# Nasal Obstruction Considerations in Cosmetic Rhinoplasty

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**KEYWORDS**

• Cosmetic rhinoplasty • Obstruction • Internal nasal valve • External nasal valve
• Surgical technique • Nasal valve compromise

**KEY POINTS**

- During rhinoplasty, an aesthetically pleasing result may come at the expense of functional integrity if thorough preoperative examination and surgical planning have not been done.
- An intimate knowledge of nasal anatomy and physiology is critical in optimizing form and function during rhinoplasty.
- Successful rhinoplasty surgeons are adept at using strategies and techniques designed to prevent and/or ameliorate postoperative obstruction.
- The importance of counseling and establishing rapport with patients cannot be overstated.

## INTRODUCTION

Over the last 20 years, rhinoplasty has consistently been one of the most popular cosmetic surgeries in the United States, with more than 200,000 procedures performed annually.[1] However, often inherent in the pursuit of an aesthetically pleasing nose are structural changes that may compromise nasal patency, particularly with respect to narrowing of the internal nasal valve (INV) and external nasal valve (ENV) (**Fig. 1**). Previously existing anatomic or mucosal abnormalities render some patients particularly susceptible to obstruction postoperatively, and these patients require careful preoperative evaluation and surgical planning.

A previous study examining post-rhinoplasty nasal obstruction demonstrated a reduction in the cross-sectional area at the INV and pyriform aperture by 25% and 13%, respectively.[2] A different study estimated that 75% to 85% of patients have

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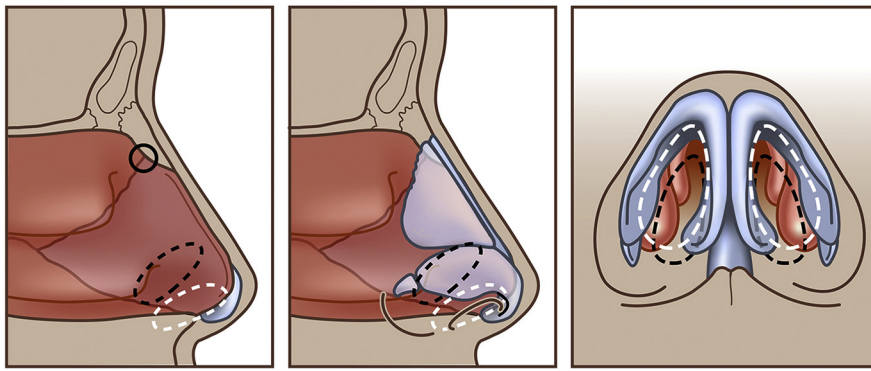

**Fig. 1.** The ENV (*white dashed line*), INV (*black dashed line*), and keystone region (*solid black line*). (*Courtesy of* Douglas Sidle, MD, Chicago, IL.)

some degree of narrowing at the nasal vestibule following rhinoplasty.[3] In keeping with these anatomic observations, it has been estimated that 10% of patients report subjective nasal obstruction following rhinoplasty,[4,5] and previous rhinoplasty has been shown to be the leading cause of obstruction prompting patients to seek nasal valve reconstruction.[6] Thus, during preoperative planning and intraoperative maneuvers, it is important to anticipate which maneuvers may negatively affect the static and dynamic support mechanisms critical to maintaining nasal airway patency and take preventative measures to avoid disrupting them.

## PERTINENT ANATOMY AND PHYSIOLOGY OF NASAL OBSTRUCTION

The prevention or repair of iatrogenic nasal obstruction begins with a thorough understanding of and appreciation for the intricate framework of the nose and the interplay among its bony, cartilaginous, and soft tissue components. Nasal patency is achieved when these components are structurally sound and do not result in obstruction at rest or with inhalation. Causes of inflammatory pathology of the nasal mucosa are myriad, and a thorough discussion is beyond the scope of this article; however, it is critical to identify and address any concomitant mucosal pathology before performing cosmetic or functional rhinoplasty.[7]

Defining nasal obstruction consists of localizing each contributing anatomic deformity and categorizing the problem as static, dynamic, or both. During analysis, it is helpful to divide the nose into vertical thirds and evaluate the structural components of each (**Fig. 2**).

The upper third of the nose, or bony vault, is comprised of paired nasal bones that articulate with the frontal bone superiorly and the ascending process of the maxilla laterally. They are thickest at their fusion with the frontal bone at the nasion and thinner caudally where they articulate with the upper lateral cartilages (ULC).[8] The keystone area (see **Fig. 1**) represents the region where the septum, perpendicular plate of the ethmoid, ULC, and nasal bones converge, and it is integral in supporting the nasal dorsum.[9]

The middle third, or cartilaginous vault, consists of the paired ULC, which are supported by fibrous connections to the caudal end of the nasal bones superiorly, the pyriform aperture laterally, and the dorsal septum medially. The INV complex as introduced by Mink in 1903 represents the cross-sectional area bounded by the dorsal septum, caudal end of the ULC, and head of the inferior turbinate.[10] The angle of the