep apnea with mandibular repositioning appliances. *Sleep Medicine Reviews* 2004;8(6):443.
15. Kushida CA, Morgenthaler TI, Littner MR, Alessi CA, Bailey D, Coleman Jr J, et al. Practice parameters for the treatment of snoring and obstructive sleep apnea with oral appliances: an update for 2005. *Sleep* 2006;29(2):240.
16. Chung, F., Liao, P., Yuming, S., Amirshahi, B., Hoda, F., Colin, M., Chapiro and Hisham Elasad., Perioperative practical experiences in using a level 2 portable polysomnography, *Sleep and Breathing*, March 2010, 1522-1709.
17. Engleman, et al: Compliance with CPAP therapy in patients with sleep apnea/hypopnea syndrome, Respiratory Medicine Unit, City Hosp, Edinburgh EH10 5SB.
18. Kushida CA, Morgenthaler TI, Littner MR, Alessi CA, Bailey D, Coleman Jr J, et al. Practice parameters for the treatment of snoring and obstructive sleep apnea with oral appliances: an update for 2005. *Sleep* 2006;29(2):240.
19. Gindre, L., Gagnadoux, F., et al., Mandibular Advancement for Obstructive Sleep Apnea: Dose Effect on Apnea, Long-Term Use and Tolerance., *Respiration*, 2009;76(4):386-92.
20. Chan, AS., Cistulli, PA., Oral Appliance Treatment of Obstructive Sleep Apnea, *Curr Opin Pulm Med.*, 2009.
21. Somers VK, White DP, Amin R, Abraham WT, Costa F, Culebras A, Daniels S, Floras JS, Hunt CE, Olson LJ, Pickering TG, Russell R, Woo M, Young T. Sleep apnea and cardiovascular disease: an American Heart Association/American College of Cardiology Foundation scientific statement from the American Heart Association Council for High Blood Pressure Research Professional Education Committee, Council on Clinical Cardiology, Stroke Council and Council on Cardiovascular Nursing Council. *J Am Coll Cardiol* 2008;52:686-717.
22. Philip D. Parks, MD, MPH, MOccH; Gerardo Durand, MD; Antonios J. Tsismenakis, MA; Antonio Vela-Bueno, MD; Stefanos N. Kales, MD,

MPH. Screening for Obstructive Sleep Apnea During Commercial Driver Medical Examinations. *Journal of Occupational and Environmental Medicine*, March 2009, Vol. 51, Issue 3.

23. Lifespan (2009, March 12). Obesity Linked to Dangerous Sleep Apnea In Truck Drivers., ScienceDaily, Retrieved May 10, 2010, from <http://222.sciencedaily.com/releases/2009/02/090311111002.htm>.
24. Philip D. Parks, MD, MPH, MOcch; Gerardo Durand, MD; Antonios J. Tsismenakis, MA; Antonio Vela-Bueno, MD; Stefanos N. Kales, MD, MPH. Screening for Obstructive Sleep Apnea During Commercial Driver Medical Examinations. *Journal of Occupational and Environmental Medicine*, March 2009, Vol. 51, Issue 3.
25. Young T, Evans I, Finn I, Palta M, Estimation of the clinically diagnosed proportion of sleep apnea syndrome in middle-aged men and women, *SLEEP* 1997; 20:705-6.
26. Engleman, et al: Compliance with CPAP therapy in patients with sleep apnea/hypopnea syndrome, Respiratory Medicine Unit, City Hosp, Edinburgh EH10 5SB.