Components of the Nasal Examination

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Abstract

Background: Along with patient history, the physical examination is the key component for any patient encounter. Determining what should be included in the nasal examination is critical. Practicing evidenced-based medicine calls for an integration of the clinical/surgical expertise of the provider, the individual patient’s needs and preferences, and the application of the current best medical knowledge found in the literature, so the results of a survey on current practices can help physicians place their own practice in context.

Objective: The author presents the results of a survey on current practices in nasal examination and gives an evidence-based review of those practices.

Methods: The attendees of the 2011 Rhinoplasty Society meeting in Boston, Massachusetts, were asked to complete a questionnaire concerning components of the nasal examination in functional cases.

Results: The questionnaire was completed by 49 of 60 attendees. Results showed that anterior rhinoscopy is routinely part of the exam to assess for nasal function. The majority of respondents use a patient questionnaire to assess function, followed in decreasing frequency by response to decongestant spray to confirm evidence of turbinate hypertrophy, nasal endoscopy, computed tomography scan, rhinomanometry, acoustic rhinometry, Cottle maneuver, and response to nasal strips to assess for internal and/or external nasal valve compromise.

Conclusions: The results of this physician survey and literature review support the inclusion of anterior rhinoscopy, patient questionnaire, endoscopy, decongestant spray rhinomanometry, and nasal strips as important components of a nasal examination.

Keywords

septoplasty, rhinoplasty, rhinomanometry, turbinate, acoustic rhinometry

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Using the appropriate examination techniques in functional nasal cases is critical in making the proper diagnosis, planning the appropriate surgical intervention, and evaluating the operative result (both long and short term). In this study, the author assessed the results of a questionnaire administered to experienced nasal surgeons as a source for determining common examination techniques in current clinical practice. He then subjected these practices to an evidence-based literature review to judge which examination techniques are most indicated.

RESULTS

The questionnaire was completed by 49 of 60 attendees. Almost half of the respondents (n = 24) had been in practice for more than 20 years. Twenty respondents had performed more than 50 functional nasal surgeries the previous year. Concerning components of the nasal examination, anterior rhinoscopy was used by almost all respondents (49 of 49...
utilized this technique preoperatively and 47 of 49 postoperatively), a patient questionnaire was used by the majority of respondents (32 of 49), and the following techniques were used in a lower percentage: endoscopy by 14 of 49 preoperatively and 8 of 49 postoperatively, evaluation of the patient’s response to decongestant spray by 20 of 49 preoperatively and 13 of 49 postoperatively, acoustic rhinometry by 1 of 49 preoperatively and 1 of 49 postoperatively, and rhinomanometry by 4 of 49 preoperatively and 3 of 49 postoperatively. Additional components of the exam included Cottle maneuver (4 of 49 preoperatively and 1 of 49 postoperatively) and response to over-the-counter nasal strips (3 of 49 preoperatively and 0 of 49 postoperatively).

**DISCUSSION**

Evidence-based medicine dictates an integration of the clinical/surgical expertise of the provider, the individual patient’s needs and preferences, and application of the current best medical knowledge found in the literature. To determine the individual patient’s needs and preferences, an appropriate history and physical examination are needed. The results of this questionnaire of surgeons at the 2011 Rhinoplasty Society meeting can be used as a reference for common practices for nasal examination in functional rhinoplasty cases since the results represent a range of chronological and surgical experience. Only anterior rhinoscopy and patient questionnaire were used by a majority of respondents queried at the 2011 Rhinoplasty Society meeting.

In comparing the questionnaire results to the existing literature on functional rhinoplasty examination techniques, it should be noted that both the quality and quantity of nasal surgery literature are increasing. A comparison of the nasal surgery literature for 1991, 2001, and 2011 in Pubmed.com using the terms *septoplasty, rhinoplasty, and turbinate reduction* shows an approximate tripling each decade of Level of Evidence (LOE) category 1 and 2 articles and a doubling of articles overall (1991: 6 of 149 articles were LOE category 1 or 2; 2001: 18 of 250 were LOE category 1 or 2; 2011: 56 of 477 were LOE category 1 or 2). Readers and surgeons should take advantage of the expanding literature, as well as results from colleague questionnaires such as the one presented in this article, when formulating an operative plan in their own practices.

Anterior rhinoscopy is considered an essential and universal part of the nasal examination. Either a headlight or head mirror can be used. Anterior rhinoscopy allows direct examination of any mid to anterior nasal structures or abnormalities, including most septal deviations, turbinates, recognition of nasal masses, response of tissues during quiet and forced inspiration, and so on.

The use of nasal endoscopy in patients presenting with the primary complaint of nasal obstruction as necessary to rule out posterior causes of nasal obstruction not visible by anterior rhinoscopy is well established. The medical literature supports the use of endoscopy even when function may be a secondary complaint. Lanfranchi et al found that 28 of 96 patients who presented for rhinoplasty and complained of nasal obstruction had additional pathology revealed by endoscopy.

Patient questionnaire is also an extremely valuable tool as it is a subjective measure of nasal function. The author uses the questionnaire from the American Academy of...
This questionnaire has been validated in clinical application. The questionnaire is given preoperatively and at each postoperative visit from 1 month forward. Five questions receive a 0 to 5 score, and the total is multiplied by 5 to yield a 0 to 100 scale.

Rhinomanometry is an objective measure of nasal function. It is the only quantifiable objective measure of nasal function currently available. The author uses the rhinomanometer from GM-Instruments (Kilwinning, UK). The cost is approximately $6000. There is a Current Procedural Terminology (CPT) code (92512), a Relative Value Unit of 0.55, and a range of current reimbursement from $29 to $65. The author uses a posterior test where the patient holds a mask against the face and places a small tube in the mouth (Figure 2). Air pressure and rate of airflow are measured and used to calculate nasal resistance. By convention, 4 nasal breath cycles are recorded and resistance calculated at 75 Pascals pressure gradient during inspiration. The author’s own rhinomanometry graph, or pressure flow curve, is shown in Figure 3. Normal resistance is 0.3 Pascals/mL/s or less.

Rhinomanometry is the best way to measure nasal function and response to decongestant spray. Knowing the response to spray is critical for any patient in whom turbinate hypertrophy is suspected. Turbinate hypertrophy is recognized as one of the most common causes of nasal obstruction. Berger et al have shown that hypertrophied inferior turbinates have a wider lamina propria or submucosa compared with normal turbinates. It is this submucosal tissue that responds to decongesting spray. Most authors consider a 30% reduction in nasal resistance (as measured by rhinomanometry) to indicate good response to decongestant spray and therefore indicate that the patient is a good candidate for reduction of submucosal tissue with powered instruments, which has been shown effective in numerous long-term LOE category 1 studies.

Computed tomography (CT) scan is used when indicated by the patient’s standard history or physical examination—for example, to evaluate possible sinus disease. Acoustic rhinometry uses sound waves to give an anatomic, not functional, description of the nasal passage. This tool is used for research but not for routine evaluation in functional cases.

It is important to remember that the nose is the largest contributor to overall airway resistance and that the internal nasal valve is the largest contributor to nasal resistance. The nasal valve is small, with an area of less than three-fourths of a square centimeter. Since airflow through the nose is governed by Poiseuille’s law, the flow is proportional to the square of the cross-sectional area. As such, a small change in the cross-sectional area results in a proportionally larger change in the air flow. For example, a 10% change in cross-sectional area results in a 21% change in the air flow. Many authors, including Constantian, have shown that a significant percentage of both primary and secondary rhinoplasty patients either have or are at risk for having internal or external nasal valve compromise. Gruber et al have shown that over-the-counter nasal strips, but not the Cottle test, can be used to diagnose accurately the presence of internal or external nasal valve weakness.

In summary, the author has found in a literature review that previously published research supports the inclusion of anterior rhinoscopy, patient questionnaire, endoscopy, response to decongestant spray (if there is evidence of turbinate hypertrophy), rhinomanometry, and response to nasal strips (if there is a question of internal or external nasal valve compromise) in a functional nasal exam. Clinically speaking, these tests would be analogous to an Epworth sleep score questionnaire and a sleep study score in patients with sleep apnea. Both of these tests are required by third-party payers prior to approval for sleep apnea surgery. It would come as no surprise to the author if the same type of documentation (ie, subjective questionnaire and objective measure of function) becomes a requirement for approval by third-party payers prior to functional nasal surgery.
CONCLUSIONS

Modern health care techniques should be based on evidence-based medicine. As such, it is appropriate to evaluate with a critical eye all current practices, especially one as basic and important as the nasal examination. When applicable, the medical literature should be used as a guide to dictate best practices and should be combined with the clinical/surgical expertise of the surgeon and the individual patient’s needs and preferences. The adage that one cannot manage what one does not measure has value. Documenting preoperatively and postoperatively the patient’s subjective nasal function with a questionnaire and the patient’s objective nasal function with rhinomanometry allows a quantifiable measure of the patient’s condition and the surgical result.

Disclosures

Dr Murrell is a military service member, and this work was prepared as part of his official duties. The views expressed in this article are those of the author and do not necessarily reflect the official policy or position of the Department of the Navy, Department of Defense, or the US government. Title 17, USC, Section 105 provides that “copyright protection under this title is not available for any work of the United States Government.” The author has no financial or commercial relationships to disclose.

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REFERENCES

9. Constantian MB, Clardy RB. The relative importance of septal and nasal valvular surgery in correcting airway...

