

Snoring Can Be Reduced When the Nasal Airflow Is Increased by the Nasal Dilator Nozovent

Björn Petruson, MD, PhD

• The ability to breathe through the nose can be increased above normal by dilating the narrow nasal valve area with the plastic nasal device Nozovent. For 10 nights, 10 patients used Nozovent every other night, and the sleeping partners of the patients judged the snoring sound level using a snoring score. The results showed a significant decrease in snoring, from moderate to slight, when Nozovent was used, or from a barely tolerable to a tolerable noise level. In about 1 night out of 4, when the nostrils were dilated, the sleeping partners did not note any snoring at all. An increased nasal airflow is achieved with less negative intrathoracic pressure, which presumably results in less opportunities for vibrations of the soft palate.

(Arch Otolaryngol Head Neck Surg. 1990;116:462-464)

The nasal valve area is the most narrow passage in the respiratory tract, causing more than half of the total resistance to nasal respiration in healthy subjects.¹ The proportional ratio between the cross-section area of

the nasal valve and the bony piriform aperture is approximately 1:1.4.² The cross-section area on each side of the nasal valve is approximately 30 mm²; in the middle of the nasal cavity, 120 mm²; and in the nasopharynx, 150 mm² (Fig 1).

When the nostrils were dilated with the plastic nasal device Nozovent, the airflow through the nose increased, on the average, from 0.68 to 0.84 L/sec at 150 Pa, or 24%.³ This improvement in airflow is comparable with that observed when nose drops are used for decongestion of the nasal mucosa in healthy subjects.⁴ Nozovent thus improves nasal airflow so that it increases above normal, and it becomes much easier to breathe through the nose. To see if nasal breathing could be improved during the night, 50 subjects used the dilator during a test period, and 40 (80%) of the 50 subjects noted that they slept better when using it. Some of the test subjects also found that they snored less than before. To evaluate the effect of Nozovent on snoring, 10 patients who snored regularly were tested.

PATIENTS AND METHODS

Patients

The study group consisted of 8 men and 2 women between 25 and 52 years of age

(mean, 39 years) who, on the average, had been snoring for more than 8 years. When asked about the loudness of the snoring, 2 patients said their sleeping partner was awakened a couple of times during the night; 5, several times; and 3, continuously. Six patients snored in all sleeping positions. A slight septum deviation was observed in 3 patients, and 1 had a slightly narrowed nasal valve.

Nozovent

Nozovent is produced in a medical-grade plastic, which, after tests, has been accepted as a USP Class VI Plastic by the Food and Drug Administration. The shape, which has been design patented, was formed and tested to fit in most Caucasian noses (Fig 2).

To prevent the dilator from falling out spontaneously, the end tabs are pressed against the skin in the lateral walls of the nasal vestibules, not against the vulnerable mucosa. The outsides of the end tabs are covered with knobs to increase friction, and the inferior parts of the tabs are shaped to fill the floor of the nasal vestibulum like a hook. When positioned in place for a couple of minutes, the pressure against the skin is accepted by most people like a watch is on the wrist (Figs 3 and 4).

During the day, Nozovent does not fall out spontaneously; during sleep, it might fall out when the nose is put into the pillow, which happens about 1 night in 5. By applying a plaster on the skin of the nostril from one side of the nose to the other,

Accepted for publication September 19, 1989.
From the Ear, Nose, and Throat Department, University of Göteborg, Sahlgren's Hospital, Göteborg, Sweden.

Reprint requests to Ear, Nose, and Throat Department, University of Göteborg, Sahlgren's Hospital, S-413 45 Göteborg, Sweden (Dr Petruson).

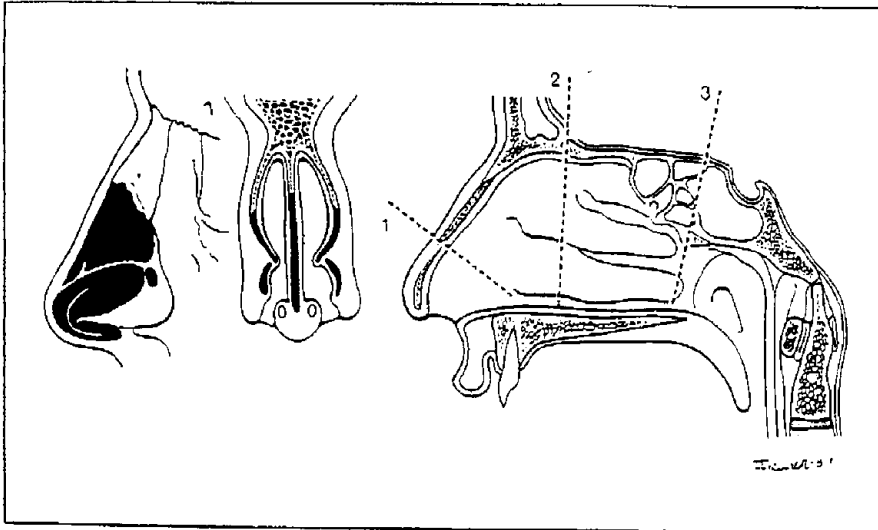


Fig 1.—The nasal valve area is the narrowest passage in the respiratory tract, with a cross-section area of approximately 30 mm² (1); in the middle of the nasal cavity, the area is about 120 mm² (2); and in the nasopharynx, it is approximately 150 mm² (3).

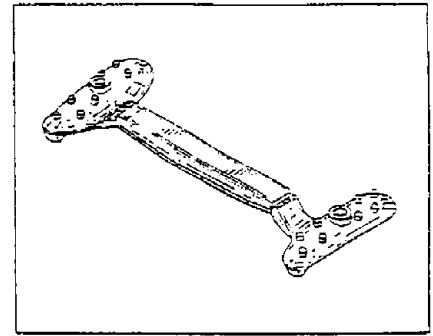


Fig 2.—Drawing of Nozovent.

alongside the bar of the dilator, a better fixation in the nose is achieved.

Snoring Score

After a training period of 1 week, the following 10 nights constituted the test period. Each of the 10 patients had to sleep every second night with the dilator, ie, 5 nights with it and 5 nights without it.

Every morning the patient had to consult the sleeping partner, and together they scored the snoring during the past night using a scale from 0 to 3 points (0, no snoring; 1, slight snoring; 2, moderate snoring; and 3, severe snoring). In all, 50 nights with and 50 nights without Nozovent were scored.



Fig 3.—A man's nose shown from below.



Fig 4.—The same nose seen in Fig 3 with a Nozovent in position.

RESULTS

The total score for the nights when Nozovent was used was 45 points, and for the nights without it, it was 95 points, a highly significant difference ($P < .001$), which, on the average, means a decrease from moderate to slight snoring. The total score for each patient is shown in Fig 5.

When Nozovent was used, 14 out of 50 nights were slept through without the sleeping partner hearing any snoring, compared with 1 night without it. Without the dilator, severe snoring was noted during 12 nights vs 1 night with it.

All of the patients wanted to sleep with Nozovent in the future. In two patients it did fall out during rotation

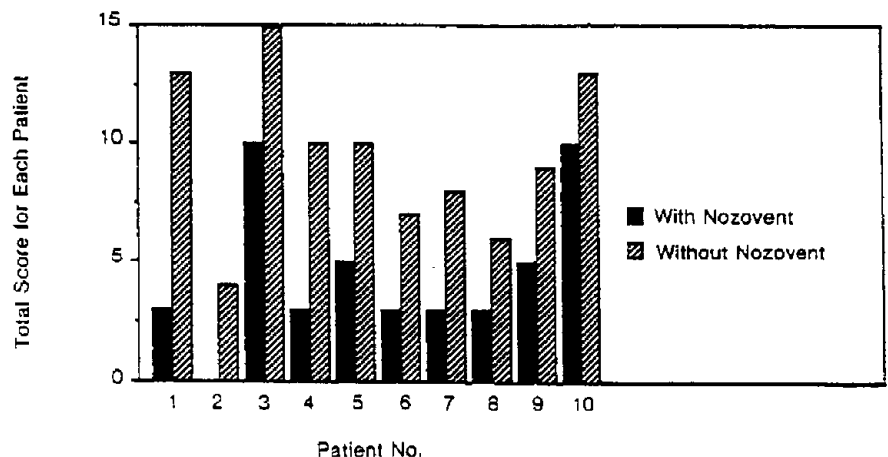


Fig 5.—The total snoring score for each of the 10 patients who slept 5 nights with and 5 nights without Nozovent. For each night the snoring score was as follows: 0, no snoring; 1, slight snoring; 2, moderate snoring; and 3, severe snoring.

in bed some of the nights and had to be put back into the nose when the patient woke up during the night.

COMMENT

Snoring can be very disturbing to a good social life. In the beginning, the nonsnoring partner in a relationship is the one who suffers the most from these nightly noises, but during the following years the snorer himself becomes aware of his snoring; he wakes himself up, gets a dry throat, and is sleepy in the morning. When the nasal breathing was increased above normal during the night by dilating the nostrils with Nozovent, some sleeping partners of pretest subjects noted less snoring than usual. In planning this study, it was decided to use the sleeping partners as judges of the snoring sound level. From a scientific point of view, a measurement in decibels would be preferable, but in social everyday life it is the opinion of the sleeping

partner that is of most interest.

To make the testing period and the scoring as simple as possible, the snoring scale contained only four steps. The results from this study showed that, on the average, there was a decrease in snoring from moderate to slight with Nozovent, or, in other words, from a barely tolerable to a tolerable noise level. In about 1 night out of 4, when the nasal dilator was used, the sleeping partners did not note any snoring at all; ie, they were not disturbed in their sleep to the degree that they heard any snoring. Without Nozovent, no snoring was noted in only 1 night out of 50. On the contrary, severe snoring was more common during nights without the dilator: in 1 night out of 4 the sound was intolerable to the sleeping partner.

When the narrow nasal valve area is dilated by Nozovent, the airflow through the nose is increased above normal and less negative intrathoracic

pressure is needed for inspiration. Presumably, in some cases, this lesser pressure is not sufficient to start the vibrations of the palate and soft tissues of the throat needed for generation of the snoring sounds. In other cases, when the vibrations start, the sound level seems to be lower.

Until now, the only efficient nonsurgical treatment for snoring has been the use of an airstream through the nose (continuous positive airway pressure).⁵ When Nozovent is used, the airflow through the nose can be created by a less than normal negative pressure, which obviously is efficient in some, but not all, cases. As this therapy for snoring is new, further investigations have to be performed, and are in progress. So far, the dilation of the nostrils with Nozovent seems to be a simple and safe way to reduce snoring.

References

1. O'Neill G, Tolley NS. Theoretical considerations of nasal airflow mechanics and surgical implications. *Clin Otolaryngol*. 1988;13:273-277.
2. Bachman W, Legler U. Studies on the structure and function of the anterior section of the nose by means of luminal impression. *Acta Oto-*

laryngol (Stockh). 1972;73:433-442.

3. Petruson B. Improvement of nasal airflow by the nasal dilator Nozovent. *Rhinology*. 1988; 26:289-292.

4. Petruson B. Treatment with xylometazoline (Otrivin) nose-drops over a six-week period. *Rhi-*

nology. 1981;19:167-172.

5. Berry RB, Block AJ. Positive nasal airway pressure eliminates snoring as well as obstructive sleep apnea. *Chest*. 1984;85:15-20.