

## SLEEP APNEA AND CHRONIC RHONCOPATHY

### Oral device therapy

written by Andrea Pelosi - June 2001

Chronic snoring or rhoncopathy and obstructive sleep apnea syndrome (OSAA) are an extremely modern clinical and social problem.

Both conditions, when protracted in time, can entail serious consequences such as cardiovascular diseases, chronic sleep hypoxemia related disorders, day somnolence, lower school performance, higher accident risk while driving and at work.

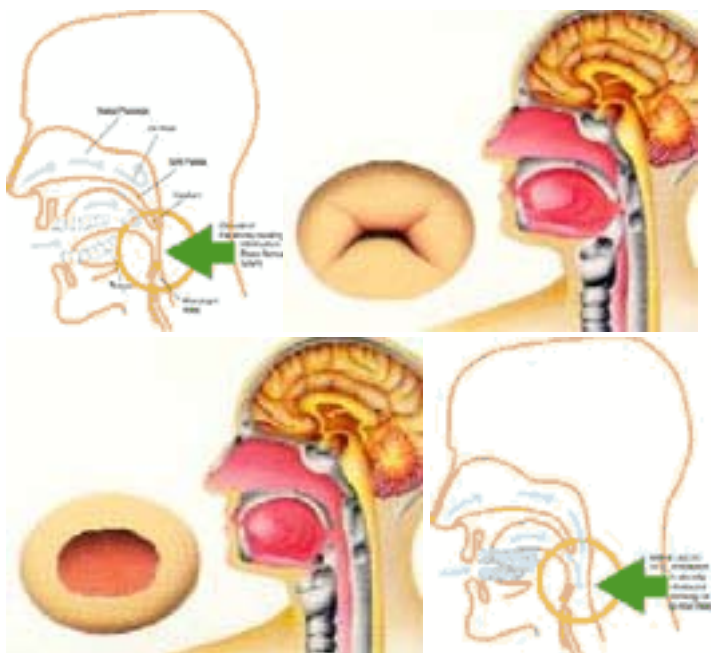
Recent statistics reported that 40% of the female population over 40 years of age snore; the percentage for males is 60%. A multidisciplinary approach to snoring and sleep apnea allows thorough tackling to be performed and suitable therapies to be supplied.

There are several kinds of testing people suffering from these disorders need to be submitted to. First of all the patient shall be checked by an otorhinolaryngologist, then he will undergo pneumology and respiratory physiology tests, snoring screening, sleep monitoring, diet therapies for weight reduction, gastro-oesophageal reflux evaluation, as well as neurologic examinations for suspected central apnea or other sleep related disorders.

Snoring is a consequence of respiratory tract constriction. According to Bernoulli's principle and the Venturi tube, in fact, a fluid speed along a tube increases as the tube section decreases. The accelerated speed of the air going through the respiratory tract produces a vibration of pharyngeal tissues, mainly the soft palate and the uvula, which generates sounds of various intensity.

Several factors may cause constriction of the respiratory tract: tonsil and/or adenoid hypertrophy, nasal congestion, malocclusion with micrognathia or retrognathism, macroglossia, or simply adipose tissue accumulation in the pharyngeal area. All the above conditions may lead to snoring, however the main cause has been identified as tongue and masticatory muscles hypotonia. As the back wall of the tongue corresponds to the front wall of the respiratory tract, the backward movement of the tongue automatically restricts the lumen for air transfer. Moreover, when the diaphragm contracts, thus creating a vacuum trying to inhale air through nose and mouth, it also sucks in the hypotonic tongue. The respiratory tract is then restricted and this causes acceleration of the air flow. This in turn generates the noisy vibrations of the soft palate and uvula peculiar to snoring.

When the tongue is sucked back opposed to the back wall of the pharynx and the oral and nasal air can no longer reach the lungs we speak about sleep apnea (OSAA Obstructive Sleep Apnea Syndrome). Every time the tongue seals to the back wall of the pharynx, the diaphragm intensifies its efforts to suck air and, in turn, causes and even tighter closure. Occlusion of the pharynx will not seize until carbon dioxide in the blood reaches levels at which the patient wakes with a loud snort and almost immediately falls back to sleep. This phenomenon can be repeated even a hundred times in one night without the patient remembering anything about it.



The first suggestions for oral devices against snoring and sleep apnea were made in the '30s, when Esmarch,

an American, suggested the Esmarch-splint, which protruded the jaw, stabilizing it in that position. Several devices for jaw protrusion are mentioned and suggested in the literature: the most frequently found are the MAD (mandibular advancement device) and the MAA (mandibular advancement appliance). In 1983, Doctor Peter T. George proposed a functional orthodontic appliance called NAPA (nocturnal airway patency appliance) against rhoncopathy and apnea. Such devices are meant to:

1. protrude the jaw and separate the tongue from the back of the pharynx
2. stabilize the jaw and inhibit mouth opening, thus allowing hyoid and tongue to be moved forward
3. increase the vertical dimension to induce a reflex at Atm (Tmj?) level to activate the genioglossus muscle and advance the tongue.

These jaw advance appliances all attain excellent results on snoring. Several authors suggest use of these appliances even on patients suffering from apnea and for 80% of these patients a reduction of the respiratory difficulty index (RDI) can be achieved.

There are also other oral appliances against snoring: some of them modify tongue position, others create a retention, others yet raise the soft palate. Among these appliances, the international literature agrees to recommend jaw advancement devices.

### Silensor device

Silensor is a jaw advancement device characterized by a plain construction which is quite comfortable for the patient as it consists in two semirigid molded plaques.

These molded plaques are joined by two connectors (left and right) fastened with pivots; one is located at upper canine level and the other at first lower molar level.

The connectors variable length determines the protrusion level forced onto the jaw and the connector position on the teeth increases jaw protrusion at mouth opening.

