

## Main Article

Isabelle Williams takes responsibility for the integrity of the content of the paper

**Cite this article:** Williams IJM, Chin Liu M, Navaratnam AV, Ferguson M. Nasal obstruction symptom evaluation score outcomes in patients awaiting septoplasty at a tertiary ENT centre. *J Laryngol Otol* 2024;**138**:902–905. <https://doi.org/10.1017/S0022215124000483>

Received: 27 September 2023  
Revised: 18 December 2023  
Accepted: 5 January 2024  
First published online: 16 April 2024



### Keywords:

Clinical trial; cost-effectiveness; nasal obstruction; nasal septum; septoplasty; turbinates

### Corresponding author:

Isabelle Williams;  
Email: [isabelle.williams7@nhs.net](mailto:isabelle.williams7@nhs.net)

# Nasal obstruction symptom evaluation score outcomes in patients awaiting septoplasty at a tertiary ENT centre

Isabelle J M Williams<sup>1,2</sup> , Melanie Chin Liu<sup>2,3</sup>, Annakan V Navaratnam<sup>2,4</sup>  and Mark Ferguson<sup>2</sup>

<sup>1</sup>Evelina London Children's Hospital, London, UK, <sup>2</sup>ENT Department, Imperial College Healthcare NHS Trust, London, UK, <sup>3</sup>University of Leeds, Leeds, UK and <sup>4</sup>University College London Hospitals NHS Foundation Trust, London, UK

## Abstract

**Objective.** Nasal septoplasty is one of the most performed procedures within ENT. Nasal obstruction secondary to a deviated nasal septum is the primary indication for functional septoplasty. Since the coronavirus disease 2019 pandemic, waiting lists have increased and are now long. This study assessed patients on the waiting list for septoplasty and/or inferior turbinate reduction surgery using the Nasal Obstruction Symptom Evaluation instrument.

**Method.** Patients on our waiting list for septoplasty and/or inferior turbinate reduction surgery were reviewed using a validated patient-reported outcome measure tool to assess symptom severity.

**Results.** Eighty-six out of a total of 88 patients (98 per cent) had Nasal Obstruction Symptom Evaluation scores of 30 or more. In addition, 78 (89 per cent) and 50 (57 per cent) patients were classified as having 'severe' or 'extreme' nasal obstruction, respectively. Two patients scored less than 30 and were classified as having non-significant nasal obstruction.

**Conclusion.** The Nasal Obstruction Symptom Evaluation instrument is a quick and easy way to validate septoplasty waiting lists. In this study, two patients were identified who no longer required surgery.

## Introduction

Nasal airway obstruction is one of the most common symptoms that patients report when seeing an ENT surgeon. Although aetiologies vary, a deviated nasal septum is the most common cause of unilateral nasal airway obstruction.<sup>1</sup> Debilitating symptoms may result including breathing difficulty, epistaxis, sinus infection, headache, snoring and sleep disturbances, as well as worsening sleep apnoea<sup>2</sup> due to poor compliance with nasal continuous positive airway pressure support.

Nasal septoplasty is typically indicated when patients complain of unilateral or bilateral nasal airway obstruction attributable to a deviated nasal septum, or to facilitate medical treatment in rhinitis or chronic rhinosinusitis when treatment has failed as a result of septal position. Despite being a frequently performed ENT operation in adults,<sup>3</sup> nasal septoplasty accounts for a large proportion of elective surgery backlog. Indeed between 2017 and 2018, there were 16 782 septoplasties carried out in England alone, with reported costs to the National Health Service (NHS) standing at around £18 million each year.<sup>4</sup> Junior doctor industrial action has compounded the problem.<sup>5</sup>

Patients are currently listed for septoplasty based on subjective clinical assessment of the impact of septal deviation on the affected airways. Growing pressures on elective care<sup>6</sup> necessitate discussions surrounding optimising and streamlining septoplasty waiting lists. This involves ensuring that patients remain suitably listed for surgery, investigating patients for co-morbid disease and attempting to prioritise patients with symptoms of severe nasal airway obstruction.

The Nasal Airway Obstruction Study is a multicentre, open-label, randomised controlled trial comparing septoplasty to medical management in adults with nasal obstruction.<sup>7</sup> This study utilised the Nasal Obstruction Symptom Evaluation questionnaire to assess the nasal airway obstruction symptoms of patients.<sup>7</sup> Patients eligible for septoplasty had a septal deflection visible at nasendoscopy and a nasal symptom score of 30 or more using the Nasal Obstruction Symptom Evaluation scale,<sup>8</sup> a validated five-item self-reported score of nasal-blockage severity. This statistically significant threshold was based on findings from Lipan and colleagues, who compared Nasal Obstruction Symptom Evaluation scores from patients presenting with nasal airway obstruction (study group) with those of patients presenting for cosmetic nasal surgery reporting no nasal airway obstruction (comparison group).<sup>9</sup>

We hypothesised that the Nasal Obstruction Symptom Evaluation questionnaire would be an easy and effective way to validate our septoplasty waiting list.

## Materials and methods

All adult (aged 18 years and over) septoplasty patients on the waiting list for nasal septoplasty and/or inferior turbinate reduction surgery at Charing Cross Hospital, London, UK, were identified. Patients were called by either a junior doctor or a medical student and invited to participate. Patients unable to be contacted were called at least three times over the course of the study period (July and August 2022). Nasal Obstruction Symptom Evaluation questionnaires were completed via telephone.

The inclusion criteria were age 18 years and over and listed for septoplasty and/or inferior turbinate reduction under the ENT team at Charing Cross Hospital. The exclusion criteria were patients awaiting rhinoplasty and/or turbinoplasty and/or columeloplasty or inferior turbinate reduction surgery only, or patients who were not currently on a waiting list (no documented clinic appointment or letter) or who had already had surgery (at Charing Cross Hospital or elsewhere).

## Results

Initially, 135 patients were identified, 11 of whom were excluded (because they were not actually on the waiting list and/or there was no documented clinic appointment or letter, or the patient had already received surgery at our trust or elsewhere, or the patient was listed for a procedure not including septoplasty). Of the 124 patients meeting the inclusion criteria, 99 were able to be contacted. Eleven patients refused to participate, giving a response rate of 71 per cent (88 out of 124). In total, 55 per cent of respondents were listed for septoplasty by doctors of registrar or fellow level, with 39 and 6 per cent of patients being listed by a consultant or senior house officer, respectively.

## Basic demographics

The average age of patients completing the Nasal Obstruction Symptom Evaluation questionnaire was 39, with a slight male predominance (52 per cent male *vs* 48 per cent female). Fifty-nine per cent of patients (52 out of 88) had symptoms of unilateral nasal airway obstruction, whereas 41 per cent (36 out of 88) had bilateral or alternating symptoms of nasal airway obstruction. Twenty-six per cent (23 out of 88) and 23 per cent (21 out of 88) of patients had a history of previous nasal surgery or trauma, respectively. A significant minority of patients had coexisting inflammatory disease: 38 per cent (33 out of 88) had clinical signs and/or symptoms of allergic rhinitis, of whom 76 per cent (25 out of 33) had had a positive skin-prick allergy test. Seventy-seven per cent of patients (68 out of 88) had trialled steroid nasal spray(s).

## Nasal Obstruction Symptom Evaluation scores

Eighty-six patients (98 per cent) scored 30 or more using the Nasal Obstruction Symptom Evaluation instrument. In addition, 28 out of 88 (32 per cent) and 50 out of 88 (57 per cent) patients met the 'severe' or 'extreme' nasal airway obstruction category requirements, respectively. The overall mean Nasal Obstruction Symptom Evaluation score was 76

(standard deviation 20). Subgroup analysis revealed mean scores of 73 and 78 for males and females, respectively. Two outliers scored less than 10 (both male patients, one of whom had significant improvement with intranasal steroids). The median scores for both males and females were the same (80).

## Discussion

Surgery for a deviated nasal septum improves quality of life (QoL) more than non-surgical alternatives as measured using the Nasal Obstruction Symptom Evaluation scoring system.<sup>10</sup> Whilst suggested by authors previously,<sup>9</sup> there is less evidence for the use of the questionnaire prospectively as a tool to screen patients awaiting nasal surgery. There is also no current national guidance available from NHS Clinical Commissioning Groups regarding which patients should be listed for septoplasty.<sup>11</sup>

Using a pre-defined threshold of 30 on the Nasal Obstruction Symptom Evaluation scale to warrant nasal surgery in patients with nasal airway obstruction secondary to a deviated nasal septum, the Nasal Airway Obstruction Study demonstrates greater improvement in Sino-Nasal Outcome Test 22 (SNOT-22) scores as well as QoL outcomes and nasal inspiratory peak flow rates in participants randomised to the septoplasty group (*vs* medical management).<sup>7</sup>

The Nasal Obstruction Symptom Evaluation questionnaire is a quick and simple way to evaluate patients on septoplasty waiting lists, helping to identify patients still requiring surgery. Ninety-eight per cent of patients on the septoplasty waiting list qualified for surgery using a cut-off of 30 or more, signifying that most patients were appropriately listed. Two patients who scored less than 10 showed significant improvement in their nasal airway obstruction symptoms with intranasal steroid(s) and no longer met septoplasty criteria.<sup>7</sup>

- Nasal obstruction is a very common ENT complaint and may result from nasal septal deviation
- Elective waiting lists for functional septoplasty are long and there is no national guidance available regarding which patients should be listed for nasal surgery
- The Nasal Obstruction Symptom Evaluation questionnaire is a patient-reported outcome measure that has been used retrospectively to demonstrate the effectiveness of nasal septal surgery
- The Nasal Obstruction Symptom Evaluation questionnaire was demonstrated to be a reliable and effective tool to prospectively screen septoplasty waiting lists, identifying patients no longer requiring surgery and/or those with co-morbid disease for whom peri-operative medical optimisation is necessary

As patients can be waiting for functional septal surgery for several months, if not years, it is essential to have a reliable and standardised tool that can be used to re-evaluate symptoms of nasal airway obstruction at regular intervals, prospectively validating waiting lists.

## A different approach to elective waiting lists

Utilising the time between contemplation of surgery and admission for surgery to optimise medical, physical and psychological health through lifestyle and medical preparatory measures can improve surgical outcomes.<sup>12</sup> Existing elective waiting lists ('preparation' lists) offer the ideal opportunity to implement such interventions,<sup>12</sup> as well as to enable

ongoing discussion between patient and surgeon regarding the benefits, risks and alternatives to surgery.<sup>13</sup>

In this study, a significant number of patients had coexisting allergic disease and/or chronic rhinosinusitis. Of note, 11 out of 33 patients with documented allergic rhinitis had not undergone skin-prick allergy testing. The 'preparation' period whilst awaiting septoplasty should be used to properly investigate and treat co-morbid patients, ensuring that the factors contributing to their symptoms, aside from a deviated nasal septum, are appropriately addressed.

### *Do increasingly long surgical waiting lists affect quality of life measures?*

Patients waiting for a procedure experience anxiety, depression and poor QoL, which can escalate over time.<sup>14</sup> Whilst not directly comparable to our study, in their retrospective analysis of adult patients with recalcitrant chronic rhinosinusitis undergoing functional endoscopic sinus surgery, Yip and colleagues found that the surgical procedure waiting time was negatively correlated with a change in SNOT-22 score.<sup>15</sup>

Few studies have looked at the influence of patient characteristics on mental health and/or the effectiveness of interventions whilst awaiting functional septoplasty. Several respondents reported feeling unhappy and frustrated as a result of the prolonged wait for their surgery. Indeed, the majority of them had not been apprised of their current standing on the waiting list or provided with a possible surgery date (direct communication with the patients). This highlights the importance of addressing and acknowledging concerns, providing validation and offering support to those on waiting lists. Periodically sending out Nasal Obstruction Symptom Evaluation questionnaires via virtual means could facilitate patient updates and enable self-help strategies to be implemented.

### *Limitations*

Our study was limited by a relatively small sample size precluding any formal statistical analysis. We encountered communication barriers arising from telephone consultation, including language barriers and hearing impairments. In such instances, we decided against using emailed questionnaires because of the risk of introducing bias. Our study was also susceptible to cognitive bias because participants might have held the belief that a higher Nasal Obstruction Symptom Evaluation score increased the likelihood of them undergoing septoplasty and could potentially impact the timing of their surgery.

Furthermore, Lipan and colleagues employed a Receiver Operating Characteristic (ROC) Curve analysis<sup>16</sup> to establish a Nasal Obstruction Symptom Evaluation score threshold of 30 for distinguishing between individuals with and without nasal airway obstruction.<sup>7,9</sup> This threshold is statistically significant but lacks validation against alternative objective metrics or treatment response, rendering it clinically inconclusive. Nonetheless, other studies have suggested a correlation between nasal inspiratory peak flow and symptom (SNOT-22) scores.<sup>17</sup>

It will be crucial to carefully examine and evaluate individuals with high Nasal Obstruction Symptom Evaluation scores (greater than 30) in the absence of nasal airway obstruction, such as those in Lipan *et al.*'s comparison group undergoing

cosmetic rhinoplasty, to confirm the true absence of nasal airway obstruction.<sup>9</sup>

Our patient cohort should be re-evaluated post-operatively using a minimum important difference in Nasal Obstruction Symptom Evaluation scores to signify treatment success in nasal airway surgery.<sup>18</sup> Future studies should investigate specifically if patients in the 'severe' or 'extreme' nasal obstruction categories gain greater benefit from septoplasty surgery. However, given that the Nasal Obstruction Symptom Evaluation instrument is subjective and influenced by several physical, psychological as well as social factors, findings will need to be analysed in the context of the patient cohort.

It is important to highlight that the Nasal Airway Obstruction Study cohort included patients with causes of nasal airway obstruction other than septal deviation, and there was a lack of documentation regarding the extent and location of septal deviation as well as the specific surgical approach taken.<sup>11</sup> Listing for functional septoplasty requires documented evidence of anatomical nasal airway obstruction (deviated nasal septum) accompanied by a comprehensive assessment and management of coexisting sinonasal conditions. Indeed, consensus opinion from the USA supports a four-week trial of intranasal steroid prior to septoplasty to assess surgical candidacy.<sup>19</sup> In addition, documenting the extent and location of the septal deviation is crucial because this aids in delineating which type of septal deviation benefits most from septoplasty and guides the selection of an optimal surgical approach.<sup>11</sup>

### *Conclusion*

This small study demonstrates that the Nasal Obstruction Symptom Evaluation questionnaire is a reliable, easy and effective way to evaluate septoplasty waiting lists, identifying patients for whom surgery is no longer required.

### *References*

- Gillman GS, Egloff AM, Rivera-Serrano CM. Revision septoplasty: a prospective disease-specific outcome study. *Laryngoscope* 2014;**124**:1290–5
- Teixeira J, Certal V, Chang ET, Camacho M. Nasal septal deviations: a systematic review of classification systems. *Plast Surg Int* 2016;**2016**:7089123
- Lee DJ, Jo H, Kwon HN, Park JH, Kim SD, Cho KS. Causes and management of persistent septal deviation after septoplasty. *Sci Rep* 2022;**12**:19574
- National Institute for Health and Care Research. Surgery for a deviated nasal septum improves quality of life more than non-surgical approaches. In: <https://evidence.nihr.ac.uk/alert/surgery-for-a-deviated-nasal-septum-improves-quality-of-life-more-than-non-surgical-approaches/> [19 September 2023]
- Nuffield Trust. Are strikes by health care staff impacting NHS waiting lists? In: <https://www.nuffieldtrust.org.uk/news-item/how-are-strikes-by-health-care-staff-impacting-nhs-waiting-lists> [27 September 2023]
- Royal College of Surgeons. NHS waiting list at record high of over 7.3 million. In: <https://www.rcseng.ac.uk/news-and-events/media-centre/press-releases/rtt-waiting-times-march-2023/> [12 June 2023]
- Carrie S, O'Hara J, Fouweather T, Homer T, Rousseau N, Rooshenas L *et al.* Clinical effectiveness of septoplasty versus medical management for nasal airways obstruction: multicentre, open label, randomised controlled trial. *BMJ* 2023;**383**:e075445
- Stewart MG, Witsell DL, Smith TL, Weaver EM, Yueh B, Hannley MT. Development and validation of the Nasal Obstruction Symptom Evaluation (NOSE) scale. *Otolaryngol Head Neck Surg* 2004;**130**(2):157–63
- Lipan MJ, Most SP. Development of a severity classification system for subjective nasal obstruction. *JAMA Facial Plast Surg* 2013;**15**:358–61
- Egmond MMHT van, Rovers MM, Hannink G, Hendriks CTM, Heerbeek N van. Septoplasty with or without concurrent turbinate surgery versus

- non-surgical management for nasal obstruction in adults with a deviated septum: a pragmatic, randomised controlled trial. *Lancet* 2019;**394**:314–21
- 11 Navaratnam AV, Pendolino AL. Septoplasty for nasal obstruction. *BMJ* 2023;**383**:2341
- 12 Levy N, Selwyn DA, Lobo DN. Turning 'waiting lists' for elective surgery into 'preparation lists'. *Br J Anaesth* 2021;**126**:1–5
- 13 Santhirapala R, Fleisher LA, Grocott MPW. Choosing wisely: just because we can, does it mean we should? *Br J Anaesth* 2019;**122**:306–10
- 14 Gagliardi AR, Yip CYY, Irish J, Wright FC, Rubin B, Ross H *et al.* The psychological burden of waiting for procedures and patient-centred strategies that could support the mental health of wait-listed patients and caregivers during the COVID-19 pandemic: a scoping review. *Health Expect* 2021;**24**(3):978–90
- 15 Yip J, Hao W, Eskander A, Lee JM. Wait times for endoscopic sinus surgery influence patient-reported outcome measures in patients with chronic rhinosinusitis who fulfill appropriateness criteria. *Int Forum Allergy Rhinol* 2019;**9**:396–401
- 16 Hoo ZH, Candlish J, Teare D. What is an ROC curve? *Emerg Med J* 2017;**34**:357–9
- 17 Ottaviano G, Pendolino AL, Scarpa B, Torsello M, Sartori D, Savietto E *et al.* Correlations between peak nasal inspiratory flow, acoustic rhinometry, 4-phase rhinomanometry and reported nasal symptoms. *J Pers Med* 2022;**12**:1513
- 18 Ziai H, Bonaparte JP. Determining a successful nasal airway surgery: calculation of the patient-centered minimum important difference. *Otolaryngol Head Neck Surg* 2017;**157**:325–30
- 19 Han JK, Stringer SP, Rosenfeld RM, Archer SM, Baker DP, Brown SM *et al.* Clinical consensus statement: septoplasty with or without inferior turbinate reduction. *Otolaryngol Head Neck Surg* 2015;**153**:708–20