Case Report

International Journal Clinical and Medical Case Reports

The 'W-to-V' Technique: An Effective Method for Nasal Valve Repair

Amani Daoud[1,2*], Amiel Dror[1,2], Shiri Geva[1] ,Insaf Saffoury[1], Tali Jane-Ohayon[2], Eyal Sela[1,2]

[1]Department of Otolaryngology, Head and Neck Surgery, Galilee Medical Center, Nahariya, Israel; 2The Azrieli Faculty of Medicine, Bar-Ilan University, Safed, Israel

[*]Corresponding Author:
Aman Daoud
Department of Otolaryngology – Head and Neck Surgery affiliated with Azrieli Faculty of Medicine, Bar Ilnan University, Safed, Israel. Tel: +972-4910-7627, Fax: +972-4910-7671, Email: amanidaouddd@gmail.com, ORCID#: 0000-0002-0940-3127

Received Date: 22 Nov 2025
Accepted Date: 13 Dec 2025
Published Date: 19 Dec 2025

Citation:
Amani Daoud, The 'W-to-V' Technique: An Effective Method for Nasal Valve Repair. International Journal Clinical and Medical Case Reports. 2025; 7: 1-4

1. Abstract

1.1. Introduction: The internal nasal valve is the narrowest segment of the nasal airway, making nasal valve stenosis (NVS) a major contributor to nasal obstruction. Prior rhinoplasty is a frequent cause of NVS. Although multiple surgical techniques have been described, the quality of supporting evidence remains low, resulting in continued debate about the optimal management strategy.

1.2. Objective: To describe a novel, "W-to-V" technique for treating NVS and to evaluate postoperative improvement in nasal obstruction symptoms.

1.3. Methods: A retrospective medical record review identified patients with nasal obstruction due to NVS who underwent the "W-to-V" technique. Participants completed the NOSE and VAS scales preoperatively and at one month postoperatively. The procedure involves creating a "W"-shaped incision along the inter-cartilaginous junction, followed by placement of traction sutures designed to widen and stabilize the internal nasal valve. Detailed operative steps and illustrations are provided.

1.4. Results: Fifteen patients were included (87% female; mean age 35.5 years). No postoperative complications occurred. Mean NOSE scores improved from 68.8 to 11.2 ($p < 0.001$), and VAS scores decreased from 6.8 to 1.8 ($p < 0.001$), demonstrating significant symptomatic improvement.

1.5. Conclusion: The "W-to-V" technique is a minimally invasive, mucosal-sparing approach that effectively improves nasal obstruction. Larger prospective studies are required.

2. Keywords: nasal valve stenosis; rhinoplasty; nasal obstruction; nasal Reconstruction; revision rhinoplasty

Abbreviations: NVS – nasal valve stenosis, TCRF - temperature-controlled radiofrequency, IT – inferior turbinate

3. Introduction

Nasal obstruction affects up to one-third of the population[1]. Structural causes for nasal obstruction includes septal deviation, nasal valve stenosis, and enlarged adenoids [2].

The nasal valve is the narrowest part of the nasal airway and accounts for two-thirds of airway resistance. The internal valve is bounded by the dorsal septum, upper lateral cartilage, and inferior turbinate (IT). Prior rhinoplasty is a common causes of valve narrowing[3]. There are surgical options that aims to expand the valve. Spreader grafts are most commonly used[4].

This study aims to describe a novel technique for treating NVS and objectively assess improvement in nasal obstruction.

4. Methods

4.1. Study Design - A retrospective medical record review of patients who underwent nasal valve surgery between the years 2020 and 2023 was performed. Data on patients' age, sex, medical history, and surgical history was collected. Prior to study initiation, institutional Helsinki Ethical Committee approval was granted (NHR-0196-23).

Patients suffering from nasal obstruction due to NVS post septorhinoplasty surgery, in which the modified cottle maneuver test was positive were included in the study. We excluded individuals younger than 18 years, cases where NVS was not the primary reason for nasal obstruction (other causes included IT hypertrophy, deviated nasal septum, etc), and cases where additional procedures addressing nasal obstruction were performed. All surgeries were performed by the same surgeon (E. S.) as well as in the same facility, Galilee Medical Center, Israel.

In this retrospective study, preoperative assessments were reviewed to identify potential causes of nasal obstruction, with the modified Cottle maneuver routinely documented. Patients had completed two validated questionnaires before surgery and again one month postoperatively: the Visual Analog Scale (VAS) for nasal obstruction and the Nasal Obstruction Symptom Evaluation (NOSE) scale. The VAS ranges from 0 to 10, with 0 indicating no obstruction and 10 representing complete nasal blockage. The NOSE scale evaluates the impact of nasal obstruction on quality of life and includes five items. Each item is scored from 0 to 4, and the total score is multiplied by 5 to yield a score ranging from 0 to 100 [5].

4.2. Surgical Technique – Surgery for nasal valve stenosis (NVS) was performed under general anesthesia. Patients were intubated

with a RAE endotracheal tube, and perioperative antibiotics—typically Cefazolin—were administered. The nose and surrounding area were sterilized using chlorhexidine. Local anesthesia with 2% lidocaine and 1:100,000 epinephrine was injected into the nasal valve area. A 10–15 mm 'W'-shaped incision was made along the stenotic nasal valve (Figure 1A–B), and a mucoperichondrial flap was elevated. Two primary sutures were placed: one connecting the lateral part of the 'W' incision to its medial aspect (points 1 to 2 in Figure 1C), and another connecting the middle part of the incision to the septum (points 3 to 4 in Figure 1C). These sutures converted the 'W'-shaped incision into a 'V'-shaped configuration (Figure 1D). No excess mucosa was trimmed. Additional sutures were added if necessary.

Postoperatively, patients were admitted for overnight observation. Upon discharge, they were instructed to apply 3% chloramphenicol cream to nasal vestibule and use nasal saline spray.

Follow-up was conducted 1 months postoperatively to assess objective improvement and to examine the nasal cavity for crusts, synechiae, etc.

4.3. Statistical analysis – Categorical data were described using percentages. Continuous variables with normal distribution were presented as mean±standard deviation and compared using independent T-test or Wilcoxon rank-sum test depending on the variables' distribution. Statistical significance was defined as $p < 0.05$.

5. Results

A total of 15 participants were included in the study, with 87% of them being female. The participants had an average age of 35.5 years, with ages ranging between 22 and 57 years. Post-operatively, no complications were reported among any of the patients, including bleeding, scarring, or synechia, indicating a good recovery process for all participants.

All participants completed both the NOSE scale and the VAS score for nasal obstruction. Mean total NOSE score was recorded at 68.8, reflecting the severity of nasal obstruction symptoms. Post-operatively, there was a substantial and statistically significant reduction in the NOSE score, with the mean dropping to 11.2 ($p<0.001$). This decrease was significant for the total score and for each individual item alone (Table 1).

Table 1 – Mean NOSE scale and VAS scores preoperatively and postoperatively.

NOSE scale scores for each question seperately and in total and VAS score for nasal obstruction are presented. Significant change was demonstrated when comparing the prior and post-surgery results.

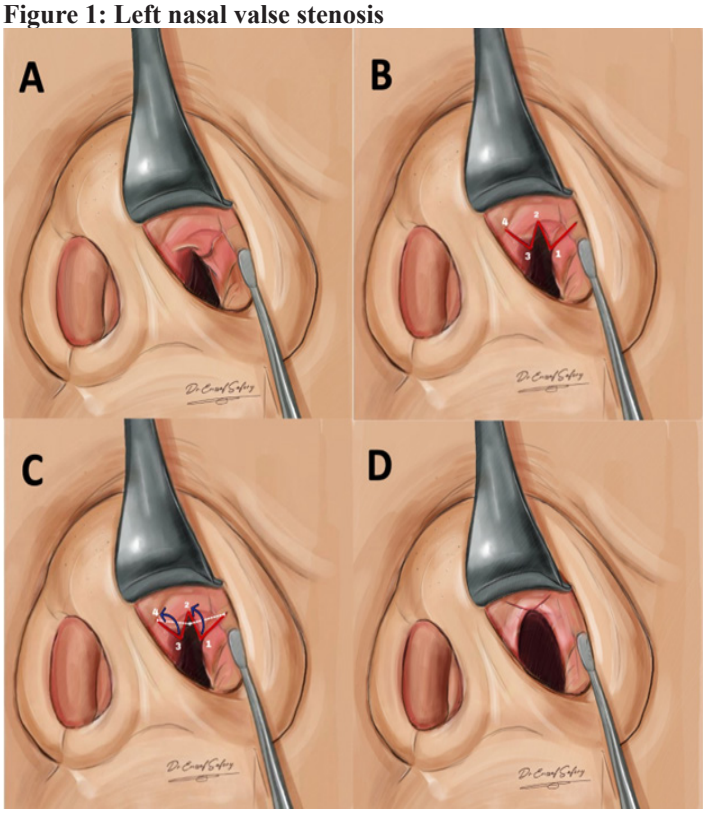
	Before Surgery		After Surgery		P value
	Range	Mean	Range	Mean	
NOSE scale					
Item 1 (0-20)	20 May	13	0 - 2	3.5	0.004
Item 2 (0-20)	20 May	14	0 - 2	2.5	0.001
Item 3 (0-20)	20 Oct	15.5	0 - 1	2	0.001
Item 4 (0-20)	0 - 20	11	0	0	0.004
Item 5 (0-20)	20 May	15.5	0 - 2	3.5	0.001
Total score	25 - 100	68.8	0 - 35	11.2	<0.001
(0-100)					
VAS score for nasal obstruction					
(0-10)	10 Feb	6.8	4 Jan	1.8	<0.001

In addition to the NOSE scale, the VAS score for nasal obstruction demonstrated a marked improvement. The mean VAS score significantly decreased from 6.8 before surgery to 1.8 afterward ($p<0.001$), underscoring the reduction in nasal obstruction symptoms.

6. Discussion

Nasal valve collapse is a challenging and well-recognized problem requiring an in depth understanding of nasal anatomy and importance of this area. In this study, we introduce the 'W' to 'V' technique, a novel and simple method for addressing NVS. (Figure 1)

Figure 1: Left nasal valse stenosis



(A) Nasal valve stenosis (B) 'W' incision along the stenotic nasal valve (C) The two main sutures are performed, connecting 1 to 2 and 3 to 4 (D) 'V'-shaped incision with a wide-open nasal valve post-procedure. Red lines demonstrate the 'W' incision. Blue arrows indicate the mucosal edges approimated with sutures.

International Journal Clinical and Medical Case Reports

Dotted white line illustrate the change after sutures are placed.

Numerous methods of repair are employed for treating NVS with no apparent consensus on which method to use [6]. A comprehensive 2017 systematic review focused on the surgical techniques for internal nasal valve collapse emphasized the diversity of approaches practiced. It highlighted that while no single technique is universally superior, personalized treatments tailored to the anatomical specifics and symptom severity of each patient often lead to more successful outcomes with better patient recovery and satisfaction [7].

Moreover, while various repair methods exist, such as spreader, alar batten, and butterfly grafts, each has its drawbacks. The alar batten graft is primarily used for cases with idiopathic or congenital nasal sidewall collapse. It involves placing a cartilage graft submucosally across the lateral nasal wall and septum. Previous studies have demonstrated that alar batten grafts significantly improve both functional breathing and cosmetic outcomes in patients with internal and external nasal valve collapse, with sustained results and minimal complications [8]. However, this method is less effective for severe nasal valve stenosis or midvault narrowing and can sometimes lead to cosmetic issues due to graft mispositioning, though it generally improves nasal airway function and patient satisfaction with minimal aesthetic impact [9].

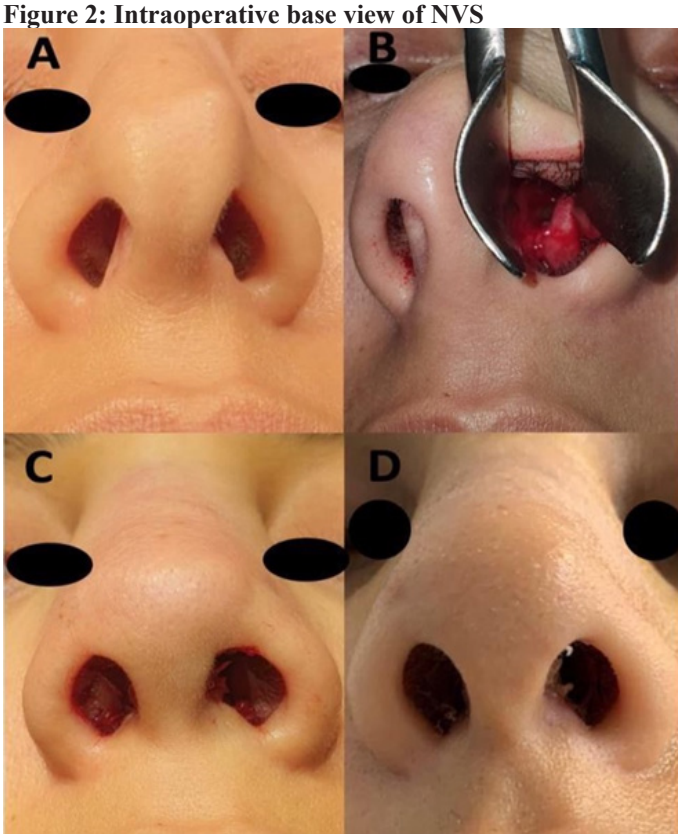
Conversely, butterfly graft is used as an alternative to spreader grafts for nasal valve repair. It supports the upper lateral cartilages, increasing the nasal valve angle and reducing collapse. Key disadvantages include the potential to slightly widen the nose and increase supratip fullness, which some patients may find undesirable. However, these changes are generally subtle and not clinically significant [10].

Spreader grafts, are placed between the anterior septum and upper lateral cartilage to widen the internal nasal valve area, effectively addressing significant mid-vault collapses and static causes of nasal collapse [9]. This technique supports the internal nasal valve and stabilizes a corrected crooked nose [11]. Although the placement of these grafts can be technically challenging and may lead to a widened nasal appearance, they are particularly valuable in revision rhinoplasty, addressing both functional and aesthetic issues related to the middle nasal vault [9,11].

Additional risks associated with different NVS treatments include multiple operative sites, and the potential for rejection of implant when using a foreign material. Suspension techniques are easy to perform with no need for grafting, however, the main drawback is the risk of relaxation of sutures [9]. Our 'W' to 'V' technique eliminates the need for grafting material, the sutures are easily performed, and the mucosa is left intact reducing the risk for granulation and scar tissue formation.

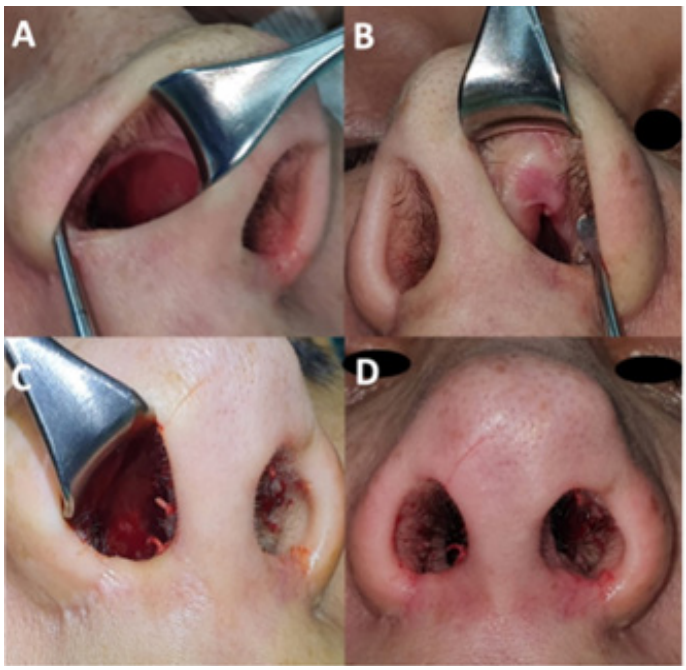
As one of the boundaries for the internal nasal valve, the nasal septum holds an important impact on NVS. A systematic review on nasal valve repair underline the frequent need for an adjunctive procedure, most commonly, septoplasty.12 Similarly, an IT reduction can help open the stenotic nasal valve area [4]. For our patients, while their main nasal obstruction cause was the nasal valve, some of them had a deviated nasal septum that seemed to contribute to the problem and was treated accordingly. (Figure 2, Figure 3, Figure 4)

Figure 2: Intraoperative base view of NVS



(A-B) Before surgery show a scarred and stenotic nasal valve. (C and D) post-surgery for NVS and deviated nasal septum demonstrate significant improvement and widening of the nasal valve

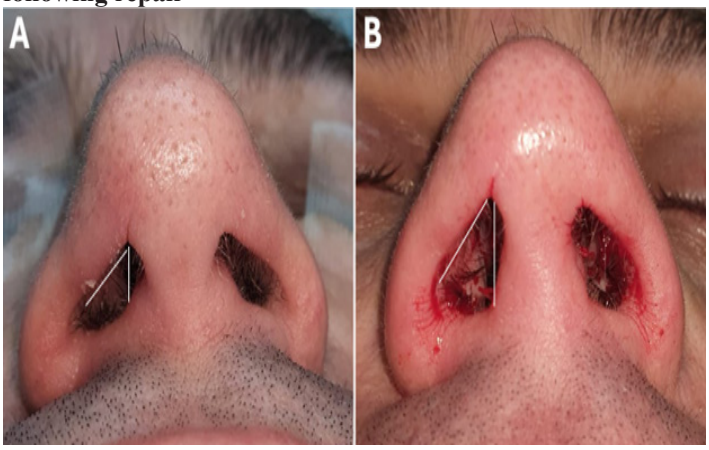
Figure 3: Base view of NVS - W to V incision



(A-B) Pre-surgery stenotic nasal valve. (C) Intra-operative post-surgery image of the the nasal valve (D) A month post surgery base

view of the nasal valve showing stable consistent improvement.

Figure 4: Pre- and postoperative view of the nasal valve region following repair



(A) Preoperative view showing internal nasal valve collapse with narrowing of the nasal valve and reduced angle (white lines). (B) Postoperative view following W-to-V nasal valve reconstruction, illustrating restoration of the nasal valve angle (white lines) and improved patency.

As the landscape of surgical interventions for NVS continues to evolve, recent innovations have introduced minimally invasive procedures providing alternatives for patients seeking relief with shorter recovery times. A 2019 randomized control trial underscored the effectiveness of bioabsorbable implants in significantly improving symptoms of nasal valve collapse, presenting a compelling, office-based alternative to more invasive surgical methods [13]. Temperature-controlled radiofrequency (TCRF) devices, which applies submucosal radiofrequency energy at the junction of the upper and lower lateral cartilages inducing tissue contraction and remodeling intended to improve valve patency. Studies demonstrate TCRF's safety and efficacy in treating nasal airway obstruction, with sustained improvements in symptoms observed over a 12-month period, making them an appealing choice for patients inclined towards less invasive procedures [14]. Another long-term study with a 3-years follow-up demonstrated that TCRF treatment of the nasal valve maintained significant improvement in nasal obstruction symptoms, with nearly 89% responder rate and no serious adverse events [15].

Our study had limitations including the small patient cohort, its retrospective nature, and the fact that some patients nececssitated additional interventions other than NVS treatment. Further larger prospective studies are required to draw definitive conclusions.

In conclusion, the 'W' to 'V' technique is a simple, mucosal-sparing, and minimally-invasive procedure that utilizes a profound understanding of the anatomy involved in this problem and consequently leads to significant improvement in nasal breathing.

Reference

1. Hsu DW & Suh JD. Anatomy and Physiology of Nasal Obstruction. Otolaryngol Clin North Am. 2018; 51: 853-865.
2. Fettman N, Sanford T & Sindwani R. Surgical management of the deviated septum: techniques in septoplasty. Otolaryngol Clin North Am. 2009; 42: 241-52.
3. Chandra RK, Patadia MO & Raviv J. Diagnosis of Nasal Airway Obstruction. Otolaryngol Clin North Am. 2009; 42: 207-225.
4. Samra S, Steitz JT, Hajnas N & Toriumi DM. Surgical Management of Nasal Valve Collapse. Otolaryngol Clin North Am. 2018; 51: 929-944.
5. Daoud A. et al. Cross-cultural adaptation of the Hebrew Nasal Obstruction Symptom Evaluation (NOSE) scale. Laryngoscope Investig Otolaryngol. 2023; 8: 34-39.
6. Barrett DM, Casanueva FJ & Cook TA. Management of the Nasal Valve. Facial Plast Surg Clin North Am. 2016; 24: 219-234.
7. Goudakos JK, Fishman JM & Patel K. A systematic review of the surgical techniques for the treatment of internal nasal valve collapse: where do we stand? Clinical Otolaryngology 2017; 42: 60-70.
8. Cervelli V. et al. Alar batten cartilage graft: treatment of internal and external nasal valve collapse. Aesthetic Plast Surg. 2009; 33: 625-634.
9. Sinkler MA. et al. Surgical Management of the Internal Nasal Valve: A Review of Surgical Approaches. Aesthetic Plast Surg. 2021; 45: 1127-1136.
10. Rist TM & Clark JM. Indications and Evolution of the Butterfly Graft in Nasal Valve Repair. Otolaryngologic Clinics of North America Preprint at https://doi.org/10.1016/j.otc.2024.07.026. 2024.
11. Leslie Kim MMIDPM. Spreader Grafts in Functional Rhinoplasty. 2016; 29-31.
12. Rhee JS, Arganbright JM, McMullin BT & Hannley M. Evidence supporting functional rhinoplasty or nasal valve repair: A 25-year systematic review. Otolaryngology - Head and Neck Surgery. 2008; 139: 10-20.
13. Stolovitzky P. et al. Assessment of bioabsorbable implant treatment for nasal valve collapse compared to a sham group: a randomized control trial. Int Forum Allergy Rhinol. 2019; 9: 850-856.
14. Han JK, Silvers SL, Rosenthal JN, McDuffie CM & Yen DM. Outcomes 12 months after temperature-controlled radiofrequency device treatment of the nasal valve for patients with nasal airway obstruction. JAMA Otolaryngol Head Neck Surg. 2022; 148: 940-946.
15. Han JK. et al. Temperature-Controlled Radiofrequency Treatment of the Nasal Valve in Patients With Nasal Obstruction: Long-Term Outcomes. Otolaryngology-Head and Neck Surgery. 2025; 2025: 1214-1223.