Effects of Breathe Right™ on snoring: a polysomnographic study

G. LIISTRO*, P. ROMBAUX†, M. DURY†, T. PIETERS* G. AUBERT† AND
D. O. RODENSTEIN *

*Pneumology, †ENT and ‡EEG Units, Cliniques Universitaires Saint-Luc, Université Catholique de
Louvain, Brussels, Belgium

The nasal vestibule is a major site of resistance to airflow in healthy subjects. A high nasal resistance may increase
snoring. Activation of the alae nasi and alar retraction reduce resistance to airflow and improve ventilation. The
Breathe Right™ (BR) device has been proposed to reduce or eliminate snoring by improving nasal breathing. We
assessed the efficacy of BR on sleep quality and snoring during 2 full-night polysomnographies, the first without and
the second with BR. Ten non-apnoeic snorers were studied. Snoring was present during 22–98% of total sleep time
during the control night. Ear-nose-throat examination disclosed a nasal valve anomaly in five subjects, objectivated
by anterior and posterior rhinomanometry. Quality of sleep and snoring were not influenced by BR, even when
different sleep stages were analysed separately. No difference in snoring index was found between snorers with or
without nasal valve anomaly. We conclude that BR is ineffective in relieving snoring in non-apnoeic snorers.

Introduction

The Atlanta Olympic Games have created the notion that
nasal breathing (and hence sports performance) can be
facilitated by a nasal dilator. The Breathe Right™ (BR) is a
simple device, in fact as simple as an adhesive tape, and is
commonly used by athletes to improve nasal breathing
during exercise.

Everyone comes to the world with natural nasal dilators. Dилator naris muscles increase the cross-sectional area of
the nostrils in physiological and physiopathological circum-
stances. The nasal valve presents, with the glottis, the
smallest cross-sectional area of the upper airways (1). Dilator naris muscles increase cross-sectional area of nasal
valve during both tidal breathing and exercise (2). Phasic
activity of dilator naris muscles is a common sign of
dyspnoea, especially in children, i.e. nasal flaring.

Recently, advertising proposed the use of the BR to
relieve snoring in habitual snorers (3). A lot of 'simple'
remedies have been proposed to cure snoring, with limited,
unknown or undocumented results (4–6). In the present
study we verified the usefulness of BR in habitual non-
apnoeic snorers.

Methods

Breathe Right™ (CNS, Chanhassen, MN 55317, U.S.A.) is
a non-invasive external nasal dilator. This adhesive elastic
band is stuck at the anterior aspect of the nose. Its lateral
sides dilate the nares by pulling apart alae nasi.

Ten subjects (one female, mean ± SD body mass index
(BMI) 30.04 ± 6.44 kg m⁻² and age 48 ± 21 years) were
recruited among a population of patients referred for
snoring with or without day-time somnolence. A full-
night diagnostic polysomnography was performed in each
subject according to standard criteria as previously
described (7). A microphone was glued on the patients' 
nick. Snoring was designated on the basis of the character-
istic microphone trace during sleep. Snoring index was
defined as the number of 30-s sleep epochs with at least one
snore over total number of sleep epochs, × 100. The
desaturation index was the number of ≥4% desaturations
per hour of sleep, related to abrupt reductions or
cessation of oronasal flow signal, and was taken as the
apnoea–hypopnoea index.

An ear-nose-throat examination was done in each sub-
ject and included anterior rhinoscopy, endonasal flexible
endoscopy and both anterior and posterior semiquantita-
tive rhinomanometry. Nasal valve anomaly was found in
five subjects.

A trial of BR was offered exclusively to non-apnoeic
snoring patients. Snoring was present during 22–98% of
total sleep time. The patients were admitted overnight to
undergo a second polysomnography with BR.
Apnoea index (number of cessations of oronasal flow ≥10 s h⁻¹ of sleep) was 2.3 ± 4.08 (mean ± sd) during the diagnostic night and 3.5 ± 4.88 during the treatment night. Again, these results were not statistically different.

When the data of the five patients with nasal valve anomaly were treated separately, the difference between variables from the two polysomnographies remained non-significant. Only one subject showed a reduction in the snoring index by more than 50%, from 26% to 6%. This patient had a nasal valve anomaly. Average BMI of the patients with nasal valve pathology was significantly lower than that of the five remaining subjects (25.4 ± 1.8 and 34.7 ± 6.0 kg m⁻², respectively. P<0.05 by independent Student's t-test).

### Discussion

We have shown that the BR has no effect on snoring and other sleep parameters in non-apnoeic snoring patients with or without nasal valve anomaly.

Snoring, a respiratory sound occurring during sleep, may be a cause of divorce (8). Many patients come to sleep laboratories to obtain help to relieve the snoring sound, rather than because they are aware of health hazards to which it has been associated (9,10). In any case, the physician has to propose the best treatment with the least side-effects. The practitioners must be conscious that various treatments exist but few are efficient or have been studied objectively.

The BR increases anterior nasal cross-sectional area and therefore might decrease nasal airflow resistance. Previous studies have shown that nasal route is an important key in the control of breathing, especially during sleep. Nasal obstruction is accompanied by increased sleep-disordered breathing (11,12). However, Miljeteig et al. (13) did not find differences in apnoea or snoring indices among patients with normal or increased nasal resistance. The hypothesis that decreased nasal resistance may relieve snoring has previously been exploited by another nasal dilator: the Nozovent®. As in our study, this device failed to decrease snoring index in polysomnographic studies (14,15). Hoffstein et al. found that Nozovent® reduced significantly snoring parameters only during slow wave sleep (15). However, we did not find similar results with the BR when snoring was analysed during different sleep stages (Table 2).

The efficacy of BR on relieving nasal obstruction is not yet established. Nasal valve represents only a part of nasal resistance, which could be modified by a nasal dilator. In a recent abstract, Nepomuceno et al. (16) have studied the effect of BR on total inspiratory resistance (TIR) in seven normal subjects. These authors showed that TIR decreased in only four subjects when BR was in place. Resistance increased in two subjects and remained constant in one. We are not aware of a study on the effect of BR on nasal resistance in patients with nasal obstruction.

Interestingly, patients with nasal valve anomaly, were significantly thinner than patients without. The fact that BR was as useless in the former as in the latter subjects suggests that an abnormal nasal valve is a marker of more

---

**Table 1. Sleep and breathing data**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Night 1</th>
<th>Night 2</th>
<th>n.s.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean SaO₂ (%)</td>
<td>95 ± 2.3</td>
<td>95 ± 2.1</td>
<td></td>
</tr>
<tr>
<td>Min SaO₂ (%)</td>
<td>79 ± 12.8</td>
<td>81 ± 5.9</td>
<td></td>
</tr>
<tr>
<td>SI</td>
<td>55.6 ± 27.9</td>
<td>56.9 ± 28.1</td>
<td></td>
</tr>
<tr>
<td>DI</td>
<td>15.1 ± 14.4</td>
<td>16.9 ± 8.2</td>
<td></td>
</tr>
<tr>
<td>MAI</td>
<td>13.2 ± 7.1</td>
<td>15.9 ± 9.3</td>
<td></td>
</tr>
<tr>
<td>TST (min)</td>
<td>365 ± 91</td>
<td>393 ± 58</td>
<td></td>
</tr>
<tr>
<td>Stage 1 (%)</td>
<td>13.5 ± 5.7</td>
<td>17.1 ± 6</td>
<td></td>
</tr>
<tr>
<td>Stage 2 (%)</td>
<td>50.2 ± 13.7</td>
<td>52.4 ± 7.4</td>
<td></td>
</tr>
<tr>
<td>Stage 3 (%)</td>
<td>6 ± 1 ± 4.1</td>
<td>5 ± 5 ± 4.7</td>
<td></td>
</tr>
<tr>
<td>Stage 4 (%)</td>
<td>7.9 ± 5.1</td>
<td>6.7 ± 7.4</td>
<td></td>
</tr>
<tr>
<td>REM (%)</td>
<td>22.4 ± 4.6</td>
<td>18.2 ± 6.4</td>
<td></td>
</tr>
</tbody>
</table>

Night 1, Control night; night 2, Breathe Right® trial night; n.s., statistically non-significant. Values shown are mean ± SD.

**Table 2. Snoring index during different sleep stages**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Night 1</th>
<th>Night 2</th>
<th>n.s.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 1</td>
<td>52.7 ± 26.1</td>
<td>53.2 ± 33.1</td>
<td></td>
</tr>
<tr>
<td>Stage 1</td>
<td>64.4 ± 29.0</td>
<td>64.6 ± 30.6</td>
<td></td>
</tr>
<tr>
<td>Stage 1</td>
<td>58 ± 36.2</td>
<td>50 ± 39.9</td>
<td></td>
</tr>
<tr>
<td>Stage 1</td>
<td>46.3 ± 43.9</td>
<td>59.9 ± 43.7</td>
<td></td>
</tr>
<tr>
<td>REM</td>
<td>35.8 ± 31.2</td>
<td>39.4 ± 38.8</td>
<td></td>
</tr>
</tbody>
</table>

Night 1, Control night; night 2, Breathe Right® trial night; n.s., statistically non-significant. Values shown are mean ± SD.

Polysomnographic data were compared using a Student's t-test for paired samples. A P value <0.5 was considered as significant.

**Results**

The interval between control and BR polysomnographies was 69 ± 53 days (mean ± sd). The BMI of the subjects did not change significantly between the two recordings.

Table 1 presents mean ± sd polysomnographic parameters during the control night and the night with BR. For the group as a whole, no statistical difference was found between any of the polysomnographic variables. Table 2 shows average snoring index values during different sleep stages. Again, no statistically significant difference was found between the 2 nights. Apnoea episodes were observed in four out of the 10 subjects during both nights 1 and 2.
general anatomical characteristics (17) responsible for snoring rather than its essential cause.

Lack of difference between snoring index and other sleep parameters between the two polysomnographies reminds us that a 'good and simple treatment' must also be tested objectively.

This study was not randomized. Indeed, a diagnostic polysomnography was performed first, and the 'therapeutic' night followed. To perform a randomized study would have required a 3rd night without the BR; this was technically difficult and practically impossible. However, randomization is essential when a significant effect is found due to an intervention, and one has to make sure that this effect is a real one and not a placebo one. Our study shows negative findings and randomization is therefore not essential.

In conclusion the Breathe Right® does not appear useful to relieve snoring in non-apnoeic snorers.

Acknowledgement

The authors thank M. Hamoir for his help.

References