

THE DENTIST'S ROLE IN THE TREATMENT OF SNORING AND OBSTRUCTIVE SLEEP APNEA (OSA)

Dr. Manuel Farill-Guzman*

Dr. Marcela Vivanco Topete**

Summary: The modern and well-trained dental surgeon plays an important role in resolving obstructive respiratory problems that occur during sleep as long as he/she is well prepared and willing to work in an ethical manner as part of a multidisciplinary medical team. The use of a Mandibular Advancement Prosthesis (MAP) during sleep, in appropriately selected cases, can alleviate up to 94% of the problems produced by obstructive sleep apnea and by snoring. When these problems are not controlled they can produce serious health consequences – even death – in the person who suffers from these disorders.

According to the International Classification of Sleep Ailments (1) the field of sleep medicine studies and treats more than 84 different ailments. While many of them are serious and others are incurable, most are considered mild. The field of sleep medicine addresses the problems that affect at least one third of our life. It represents a new field of medicine with its own knowledge base, challenges, emotions and opportunities. For more than a decade this field has been open to responsibly trained (2) dental surgeons so they can treat bruxism and obstructive respiratory problems that occur during a patient's sleep. The following are these problems beginning with the least serious.

Upper Air Passage Resistance Syndrome

This is a syndrome that in general is characterized by the patient having to make additional efforts to breathe properly during sleep. As in almost all of the obstructive respiratory problems, the problem lies in a deformation of the oral and throat tissues. It occurs in individuals with narrow or triangular-shaped dental arcs. Not all individuals with this description suffer from snoring or sleep apnea but they do have a higher risk in the future.

Snoring disorder with or without apnea – also called “simple snoring disorder”, are two of the topics of this paper and will be addressed at the end of this list.

*Private practice in dentistry, Director of Snoring Treatment Center, Mexico, Member ADM, ADDF, Somimies and FICD

**Private practice, Hospital Mocel and Snoring Treatment Center, Member ADM and ADDF, Mexico City

Central Apnea

This can exist alone or be accompanied by obstructive apnea and occurs within the diaphragm, the brain, or the nerve connections between the two make little or no effort to bring air to the lungs. In other words, there is no respiratory effort. To date, there is no effective treatment for this type of apnea, which is uncommon but tends to increase with age. As dentists, we do not have any way to treat this type of apnea with is detected only through a polysomnograph and by identifying symptoms.

Obstructive Sleep Apnea (OSA) (6)

This is a condition that is potentially fatal when it is not controlled. A definitive cure is not known. The word Apnea is derived from Greek and means “absence or respiration” and in medicine it is characterized by when involuntary breathing is suspended for lapses of more than 10 seconds. Normal display of this is considered up to 4 suspensions (of more than 10 seconds) per hour (4X8 hours of sleep = 32 apneas or hypo-apneas per night of sleep.) Hypo-apnea is a term proposed by Dement and Guilleminault in 1973 to describe a situation in which the pharynx does not completely close but closes enough to produce a constriction which results in lower oxygen levels in the blood; this provokes the patient to wake up. The sum of hypo-apneas and apneas per hour is called the IAH Index. This IAH allows apnea to be classified in the following manner:

Mild: IAH from 5-15 apneas or hypo apnea. This means as many as 120 awakenings during 8 hours of sleep.

Moderate: IAH of 15 to 30 (up to 240 awakenings)

Severe: IAH from 30 to 50 (up to 400 awakenings)

Very Severe: IAH grater than 50 apneas and hypo-apneas per hour

Apnea and hypo-apnea, called “nocturnal strangulations” by Dr. William Dement (7) 7, a pioneer in the field of sleep medicine, are easily identified since they are frequent interruptions of sleep during the night, without the patient remembering, referred to as sleep fragmentation, and keeping blood oxygen levels low. During moments of apnea the patient will wake but will not recall doing so due to the neural messages resulting from the lack of oxygen in the blood. In effect OSA is one of the easiest conditions to detect given that the patient snores heavily and frequently, wakes of ten during the night, and thus normal sleep patterns are seriously disrupted making adequate rest difficult. This leads to diurnal hyper somnolence, in which the patient will doze or fall asleep as soon as he loses concentration, for example, while watching television, reading, at the movies, at social gatherings, driving automobiles, or handling heavy machinery. This makes patients more prone to be involved in accidents, and in fact they are seven times more likely to suffer accidents than those who do not suffer from OSA (8,9). Two other symptoms which help refine the diagnosis is that these patients will fall asleep in less than five minutes upon going to bed, and they are generally over-weight (10). The following are other symptoms associated with snoring and OSA:

- heavy snoring more than four times a week
- having sudden moments of no breath and making noise and movements upon regaining breath
- trouble getting up in the morning

- trouble concentrating
- memory lapses
- waking tired or thirsty
- waking with a dry or sore throat
- low performance at work
- diminished libido
- male erection dysfunction

A variety of scientific articles have shown that obstructive sleep disorders are intimately related to the presence of cardiovascular and cardio-respiratory problems. Side-effects associated with lowered blood oxygen levels and sleep fragmentation include: hypertension, arrhythmia, quickened heart beat, and in the long-run, heart disease, and cardiovascular and cerebral vascular problems such as stroke and embolisms (11, 12). Researchers continue to study these challenging problems. Following are some theories: A) Balley (13) holds that an alteration in the sympathetic nervous system produces changes in blood pressure, heart pulse, and other cardiovascular functions B) Dement (14) proposes that lowered blood oxygen levels is such that many times during the night the cardiovascular system experiences severe swings in oxygenation levels equivalent to going from sea level to the top of Mount Everest, causing brain damage. Once blood oxygen levels are corrected though the heart pulse rate and blood pressure rise to dangerous levels, sometimes up to 300mm Hg. These sorts of pressures can damage organs and cause brain stroke. If heart arteries are damaged this sort of exertion causes heart failure. C) Friedlander (15) states that as arterial pressure rises, particularly in the arteries around the cervix, the inside of these vessels is damaged, producing scar tissue where it is more likely that clotting can occur, which can then be dislodged through snoring and the continued rise and fall of arterial pressure. These dislodged clots can lead to cardio or cerebral vascular embolisms. D) A current theory suggests that frequent multiple awakenings accompanied by hormonal imbalances produce the vascular damage and arterial hypertension.

Currently, a well-founded theory also links OSA to lung and gastric (nocturnal gastrointestinal reflux, hiatus hernia) disorders. Time might bring to light more disorders of other systems.

Snoring Disorder

Snoring is an antisocial noise which should be taken seriously and must be considered a precursor or symptom of OSA, as discussed above. Constant simple snoring (without OSA) affects approximately 20% of the adult population, and is more frequent in males than females. This type of snoring is best treated by a dental surgeon using a jaw advancing prosthesis. The following factors give rise to this problem (16):

1. Over weight
2. Age (older patients show more frequency and force in their snoring)
3. Consumption of alcohol, or sleep inducing pills or substances
4. Swollen tonsils and uvula; long, soft roof of the mouth
5. Macroglossia

6. Micrognasia
7. Frequent throat infections
8. Deviated nasal bone; severe nasal obstruction
9. Sedentary life-style
10. Smoking

Snoring is an obnoxious noise which has registered up to 80 decibels when inhaled air passes through narrow or minimized passages. Generally, the combination of a long and soft palate and a large tongue causes the air current, inhaled either by nose or mouth, increases in speed and pressure, causing soft tissue of the throat and /or nasal passage to vibrate. If the patient wakes, these muscles instantly regain their form and thus the noise stops and adequate airflow is restored. The jaw now in relaxed position, will move backward (except in the case of bruxism) and carry the tongue back with it. If chewing, lingual, and palette muscles are relaxed, then the throat will be partially or totally obstructed. The only part of the respiratory system where collapse of the air passage is possible is the neck, where there is no bone covering.

Mandibular Advancement Prosthesis in Orthodontics

The cases of simple snoring disorder, or in those that are combined with mild or moderate OSA, a well-trained dentist can adapt or adjust a pre-made Mandibular Advancement Prosthesis (MAP), (see photo 1) so when asleep the patient's jaw will not move backwards causing these symptoms (see photo 2 and 3). The Success rate among patients using a MAP – in our case the TheraSnore™ Brand – is 94% (17). This result is consistent with other studies done at different times and places (see graph 1).

The MAP has some side effects, the majority being temporary, such as sialorrea (see translator's note) tooth discomfort, Temporomandibular Joint (TMJ), and dry mouth. Generally, none of these discomforts, because they are minor and temporary, are obstacles for an effective use of the MAP.

The most common side effects reported by patients beginning the treatment are soreness in one or some teeth (easily relieved when the device is removed), TMJ pain, and a feeling that their bite has changed when the device is removed in the morning during the first few weeks. In the majority of the cases the pain stops by taking out the device and through the use of painkillers and the jaw returns to its place in one or two hours. When these problems arise, they must be evaluated and then it must be explained to the patient that the large general health benefit of the treatment outweighs these minor and temporary local discomforts.

Occasionally, more permanent changes in the bite (18) have been documented and even minor shifts in the position of the teeth, but curiously, the patients who have experienced these changes did not report them. It seems that some jaw exercises designed to rest the jaw have proved to be useful in avoiding these changes. It is important to note that a substantial number of MAP's do not have the design approval from the American Academy of Sleep Medicine, which required, among other things, that the majority of the biting surfaces must be covered in order to avoid the "displacement during the night", of the molars, which is the primary cause of shifting in the jaw position or "bite".

Although the use of a MAP in most cases eliminates snoring and mild to moderate apnea as well as brings O₂ to normal, or almost normal, levels (see graph 2), the dentist must be trained to do an extensive examination in order to arrive at a correct diagnosis. When the disorder is complicated, OSA is moderate to severe, or when other accompanying complaints are detected, or if there are doubts as to diagnosis the patient should be referred to a sleep specialist, clinic, or laboratory in which a polysomnograph can be performed and interpreted by a professional in order to arrive at a proper and definite diagnosis. Failure to do this compromises the integrity of the dental surgeon and can even lead to a risk of malpractice.

The end of this paper mentions places in which one can seek help in these cases.

Other Medical Treatments

It can be that the sleep professional decides to tackle the obstruction problems with other therapeutic means; the uvulopalatopharyngoplasty (UPPP) (see translator's note), palette, lingual or Mandibular surgery, somnoplastia (new procedure still difficult to assess that shrinks the soft tissue using radio frequency produced heat) or via a CPAP or BIPAP, electronic machines made up of a compressor, a tube and a nasal mask that supplies air at a calibrated pressure through the nose in order to open air passages during sleep (19). Of course, the solution that is considered last is only for extraordinarily serious cases, the permanent tracheotomy, with all of its risks.

There also exists the so-called lingual reposition procedure, but it will not be addressed in this paper due to the fact they are used so rarely, and they tend not to be very effective particularly in the long term.

Conclusion

The dentist has the benefit of an optimum view of the throat of the patient and can therefore determine if it is anatomically blocked and classify according to the Mallampatic classification (see graphic 3). The dentist can observe if the patient displays any of the signs that produce snoring, can determine via clinical history (20) or in and oral anamnesis whether the patient snores and often the dentist can ask the patient's partner or spouse, which will leave little doubt as to the presence of snoring. Often the patient or his/her partner will inform the doctor without prompting. How many times in social situations do we hear complaints or comments related to snoring? There exists a demand for the services of the dental surgeon who can treat snoring and mild to moderate apneas. In the general public, there is increasing awareness of the field of sleep medicine and particularly as related to obstructive respiratory problems. This growing awareness is particularly true among medical surgeons. Unfortunately, there are few dentists who are appropriately trained to respond efficiently and ethically to this need and it is therefore, important to increase their numbers and distribution throughout the country. What is also needed is that dentist play a greater role in the field of sleep medicine.

Those readers interesting in obtaining training or joining the Mexican Society of Research and Sleep Medicine, are encouraged to write to the following e-mail addresses: jvm@xanum.unam.mx, reysh@fournier.facmed.unam.mx, drmfarill@att.net.mx, clivoz@netmex.com.mx, and opg@servidor.unam.mx. Also, there are several institutions equipped with sleep medicine laboratories that are working at capacity. Among these are those at the National Institute of Neurology and Neurosurgery, National Institute of Cardiology, National Institute of Nutrition, National Institute of Respiratory Diseases, the Psychiatry Society of Mexico, and the most modern in Latin America, the Sleep clinic at the UNAM, within the General Hospital of Mexico in Mexico City.

The authors wish to thank those who helped in the study, Doctors Aitxa Oloarte and Ana Ma. Rosas, and Doctors Reyes Haro Valencia, Raul Alvarado Calvillo, Vincente Cuairan and Tetsuji Tamashiro.

Bibliography follows (see original)

Translator's Note: No translation available for "sialorrea" or "uvulopalatopharyngoplasty (UPPP)".