Management of the Nasal Valve

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KEYWORDS

• Nasal obstruction • Functional rhinoplasty • Nasal valve • External valve • Internal valve
• Spreader grafts • Butterfly graft • Batten grafts

KEY POINTS

- The nasal valve is frequently a contributor or sole cause of nasal obstruction and must be clinically evaluated in any patient presenting with nasal obstruction.
- Understanding of nasal valve anatomy with critical assessment of the site of obstruction is essential to effective nasal valve management.
- Validated outcome measures, such as the Nasal Obstruction Symptom Evaluation score, are helpful for preoperative evaluation of the severity of obstruction and postoperative assessment of success.
- Technique selection should be individualized to the locale and type of valve dysfunction. Spreader grafts are seldom adequate as a lone intervention for nasal valve dysfunction.
- High-quality research, ideally directly comparing techniques, is needed to both simplify and improve nasal valve management.

INTRODUCTION

The ability to breathe through the nasal passages is a noticeable feature of healthiness and well-being. The nasal airway plays a central role in air heating and humidification, olfaction, and, most importantly, airflow.[1] Obstruction of the nasal airway is a common complaint in the otolaryngologic practice and has a dramatic impact on patient quality of life.[2] Although several medical and surgical treatments exist to address this common patient complaint, developing the best therapeutic strategy targeting the sources of the problem can be challenging. Often, there are multiple contributing factors complicating treatment.

The causes of nasal airway obstruction are legion, though they can typically be broken down to mucosal or structural causes. Structural causes of obstruction may be posttraumatic, idiopathic, or iatrogenic at the hands of the nasal surgeon.[3,4] Underpinning all of this is an anatomic malformation or dysfunction. In fact, up to 75% to 85% of people have some type of anatomic deformity of the nose.[5] Only a subset of these individuals experience a severe enough impact on quality of life to prompt a clinical evaluation.

Most otolaryngologists are adept at diagnosing anatomical deformities of the septum and turbinates. However, nasal obstruction from nasal valve dysfunction (NVD) may be overlooked as a

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contributor or sole cause of nasal obstruction. NVD has been implicated in having a role in up to 13% of adults complaining of chronic nasal obstruction.[3] Moreover, the nasal valve has been implicated as the cause of persistent nasal obstruction after septoplasty in up to 95% of cases.[6]

NVD is a distinct cause of symptomatic nasal obstruction, yet there are several ambiguities surrounding the diagnosis and management of this process.[7] The literature has often been confusing and occasionally contradictory in almost every aspect of management of the nasal valve. Discrepancies exist over the nomenclature and terminology, anatomy of the nasal valve, the desired effects of a particular technique, and appropriate outcome measures, just to name a few. In most outcomes studies, adjunctive procedures are often performed in addition to directed nasal valve correction, which potentially confounds the results. There is significant heterogeneity in study designs and lack of randomized controlled trials. Most studies are uncontrolled case series, which only recently have used validated outcome measures.[7–9] This problem in the literature serves as an unfortunate imposition to quality clinical decision-making.

Although confusion may exist in the literature, there is in fact a good body of evidence supporting treatment of the nasal valve.[8,9] Most of the evidence has been overwhelmingly positive. This article reviews the management of the nasal valve, highlighting the controversial aspects of this topic and addressing the current best practices available. The goal is not only to help the reader understand the challenges in the literature but also to provide a framework for thoughtful and effective management of this problem (**Box 1**).

ANATOMY

The nasal valve is an anatomically complex concept and is nonspecific in its original description. First suggested by Mink,[10] the nasal valve was described as the region of maximal nasal resistance.[10] It was later described by Bridger[11] as the flow-limiting segment of the nasal airway located at the triangular aperture between the upper lateral cartilage (ULC) and septum. From the author's perspective, the nasal valve is much more generic. In reality, the nasal valve encompasses the column of air housed by the mucosa, cartilage, and soft tissue of the nose external to the piriform aperture. This area is typically modified in some fashion during nasal valve surgery (**Fig. 1**).

Box 1
Controversies in nasal valve management

- Anatomy
- Terminology
- Diagnosis
- Objective outcome measures
- Technique selection

The two major components that comprise the nasal valve, the internal and external valves, are classically described in more anatomically specific terms. In most texts, the internal valve is the triangular cross-sectional area between the caudal border of the ULCs, the septum, the head of the inferior turbinate, and nasal floor. The normal angle at the junction of the caudal ULC and septum is 10° to 15° in the caucasian nose and usually more obtuse in asians and african americans.[12,13] Of the entire nasal valve area, the internal valve is generally considered to be the narrowest portion and is the site of maximal airway resistance.[5,14]

The external valve has classically referred to the area in the nasal vestibule, under the alar lobule, formed by the caudal septum, medial crura of the alar cartilages, alar rim, and nasal sill.[15] It is important to note that, though the location and anatomy of the internal valve has been largely consistent in the literature, this has not been universally true regarding the external valve.

As an alternative to the classic definition of the external valve, Khosh and colleagues[4] referred to the external valve as bound superolaterally by the caudal edge of the upper lateral cartilages, laterally by the piriform aperture and fibrofatty tissues of the ala, and the nasal floor. Spielmann and colleagues[8] described the external nasal valve as being formed by the septum, the medial and lateral crura of the lower lateral cartilage (LLC), and the premaxilla. Ballert and Park[13] used a separate term to describe the area between the internal and external valves. The intervalve area was defined as the caudal-lateral aspect of the lateral crus, including the fibrofatty tissue, which extends to the piriform aperture and immediately deep to the supra-alar crease.

Yet another way to consider the anatomy of the nasal valve is to divide it into 2 zones, as described by Most.[16] In order to better characterize the points of lateral wall collapse, he described 2 zones where lateral wall collapse occurs. Zone 1 corresponds to the scroll region and inferior portion of the upper lateral cartilage, whereas zone 2 corresponds to the skin and soft tissues of the nasal ala, similar to the traditionally described external valve[16] (**Fig. 2**).