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Effect of Breathe Right nasal strip on snoring*

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SUMMARY

Snoring is a significant problem both for the patient and for the bedpartner. It is well known that nasal stuffiness can contribute to snoring, and sleep quality may deteriorate because of the snoring. Nasal dilation can reduce snoring and improve sleep. Thirty-five habitual snorers (18 female, 17 male) and their bedpartners participated in an open label study. The patients were diagnosed as heavy snorers after they underwent overnight polysomnography showing that their apnoea indexes were below 5, thus sleep apnoea patients were not included in the study. The participants and their partners filled out evaluations concerning snoring intensity, mouth dryness and Epworth Sleepiness Scale prior to and after using Breathe Right nasal strips for 14 consecutive nights. The Breathe Right external nasal dilator is a simple, non-pharmaceutical method to decrease nasal airway resistance and thus potentially reduce or eliminate snoring. After using the strips there were statistically significant decreases in snoring ($p<0.001$) as graded by the bed partner, and in mouth dryness ($p=0.025$) and in the Epworth Sleepiness Scale scores ($p=0.001$), as graded by the patient. The results of this study indicate that Breathe Right nasal strips may be used to reduce snoring, mouth dryness and sleepiness in patients presenting with symptoms of snoring.

Key words: snoring, nasal dilators, Breathe Right

INTRODUCTION

Obstruction of the nasal airway can have a significantly detrimental impact on sleep, generally in the form of increased arousals and snoring (Lavie, 1983; Lavie et al., 1983). During sleep the pattern of breathing is distinctly different from that of wakefulness. The patency of the upper airway musculature is reduced during sleep, making a person more susceptible to potential obstructions of the airway (Isono and Remmers, 1994). The reduced patency can lead to higher likelihood of snoring, which can precipitate sleep disrupting arousals (Guilleminault et al., 1991). Not only is the snorer's sleep disrupted (Hillerdal et al., 1991) but the bedpartner's sleep may be as well.

Snoring can occur via both nasal breathing and mouth breathing. One theory of nasal snoring is that a narrowing of the nasal airway causes an increase in the velocity of the air passing through it. With this increased velocity, the pressure drop through the nose increases according to Bernoulli's law and the tissue vibration, or snoring, may begin (Isono and Remmers, 1994).

Any obstruction of the nasal airway that increases nasal airway resistance (e.g., deviated septum, congestion, nasal polyps) can cause a person to favour mouth-breathing. When the mouth is open the base of the tongue is positioned more caudally, allowing less room for air passage and again providing for more likelihood of tissue vibration or snoring.

The nasal valve is the narrowest part of the nasal airway and accounts for more than half the airway resistance during nasal breathing (Bachman and Legler, 1972). Given the proposition that narrowing of the nasal airway can lead to snoring and disrupted sleep, it follows that opening the nasal airway can reduce the problem (Petruson, 1989). Various methods have been used to achieve nasal dilation, among them nasal sprays and both internal and external mechanical nasal dilators (Petruson, 1989; Chaudhry and Askinazy, 1990; Scharf et al., 1994). The purpose of this study was to evaluate the effects of an external, mechanical nasal dilator on snoring, mouth dryness and daytime sleepiness.

MATERIAL AND METHODS

Consecutive subjects were drawn from the population of patients seen at the Sleep Disorder Centre of Avesta Hospital at Avesta, Sweden. Thirty-five heavy snorers (18 female, 17 male) and their bedpartners entered an open label study.

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The external nasal dilator (Breathe Right® nasal strips; CNS, Inc., Minneapolis, USA) was worn by non-apnoeic snorers for 14 consecutive nights while three evaluative instruments were completed by the subject or the bedpartner at the beginning and at the end of the two-week trial. Age, gender and body mass index (BMI) were also recorded.

Subjects were included in the study if they demonstrated heavy snoring for more than 50% of the night and the apnoea index was less than 5 as measured by all-night-attended polysomnography. Frequent, loud disruptive snoring was also confirmed by the bedpartner. Prior use of the Breathe Right nasal strip excluded subjects from the study.

The Breathe Right nasal strip is a non-invasive, external nasal dilator designed to slightly dilate the anterior part of the nose. The strips adhere to the outside of the nose while gently pulling the sides of the nose outward, widening the nasal valve space. In earlier studies, the Breathe Right nasal strips have been shown to decrease nasal resistance by 31% (unpublished data).

On awakening each morning the bedpartner was asked to rate the subject's snoring on a scale from 1-5 ("5" being the worst/loudest). In the second evaluative instrument the patient rated their own sense of mouth dryness on a scale from 1-5 ("5" being the driest). The third evaluation was to have the subject complete the Epworth Sleepiness Scale (ESS; Johns, 1991). These three instruments were administered immediately before and directly after the 2-week nasal strip trial.

Statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS) on a microcomputer. Paired *t*-tests were used to compare initial and final scores for the three variables. P-values ≤.05 were considered statistically significant.

RESULTS

Thirty-two people (16 male, 16 female) completed the protocol. Of the 32 subjects who finished, the ages ranged from 19 to 71 years (mean: 46 years) while the BMI ranged from 19.7 to 41.0 with a mean of 27.1.

For the entire group of subjects, there was a significant decrease in snoring ($p<0.001$) as graded by the bedpartner after 14 nights' use of the nasal strip (Figure 1); 52% (16/31) of the subjects showed a decrease in snoring. There was no difference between male and female subgroups.

For the entire group of subjects, there was a significant decrease in mouth dryness ($p=0.025$) as graded by the patient after 14 nights' use of the nasal strip (Figure 2). Forty per cent (13/32) of the subjects showed a decrease in mouth dryness. Females showed a larger decrease in mouth dryness than males.

For the entire group of subjects, there was a significant decrease in the ESS scores ($p<0.001$) after 14 nights' use of the Breathe Right strips (Figure 3). Sixty-six per cent (21/32) of the subjects showed a decrease in their ESS score. Males showed a greater decrease in the scale than females, but it was not statistically significant.

DISCUSSION

This study was an open label investigation of snoring and improved nasal patency using three subjective evaluative instruments. As a group there was a statistically significant improvement in all three parameters, indicating that the Breathe Right nasal strip can be of benefit in snoring as has been reported previously (Scharf et al., 1994). An open study with the Nozovent

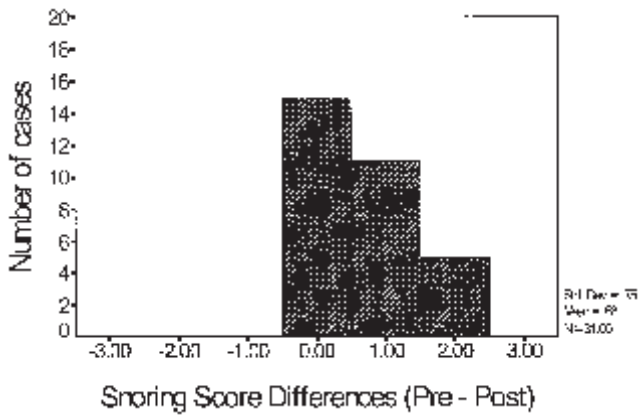

Figure 1. Snoring score changes, comparing pre- and post-treatment scores. A positive number indicates that snoring improved after use of the nasal strip. A zero difference indicates no difference after use of the nasal strip.

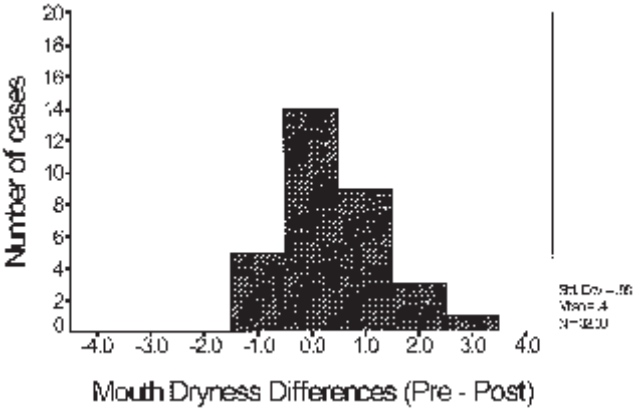

Figure 2. Mouth dryness score changes, comparing pre- and post-treatment scores. A positive number indicates that mouth dryness improved after use of the nasal strip. A zero difference indicates no difference after use of the nasal strip.

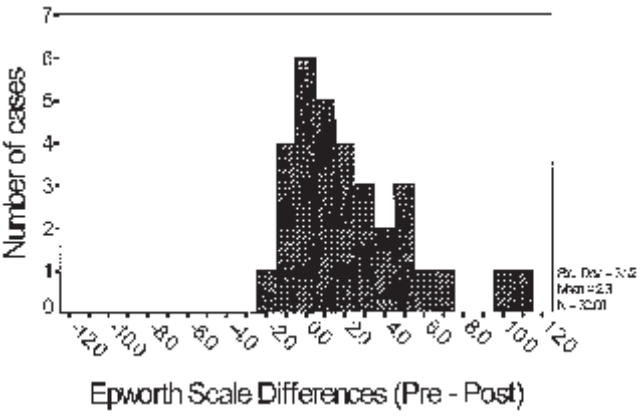

Figure 3. Epworth Sleepiness Scale score changes, comparing pre- and post-treatment scores. A positive number indicates that the Epworth Sleepiness Scale improved after use of the nasal strip. A zero difference indicates no difference after use of the nasal strip.

internal nasal dilator demonstrated similar results (Petruson and Theman, 1992).

The ESS has been validated against the Multiple Sleep Latency Test and demonstrates a strong correlation when measuring daytime sleepiness. The mouth dryness and bedpartner-rated snoring indices were simple – yet direct – measures of efficacy. While there could be placebo effects of taking any "anti-snoring" action for a 2-week period, the subjects consistently observed significant improvement, even though they did not have access to their initial ratings. One of the strengths of this study is that all the subjects were initially diagnosed by all-night-attended polysomnography, thus, were confirmed under controlled circumstances to be both heavy snorers and non-apnoeic.

While people are not obligated to breathe through their noses, advantages accrue to those who do: better heating, humidifying and particulate filtering (Eiser, 1990; Slavin, 1994). Physiological nasal breathing during sleep is important because pathological conditions may result in sleep disordered breathing (Olsen and Kern, 1990). Impaired nasal breathing sets up the conditions for snoring which in turn disrupts sleep via the mechanism of arousals. In order to enhance nasal breathing during sleep it is important to maximize the cross-sectional area at the isthmus of the nasi (Hoijer et al., 1992). An initial version of an internal, mechanical nasal dilator was described by Francis (1905). Both internal devices, such as Nozovent and Breathe with EEZ, and the external Breathe Right nasal dilator are now available on the market. The Breathe Right nasal strips have been shown to be easy to use and without deleterious side effects.

FDA approval for marketing of the Breathe Right nasal strip was received in the Fall of 1993. An estimated 20 million US citizens have tried the strips and minimal adverse reactions have been reported. Those reactions reported have generally been due to the effect of the adhesive on nasal skin (Anderson, personal communications).

The result of this study indicates that Breathe Right nasal strips may be used to reduce snoring, mouth dryness and sleepiness in patients presenting with symptoms of snoring. Further studies of the effects of Breathe Right nasal strips during overnight polysomnography would be of value.

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