

# A simple and reliable method of patient evaluation in the surgical treatment of nasal obstruction

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## Abstract

*We have developed a simple method of evaluating nasal obstruction both before and after corrective surgery. With our system, patients self-rate their nasal patency on a 10-point visual analog scale under different conditions. After a baseline self-assessment, patients rate their breathing while the examiner lifts the lower lateral nasal cartilage with an ear curette and again during lifting of the upper lateral cartilage. Separate assessments during cartilage support are made before and after the patient has received nasal decongestion therapy. The results of these manipulations help identify the specific structural abnormality and its anatomic site, thereby serving as a reliable aid to planning surgery (i.e., open septorhinoplasty, turbinoplasty, external valve surgery with alar batten grafts, and/or internal valve surgery with spreader grafts with or without composite skin/cartilage grafts). We tested our method in preoperative evaluation and surgical planning on 19 patients with nasal obstructions. Our method was just as useful in making postoperative assessments, and it allowed us to judge the effectiveness of specific procedures in restoring nasal patency. Of the 19 patients, 18 (94.7%) reported that their nasal breathing had improved following surgery.*

## Introduction

Nasal obstruction is associated with a variety of deformities of the intranasal structures. Typically, three areas of the nose are addressed surgically to alleviate nasal obstruction: the medial wall, the lateral wall, and the nasal

valves. Evaluation of the separate nasal substructures individually as well as the nasal cavity as a whole is important in guiding surgical management. By evaluating each area systematically, the physician can tailor the surgical approach to the degree of obstruction and to the specific anatomic deformity.<sup>1</sup>

However, the contribution of each nasal area or substructure to a patient's sensation of nasal obstruction has been difficult to quantify. To overcome this problem, we have developed a simple systematic approach to identifying the degree and location of specific anatomic abnormalities. This information allows us to determine which type of surgery—open septorhinoplasty, turbinoplasty, external valve surgery with alar batten grafts, and/or internal valve surgery with spreader grafts with or without composite skin/cartilage grafts—is likely to be most successful. Our method is also useful in evaluating nasal patency following surgery. In this article, we describe the details of our method and we report the results of its use in 19 patients with nasal obstruction.

## Description of our method

**Preoperative evaluations.** The first step in our method is to perform a detailed intranasal examination of the septum, the turbinates, the mucosa, and the middle meati with a speculum and endoscopic rhinoscopy. The next step is to establish a subjective but quantitative baseline value by having the patient self-rate the perceived degree of nasal patency according to a visual analog scale of 0 (no patency) to 10 (maximum patency). The patient provides an overall rating as well as a rating of each side independently.

Next, the patient uses the same rating scale to score his or her patency while the examiner performs a modified Cottle maneuver that involves two different nasal manipulations: *lower* lateral cartilage support (figure 1) and *upper* lateral cartilage support (figure 2). To accomplish the former, the examiner uses a small ear curette to elevate

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Figure 1. A: Lower lateral cartilage support is performed by using an ear curette to gently support the external nasal valve. B: Position of the curette outside the nose simulates its position within.

the lower lateral cartilage just enough to mimic the support that the patient would be expected to attain with surgical grafting. The same technique is used to elevate the upper lateral cartilage.

The patient is then administered decongestion therapy with 0.25% phenylephrine HCl, and all examinations and manipulations are repeated and scored.

**Choice of surgical procedure.** If lower lateral cartilage support results in an increase in patency, we make the decision to improve the external valve by fashioning septal cartilage (or ear conchal cartilage) into thin alar batten grafts and placing them into the exact location of the improvement in patency.<sup>2</sup>

If upper lateral cartilage support yields increased patency, we provide support to the internal valve surgically. We fashion spreader grafts from septal cartilage and place them on the appropriate side between the upper lateral cartilage and the dorsal septum.<sup>3</sup>

If decongestion succeeds in increasing patency, we make the decision to reduce the inferior turbinates either with out-fracture and cautery or with a potassium titanyl phosphate (KTP) laser.

During the surgery itself, if a septal deviation is present caudally at the external nasal valve or more centrally at the internal nasal valve, it is corrected.<sup>4</sup> We then harvest a

portion of the posterior inferior septal cartilage, ensuring that its size is appropriate for the grafting site.

The treatment of one nasal subsite does not preclude the treatment of another.

**Follow-up.** Patients are re-evaluated 6 months postoperatively. They again self-rate their nasal patency before and during the same modified Cottle maneuvers. Results are used to determine whether the surgical procedure led to an improvement in patency at the specific areas of nasal obstruction in comparison with the patient's preoperative rating.

#### Study: Patients and methods

Our study included 19 patients with nasal obstruction—11 females and 8 males, aged 15 to 54 years (mean: 37). Sixteen patients were found to have septal deformities, and they underwent septoplasty. Twelve patients responded to preoperative decongestion therapy, and they underwent turbinoplasty. Five patients experienced improved nasal breathing during preoperative lower lateral cartilage support (mean improvement: 2.9 points), and they received a total of seven alar batten grafts (three unilateral and four bilateral). Fourteen patients experienced improvement (mean: 3.1 points) during preoperative upper lateral cartilage support, and they received a

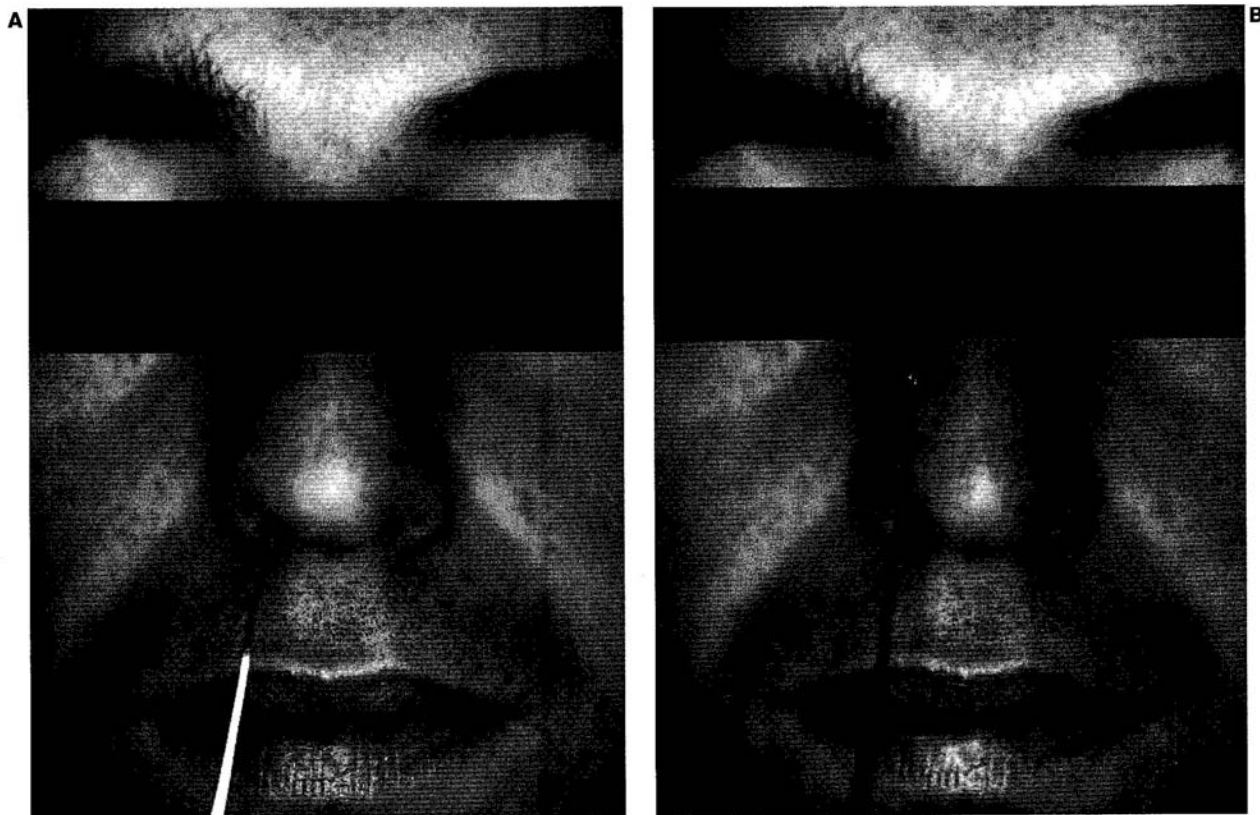


Figure 2. **A:** Upper lateral cartilage support is performed by using the curette to gently support the internal nasal valve. **B:** Position of the curette outside the nose simulates its position within.

total of 21 spreader grafts (seven unilateral and seven bilateral).

During follow-up (mean: 24 mo), patients were re-evaluated in the manner described above.

### Results

Overall, improvement in nasal patency following surgery was reported by 18 of the 19 patients (94.7%). Nine patients (47.4%) noted improvement within the first month, four (21.1%) within 2 months, three (15.8%) within 4 months, one (5.3%) within 6 months, and one within 1 year.

All 16 patients who underwent septoplasty and 11 of the 12 (91.7%) who underwent turbinoplasty reported subjective improvement in nasal breathing (table).

Improvement (mean: 3.6 points) was reported by all five patients who received alar batten grafts. During the postoperative modified Cottle maneuver at the external nasal valve in this group, there was a minimal or no increase (mean: 1.3 points) in airflow in four of the five patients (80.0%) and in six of the seven grafted sides (85.7%).

Of the 14 patients who received spreader grafts, 13 (92.9%) reported improvement (mean: 2.5 points) in nasal breathing postoperatively. During postoperative

modified Cottle maneuvers at the internal nasal valve, 11 of 14 patients (78.6%) and 17 of the 21 grafted sides (81.0%) were deemed to be successfully treated, as additional postoperative upper lateral cartilage support did not result in any significant additional increase (mean: 1.7 points) in airflow.

### Case reports

**Patient 1.** A 44-year-old white woman complained of bilateral nasal obstruction following nasal trauma. During her preoperative examination, she rated her breathing as 4 on the right and 2 on the left. During the modified Cottle maneuver, her breathing improved to 5 on the right and 4 on the left with support of the lower lateral cartilage. With support of the upper lateral cartilage, her breathing improved to 7 on the right and 6 on the left. She responded to decongestion therapy.

We performed open septorhinoplasty and placed a batten graft on the left and spreader grafts bilaterally. We also performed a turbinoplasty with the KTP laser. Postoperatively, the patient reported that she first noticed an improvement in her breathing at 2 months. At 24 months, she rated her overall breathing as 8 on both sides. Her patency improved to 9 with further lower and upper lateral cartilage support during the modified Cottle maneuver.

**Patient 2.** A 33-year-old white man reported long-standing obstruction in his right nasal passage. On initial evaluation, he rated his breathing as 5 on the right and 8 on the left. During lower lateral cartilage support, his breathing improved to 6 on the right and 9 on the left; with upper lateral cartilage support, his scores rose to 8 on the right and 9 on the left.

We performed open septorhinoplasty and placed a batten graft and a spreader graft on the right. At 3 months postoperatively, the patient reported that his nasal breathing had improved. At 12 months, he rated his breathing as 9 on the right and 10 on the left, with and without support provided by the modified Cottle maneuvers.

### Discussion

Restoration of nasal patency is a complex undertaking. The nose is an intricate structure, and various subsites contribute to nasal airflow. A simple, valid, office-based method that allows for quantitative and qualitative measurement of nasal obstruction would be an aid to both preoperative planning and postoperative assessment.

Historically, various methods have been used to evaluate nasal obstruction. Rhinomanometry was established in the 1950s as the first adequate means of objectively evaluating nasal patency. Unfortunately, this method is impractical in everyday office practice and its findings do not necessarily correlate with patients' subjective assessments of nasal obstruction.<sup>3,5-7</sup>

Measurement of nasal resistance provides important and impartial data for airflow analysis in an academic setting, and it is a useful tool for comparing pre- and postoperative changes. Likewise, acoustic rhinometry is useful in making postoperative comparisons by quantifying changes in the cross-sectional area of the nasal cavity.<sup>8</sup> However, as reliable as these methods are, each requires machinery that is not always available in office and clinic settings.

The use of the modified Cottle nasal manipulations is a simple, accurate, and accessible method of evaluating nasal patency. With this technique, the surgeon can pinpoint the level of obstruction, choose the most appropriate type of surgery, simulate postoperative improvement, and predict the surgical outcome with confidence. Although our method involves no objective measurement, we believe that patients' subjective self-ratings are reliable.

One measure of the method's effectiveness is the fact that 11 of the 14 patients (78.6%) who received spreader grafts and four of the five (80.0%) who received alar batten grafts did not experience any additional improvement in nasal breathing during further postoperative cartilage support with the modified Cottle maneuver (table); in other words, patency following surgery had been maximized. In sum, patients improved so much following surgery that additional opening of the nasal valve did not enhance their sensation of airflow.

**Table. Number of patients with successful postoperative outcomes according to the type of surgical procedure**

Procedure	Patients n (%)	Grafted sides n (%)
Septoplasty	16/16 (100.0)	—
Turbinoplasty	11/12 (91.7)	—
Alar batten grafting (during unsupported breathing)	5/5 (100.0)	—
Alar batten grafting (during support of the external nasal valve)	4/5 (80.0)	6/7 (85.7)
Spreader grafting (during unsupported breathing)	13/14 (92.9)	—
Spreader grafting (during support of the internal nasal valve)	11/14 (78.6)	17/21 (81.0)

We recommend the use of these simple nasal manipulations in formulating an operative plan. This method enables surgeons to predict whether the patient will benefit most from septoplasty, turbinate reduction, or nasal valve support. The modified Cottle maneuver is easy to understand and perform, and it involves the patient directly in the evaluation and treatment of his or her health.

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