

## C O N C L U S I O N

## The clinical importance of the nasal valve

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**Summary.** The nasal valve deserves relevant in patients presenting with nasal obstruction. In particular, the nasal valve plays an important role in nasal airflow control, it is relevant for the otolaryngologist to not only consider but also fully evaluate the nasal valve when seeing a patient with nasal obstruction. These data reported in this Supplement confirms the clinical relevance of the nasal valve in different groups of patients and normal subjects. In fact, an integrity of nasal valve is fundamental to ensure a physiological nasal breathing that in turn guarantees a correct pulmonary function. The possibility to use the non-surgical and well-accepted option constituted by the nasal internal dilator represent an interesting opportunity for both the physician and the patient. ([www.actabiomedica.it](http://www.actabiomedica.it))

**Key words:** nasal valve, nose, nasal dilator, airway obstruction, Nas-air®

The nasal valve deserves relevant in patients presenting with nasal obstruction. However, there is controversy about the anatomy, terminology, evaluation, and management of the nasal valve. Innumerable techniques with variable effects have been described in the literature. The evidence quality of many studies is unfortunately poor (1). Therefore, there is need of performing new studies with rigorous methodology, as very recently pointed out (2).

It is well known that nasal obstruction is a frequent and highly subjective complaint, but data deriving from objective examination do not always correlate with patients' symptoms (3). Many studies tried to validate clinical, instrumental and qualitative questionnaires to quantify degrees of nasal obstruction (4-7). In this regard, the American Academy of Otolaryngology clinical consensus statement stated that the internal nasal valve plays a distinct role in nasal obstruction separate from other anatomical issues and/or disorders, including allergy. Anyway, there is consent that surgery is an effective treatment option for such cases (8). Structural nasal obstruction can be caused by different

problems, including a deviated nasal septum (DNS), internal nasal valve (INV) obstruction or external nasal valve (ENV) obstruction. Grading systems are in place for a DNS and ENV collapse but not INV obstruction (9). Internal nasal valve obstruction can be caused by a static structural abnormality (high septal deviation or an enlarged turbinate) or by a dynamic collapse abnormality of the upper lateral cartilage/lateral nasal wall on inspiration secondary to a weakness in the integrity of the upper lateral cartilage/nasal side wall. Static and dynamic INV collapses are distinct entities but can also coexist. The internal nasal valve (INV) is located approximately 1.3 cm from the nares and is typically the narrowest portion of the nasal cavity. It is a cross-sectional area bounded medially by the dorsal septum, laterally by the caudal portion of the upper lateral cartilage and inferiorly by the head of the inferior turbinate (6). The average angle of the INV ranges from 9° to 15° and inter-individual variance is well recognized, in part due to the size of the inferior turbinate. Collapse of the valve is thought to obey Bernoulli's principle and as such, is a common cause for nasal obstruction (7).

The visual analogue score is often thought to represent the best outcome measure for identifying nasal obstruction (10). In addition, nasal obstruction is closely associated with the intensity of mucosal inflammation (11).

On the basis of this background, as the nasal valve plays an important role in nasal airflow, it is relevant for the otolaryngologist to not only consider but also fully evaluate the nasal valve when seeing a patient with nasal obstruction. If not the primary cause of obstruction, it is often a contributing factor. If NVD is discovered, it should be addressed during surgical intervention to avoid a suboptimal outcome. Consequently, the management of the nasal valve may consider many surgical options. Most of the techniques used have been shown to have positive effects, though there is a lack of randomized controlled trials directly comparing techniques. A large part of the problem is that the selection of the surgical method has to be tailored to the patients and their specific pathology. There is no one-size-fits-all approach. However, the possibility of managing impaired nasal valve by non-surgical strategies may be particularly attracting. In this regard, nasal dilators could represent a fruitful alternative option to surgery procedures.

Actually, the present Supplement includes a series of studies that investigated the possibility to restore nasal patency in different settings.

A first study explored the possibility to contrast snoring. The study design considered the comparison between internal and external nasal dilators. The findings showed that both devices were able to reduce snoring, but internal dilator was preferred by most patients.

Another study explored the pathophysiological role of the nasal valve in patients with obstructive sleep apnea syndrome (OSAS). Severe nocturnal respiratory pattern was associated with a bilateral nasal valve incontinence.

A further study evaluated the effect of internal nasal dilator on respiratory pattern in OSA patients. The outcomes demonstrated that this device significantly improved respiratory parameters and sleep quality. The same internal nasal dilator was used in OSAS patients during continuous positive airway pressure (CPAP) treatment. The most important finding evidenced that

this nasal device significantly improved adherence and compliance to CPAP. This issue is particularly relevant as a major shortcoming of CPAP is really low adherence and compliance.

Finally, it has been compared external and internal nasal dilators in a group of athletes. Both devices improved sport performance, but the internal dilator was significantly more appreciated than the external one.

Therefore, these data underline the clinical relevance of the nasal valve in different groups of patients and normal subjects. In fact, an integrity of nasal valve is fundamental to ensure a physiological nasal breathing that in turn guarantees a correct pulmonary function. The possibility to use the non-surgical and well-accepted option constituted by the nasal internal dilator represent an interesting opportunity for both the physician and the patient.

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