

Treating Symptomatic Midvault Soft Tissue Collapse in Revision Rhinoplasty with a Nasal Wall Implant

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Summary: Persistent nasal airway obstruction (NAO) due to midvault soft tissue collapse in patients following rhinoplasty or nasal surgery is a clinical challenge for surgeons. An absorbable lateral nasal wall implant is one option available to help treat midvault soft tissue collapse and to improve NAO symptoms. Previous studies have not investigated its use in complex revision functional rhinoplasty with respect to patient-reported outcomes. Data were collected on all patients with a history of previous nasal procedures who underwent Latera implant placement in conjunction with functional rhinoplasty from January to December 2018. The Nasal Obstructive Symptom Evaluation and Visual Analogue Scale were used to evaluate functional outcomes. Eight implants were placed in 6 revision functional rhinoplasty patients with midvault collapse. All patients responded to the survey. Mean follow-up was 16 ± 4 months. There were no implant-related adverse events. Mean Nasal Obstructive Symptom Evaluation score was 33 ± 33 , and mean Visual Analogue Scale score was 20 ± 9 . In total, 1 patient reported complete resolution of NAO, whereas 2 patients reported mild, 1 reported moderate, 1 reported severe, and 1 reported extreme symptoms. Four of the 6 patients reported nasal obstruction improvement, with all reporting improvement in midvault soft tissue collapse. Apart from being used in nasal valve collapse treatment, a lateral nasal wall implant is a potentially useful solution that may help surgeons improve patients' NAO symptoms in complex functional rhinoplasty cases. However, in certain cases, a patient's nasal obstructive symptoms may continue to be multifactorial. (*Plast Reconstr Surg Glob Open* 2020;8:e2887; doi: [10.1097/GOX.0000000000002887](https://doi.org/10.1097/GOX.0000000000002887); Published online 17 June 2020.)

INTRODUCTION

Persistent nasal airway obstruction (NAO) due to midvault soft tissue collapse in patients who have had rhinoplasty or nasal surgery remains a challenging clinical issue. Impact on patient quality of life can be dramatic, restricting daily activities and sleep.^{1,2} Nasal anatomical structure abnormalities are common underlying problems causing NAO symptoms.³ Depending on the underlying problem, different techniques have been used to treat NAO and correct nasal valve dysfunction.⁴⁻⁷

Studies have described a novel technique to treat nasal valve collapse (NVC) with an absorbable Latera implant; however, they have not investigated its use in multiple revision functional rhinoplasty patients.⁸⁻¹¹ We describe a case series of patients with a history of multiple nasal procedures who underwent revision functional rhinoplasty with application of the Latera implant to improve NAO symptoms from soft tissue midvault collapse, an area not being treated by standard nasal obstruction techniques.

METHODS

After Institutional Review Board approval at Beth Israel Deaconess Medical Center (Protocol: 2019P000651), data were collected on adult patients with a history of multiple nasal procedures who underwent revision functional rhinoplasty with an absorbable implant (Latera; Spiro Inc., Redwood City, Calif.) (Fig. 1), which consists of a 70:30 blend of poly L-lactide and poly D-lactide polymers,¹⁰ from January to December 2018. Those with midvault soft tissue dynamic collapse of the nose upon inspiration were offered implant placement (Fig. 2). The device was

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Fig. 1. Lateral implant delivering device (A) and Lateral implant (B).

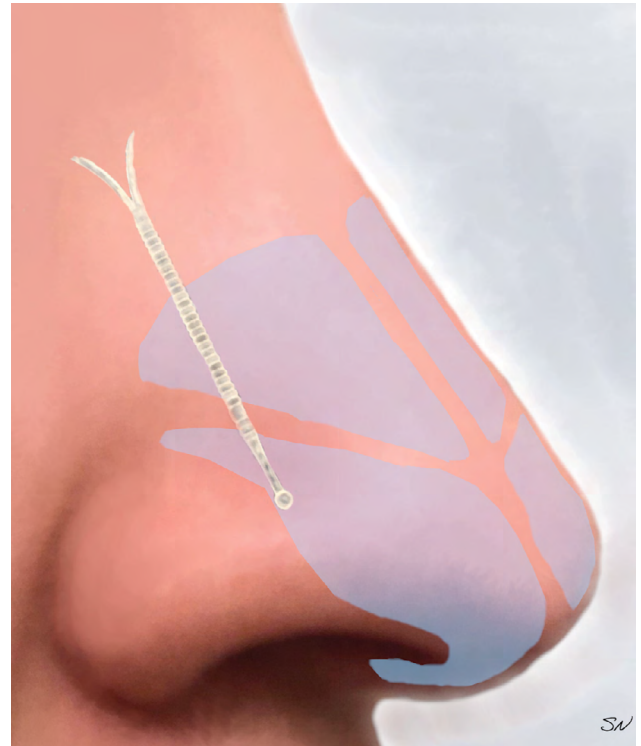


Fig. 2. Schematic illustration of the Lateral implant application.

centered upon the exact area of symptomatic collapse, and the preexisting scar did not preclude its placement.

The Nasal Obstructive Symptom Evaluation (NOSE) and Visual Analogue Scale (VAS) were used to evaluate functional outcomes. The NOSE is a validated instrument widely used to evaluate functional outcomes, with severity scores ranging from 0 (no nasal obstruction) to 100 (worst possible nasal obstruction).^{12–14} This was further classified into mild (5–25 points), moderate (30–50 points), severe (55–75 points), and extreme (80–100 points).¹⁵ A VAS score from 0 (no difficulty) to 100 (maximum imaginable difficulty) was used to capture patients' perception of their ability to breathe through the nose. Data collection also included demographic information, nasal medical history, and previous operations. Patients were contacted by phone and were offered to complete the survey either via phone or e-mail.

RESULTS

From January to December 2018, 8 Lateral implants were placed in 6 revision functional rhinoplasty patients. Of these patients, 4 never smoked, 2 previously smoked, 5 presented with persistent nasal obstruction symptoms following previous nasal obstructive procedures, and 1 required reconstruction following Mohs resection with subsequent nasal wall collapse. Mean age \pm SD was 50 ± 14 years. Mean follow up was 16 ± 4 months. Nasal medical history and previous operations are summarized in Table 1.

No patients had implant-related complications (ie, extrusion, infection, pain). All patients responded to

the survey, with NOSE and VAS scores listed in Figure 3. Mean NOSE score was 33 ± 33 , and VAS score was 20 ± 9 . One patient reported complete resolution of NAO, and 2 patients reported mild symptoms (NOSE: 5 and 15, VAS: 3 and 25, respectively). Two underwent revision functional rhinoplasty with bilateral Lateral implant placement, with 2 reporting moderate symptoms (NOSE: 40, VAS: 25), 1 reporting severe symptoms (NOSE: 55, VAS: 29), and another reporting extreme symptoms (NOSE: 85, VAS: 20).

In total, 4 of 6 patients reported improvement of nasal obstruction at follow up over 1 year, with all patients reporting improvement of midvault soft tissue collapse, the original indication for surgery, on the symptomatic side.

DISCUSSION

In this case series, our findings of NOSE and VAS scores were similar to those in previously published studies.^{8–11} Two studies with inclusion criteria of failed medical management of at least 4 weeks evaluated functional outcomes following NVC treatment with the Lateral implant under local anaesthesia in clinic-based settings. Both of them demonstrated significant improvement of NOSE and VAS scores at 3 months¹⁰ and at 12 months.¹¹ San Nicoló et al^{8,9} published 1- and 2-year evaluations of NVC treatment with the Lateral implant, reporting significant improvement of NAO symptoms and improvement of NOSE scores.

As one of the most technically challenging operations, rhinoplasty may have revision rates range from 5% to 15%, with numerous patients requiring revisions for postoperative NAO symptoms and compromised breathing.^{16–18} Up

Table 1. Demographics of Patients Who Underwent Revisional Rhinoplasty with Lateral Implant Placement

Case	Sex	Age	Medical History	Surgical History	Indication	Procedure
1	F	27	Nasal septum deviation	Septoplasty Turbinate reduction	Nasal obstructive symptoms Lateral wall collapse	Septoplasty Turbinate reduction Spreader grafting Bilateral concha endoscopic excision Bilateral Lateral implant placement
2	F	49	Nasal fracture, 3 times Septal perforation	Septoplasty Turbinate reduction	Nasal obstructive symptoms Lateral wall collapse	Spreader grafting Unilateral Lateral implant placement
3	M	59	Sinus disease Nasal septum deviation Obstructive sleep apnea	Septoplasty Turbinate reduction	Nasal obstructive symptoms Lateral wall collapse	Septoplasty Turbinate reduction Spreader grafting Cartilage graft harvest Bilateral Lateral implant placement
4	M	41	Nasal septum deviation Nasal trauma	Sinuplasty Turbinate reduction, 3 times	Nasal obstruction symptoms Lateral wall collapse	Septoplasty Unilateral Lateral implant placement
5	F	66	Basal cell carcinoma, left intranasal/rim mass	Mohs resection	Composite nasal tip, fort triangle, alar rim defect reconstruction Nasal obstructive symptoms Lateral wall collapse	Full thickness skin graft from supraclavicular area Unilateral Lateral implant placement
6	M	57	Nasal septum deviation Sinus disease	Sinuplasty Septoplasty Turbinate reduction	Nasal obstruction symptoms Lateral wall collapse	Spreader grafting Left alar batten grafting Unilateral Lateral implant placement

F, female; M, male.

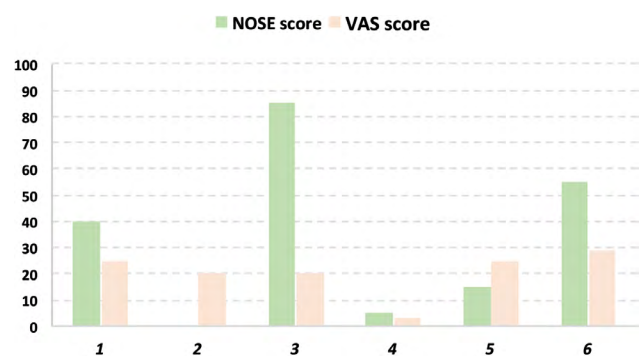


Fig. 3. NOSE and VAS score results. VAS score: 0 indicating no difficulty to 100 indicating maximum imaginable difficulty. NOSE score: 0 indicating no problems to 100 indicating the worst possible problems with nasal obstruction. The NOSE score severity classification: mild (5–25 points), moderate (30–50 points), severe (55–75 points), and extreme (80–100 points).

to 70% of these revision patients report breathing as the main complaint, whether from residual septal deviation, nasal valve stenosis, or alar collapse.^{19,20} A satisfactory outcome may be especially difficult to achieve given surgical alteration or potential weakening of the nasal soft tissue, cartilage system, and prior use of standard options (septoplasty, spreader grafting, turbinate reduction). The senior author has not found consistent success with conventional cartilage (rib, septum, ear) grafting of the midvault for nasal soft tissue collapse for nasal obstruction; weighing the morbidity of a remote donor site, we sought an alternative procedure. From the findings of our study, the absorbable Lateral implant may be a useful adjunct due

to the support it provides the upper and lower lateral cartilages of the nose, separate from the internal nasal valve and internal anatomy of the nose. The senior author also notes that patients who have had multiple reduction rhinoplasties may not have enough cartilage and placement of Lateral implant could be challenging.

The main limitations of this study are sample size and missing baseline NOSE and VAS scores to compare with postoperative follow-up results. Additionally, instruments used in this study are subjective, and patient variability in reporting is another important consideration. Moreover, the true impact of the Lateral implant on nasal obstruction improvement may be difficult to isolate given that patients had concurrent procedures.

CONCLUSIONS

The Lateral implant is potentially useful in helping surgeons improve certain patients' NAO symptoms due to midvault soft tissue collapse. Apart from use in NVC treatment, it may be considered for use in complex functional rhinoplasty cases given the relatively satisfactory outcomes. However, nasal obstruction is still multifactorial from the standpoint of the nasal lining, environmental causes, and other etiologies.

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