Clinical article

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Nasal dilators for snorers: a study on 55 patients

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Abstract

Snoring is caused by the vibration of the soft palate when air passes through the back of the mouth. This phenomenon has been related to pressure in the different levels of the air passages. The effect of nasal dilator tubes on sleep is studied. 81.8% of subjects' partners reported a great improvement in the quality of sleep of subjects using nasal tubes; no statistically significant differences were found between men and women.

Keywords: Snoring. Nasal dilator tubes. MFS (multifunction system).

Introduction

Obstructive sleep apnoea (OSA) and snoring are relatively frequent disorders, and have serious effects on the quality of sleep of sufferers and of their partners. Though both problems have been described for quite some time1, no cure has been found, despite the wide variety of treatments available[2].

Snoring is caused by the vibration of the soft palate when air passes through the back of the mouth, particularly during inspiration.

OSA and snoring are relatively frequent problems, affecting approximately 15% of women and 35% of men[3]. Although they are often considered to be related, snoring throughout most of the night does not necessarily indicate the presence of OSA, for both men and women.

Physiopathology of snoring[4,5]

The snoring phenomenon has been difficult to study as the discomfort caused by

snoring is subjective and most data are obtained from people close to the sleeping subject. It is an acoustic phenomenon produced by vibration of the soft tissues of the pharynx during inhalation. If we consider the respiratory tract through which air moves, this is formed by rigid walls (such as the bronchi, trachea) in some areas and non-rigid, collapsible tissues in other areas (soft palate, uvula, tonsils, base of tongue, muscles and pharyngeal mucosa, and more specifically, the area that extends from the epiglottis to the choanae).

Therefore, when air flows through a stenosed or collapsible tract (producing narrowing), vibration appears due to the negative pressure in the airway compared to the external pressure. This requires sufficient distensibilty and airflow. The velopharyngeal sector is where most snoring originates, although there are other structures, as in the case of sleep apnoea, that cause vibration of the pharyngeal structure due to their narrow shape1.

Snoring may also be defined as a disorder of the upper airways, involving neither apnoea nor hypoventilation, and caused by the vibration of pharyngeal tissue. The process may occur without OSA, in which case it is defined simply as snoring, or in conjunction with OSA, in which case the snorer's sleep is disturbed, with negative consequences.

Nasal dilation and OSA

Nasal obstruction interferes with breathing during sleep[2]. Obstruction of the nasal passages causes resistance, which gives rise to snoring. For snoring to occur, there must be a collapsible segment, such as the pharynx, and negative pressure, to produce vibration. This explains how many people who do not normally snore become snorers when under the effects of hay fever or colds.

This is not the case for OSA, where airflow resistance is merely one of the factors involved. Reduced nasal airflow resistance is, however, associated with a drop in the number of arousals, which may give rise to a subjective improvement in sleep quality.

To stabilise the airways in the face of increased resistance, obstruction of the nasal passages strengthens the pharyngeal dilator muscles, which also favours snoring. Nasal obstruction is also related to mouth breathing. When the nasal passages are blocked, the subject cannot breath through the nose, doing so instead through the mouth. This is associated with posterior rotation of the mandible, favouring the collapse of the oral airways, another factor which favours snoring.

When studying OSA we again see how nasal resistance has a clear influence. Thus, in the control subject, we see *increased* resistance during inspiration, which tends to close the airways. If, for any reason, the passage of air through the nose is obstructed, this resistance increases, which in turn increases the tendency of the pharynx to close. In this case, the sleeper will tend to breathe through the mouth, which also increases the likelihood of pharyngeal collapse, due to muscular imbalance and mandibular posterior rotation. In patients with other predisposing factors this may lead to episodes of OSA.

The use of nasal dilators to prevent OSA is controversial. Obstruction of the nasal passages is one of the possible causes of OSA, and may originate either in the nose or as a consequence of adenotonsillar hypertrophy[7]. According to some authors8,nasal dilators have no significant effect on OSA as, although they reduce nasal resistance, these authors do not believe this to be a cause of hypopharyngeal obstruction. Others9 believe that nasal obstruction may be a cause of OSA, due to increased negative inspiratory airway pressure.

Nasal dilation improves nasal breathing, dilating the nostrils to prevent airway collapse[10]. This leads to less snoring and less dryness of the mouth. The classification and treatment of nasal airway collapse are, therefore, important elements to be taken into account when studying snoring[11-13]. Nasal dilation is also effective in the case of snorers with chronic rhinitis, reducing snoring in the absence of other factors, such as obesity[14]. Although nasal dilation has been observed to reduce snoring, the same cannot be said in the case of OSA[15-17] and studies show no improvement in OSA, even though many patients have reported a subjective improvement in their symptoms, including improved quality of sleep.

Among the different designs of oral dilators available, we found one having the sufficient elasticity to fit into and .dilate the nostrils, decreasing resistance and improving nasal airflow. It can be fitted by patients at home at night. Patients with reduced tolerance are advised to apply it at intervals throughout the day to familiarise themselves with the treatment.[8].

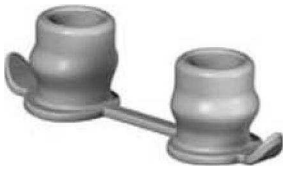


Figure 1 MFS nasal dilator tubes.

Figure 2 MFS nasal dilator tubes

MFS nasal stimulators[18] (Figures 1 and 2)

These nasal stimulators have been developed using the MFS (multifunction system) method, to treat the collapse of the nasal walls. Based on studies of nasal wall collapse, applying a new classification system (MFS) and evaluating the beneficial effects on nasal ventilation, perinasal muscle activity and the remodelling of nasal cartilage, these nasal stimulator tubes have been designed to perform the following clinical functions:

- To permeabilise the passage of air through the nasal passages during inspiration (intubation effect). This effect is immediate.
- To remodel the cartilage of the lower third of the nasal pyramid, having a harmonising effect on nasal morphology. This effect is attained over a period of six months.
- To stimulate the activity of the perinasal muscles, increasing the functional dilation of the nostrils. This effect is attained over a period of approximately nine months.

Objectives of the study:

- To assess the dilation effect of MFS nasal tubes on snoring.
- To assess differences in changes in snoring patterns among men and women due to the effect of using of nasal dilator tubes.

Materials and methods

Fifty five subjects (35 men; 20 women) were included in the study. All suffered from night-time snoring, the noise of which caused annoyance to their partners.

Subjects were asked to use MFS nasal stimulator tubes for one week, with the aim of reducing snoring caused by insufficient nasal dilation. Their partners were asked to observe whether they noticed any change with regard to previous snoring sound levels. A suitable size of nasal stimulator was chosen for each patient.

TABLE 1

Nasal tubes and effects on snoring: frequency and percentages

	Absolute frequency			Percentage		
	Men	Women	Total	Men	Women	Total
Good	22		45	73.3	92.0	81.8
Fair	6	1	7	20.0	4.0	12.7
Poor	2	1	3	6.7	4.0	5.5
Total	30	25	55	100.0	100.0	100.0

Results were assessed subjectively by snorers' partners. Partners were asked whether night-time snoring remained the same (poor), improved somewhat (fair) or disappeared (good) with the use of the nasal stimulator tubes.

Results

The results obtained in the study group are shown in Table 1 and Figure 3.

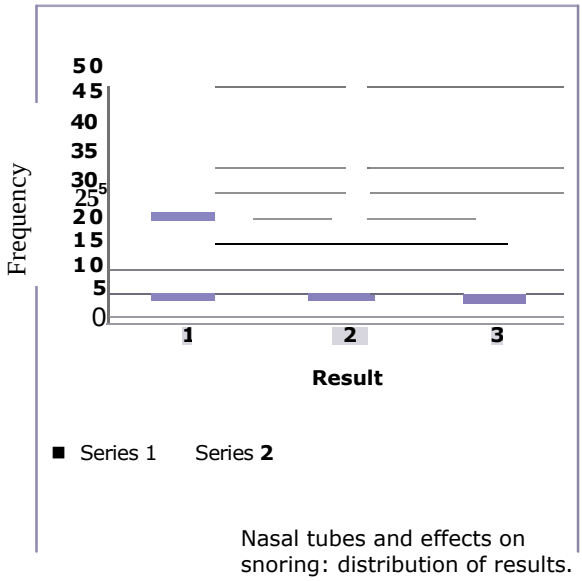
In the overall group (55 patients), we found that 45 reported an improvement, 7 reported little improvement, and 3 continued to snore at night.

In the overall group, reduced snoring was reported for men in 22 cases, a slight reduction in 6 cases, and maintained snoring levels in 2 cases; for women snoring was reduced in 23 cases, slightly reduced in 1 case, and maintained in 1 case. No statistically significant differences were reported between men and women.

Discussion

OSA and snoring are frequent problems. While OSA is a multifactorial problem, in which a collapsed airway is just one of the factors involved[6], in the case of snoring, airway collapsibility is a very important factor. Although the vibration that causes snoring is located in the pharynx and soft palate, negative pressure favours this collapsibility. Accordingly, reducing respiratory resistance at nasal level may be of benefit to patients[15-17].

Figure 3



Nasal tubes and effects on snoring: distribution of results.

The results obtained in this study concur with these assertions with regard to **snoring**, as when nasal resistance is improved using MFS stimulator tubes, snorers' partners report a subjective improvement in their perception of the sleeper's snoring levels, as verified by 80% of subjects in the study sample.

The amelioration in this effect may be due to reduced airway collapsibility. With regard to treatment for snoring, a classification showing the degree of nasal collapse before and after treatment may be of benefit. Duran's nasal collapse coding[11] may be very helpful here, as may subsequent studies linking reduced snoring to reduced nasal airway collapse.

Conclusions

- Nasal dilator tubes may help to reduce snoring, thanks to the dilating effect on nostrils.
- 81.8% of subjects' partners reported improved quality of sleep in subjects using nasal tubes.
- No statistically significant differences were observed between men and women.

Further studies are required in order to observe the effect of nasal dilator tubes on snoring in larger samples, along with any possible effects on OSA.

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