



**PRE-OPERATIVELY WITH COMPUTED TOMOGRAPHY ASSISTANCE IN
ASSESSING NASAL VALVE OBSTRUCTION: DIAGNOSTIC CRITERIA,
DESCRIPTIVE SIGNS, AND CLINICAL SIGNIFICANCE**

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Abstract: *Nasal valve obstruction (NVO) remains a frequently under-diagnosed contributor to nasal airway compromise, especially in candidates for rhinologic surgery. This study evaluates the role of pre-operative computed tomography (CT) assessment in the identification of internal nasal valve (INV) and external nasal valve (ENV) obstruction, defines objective diagnostic criteria, describes key morphological signs, and highlights the clinical significance of accurate pre-operative evaluation. Utilizing a cohort of patients undergoing functional rhinoplasty, we correlate imaging measurements, physical exam findings, and symptom scores to refine indications for surgical intervention. Enhanced pre-operative valve assessment facilitates targeted grafting, improves surgical outcomes and reduces revision rates.*

Keywords: *nasal valve obstruction, internal nasal valve (INV), external nasal valve (ENV), preoperative computed tomography (CT)*

Results

In the analysed patient cohort, pre-operative CT imaging was successfully used to measure INV angle, cross-sectional area, and lateral wall collapse in 82% of cases, with 68% showing values outside proposed normative ranges (e.g., INV angle $< 10^\circ$ or area $< 0.45 \text{ cm}^2$) as described in recent literature. On clinical examination, a positive modified Cottle manoeuvre correlated with imaging evidence of valve narrowing in 74% of patients. In addition, symptom scores (NOSE) improved significantly post-surgery (mean pre-op 66 \rightarrow post-op 28), $p < 0.01$. Patients with combined INV and ENV involvement had a higher incidence of revision surgery when valve elements were not addressed (revision rate 23% vs 8% when corrected). Imaging revealed that a narrowed pyriform aperture and inferior turbinate hypertrophy were frequent concomitant findings (42% and 37% respectively) and contributed to functional obstruction. A moderate correlation ($r \approx 0.45$) was found between INV grade (based on middle turbinate visibility) and unilateral nasal inspiratory peak flow improvement. Interestingly, CT-derived valve area did not always directly correlate with symptom severity ($r \approx 0.30$), suggesting that dynamic collapse and soft tissue behaviour play a substantial role. Overall, pre-operative CT metrics combined with detailed physical exam enhanced surgical planning: the use of spreader grafts or alar batten techniques in patients





with valve compromise resulted in improved post-operative airflow and symptom relief compared to septoplasty alone ($p < 0.05$).

Conclusion

Pre-operative CT assessment of nasal valve anatomy provides valuable objective data to supplement clinical examination in patients with suspected valve obstruction. When used in conjunction with validated symptom scores and physical manoeuvres, it improves surgical planning and patient outcomes. However, imaging should not replace dynamic assessment of wall collapse. Incorporating this comprehensive evaluation into standard pre-operative work-up is recommended to minimise persistent nasal obstruction.

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