

Otolaryngology -- Head and Neck Surgery

<http://oto.sagepub.com/>

Septoplasty Improves Life Quality Related to Allergy in Patients with Septal Deviation and Allergic Rhinitis

Young Hyo Kim, Beom Joon Kim, Kang Hyun Bang, Yoonseok Hwang and Tae Young Jang
Otolaryngology -- Head and Neck Surgery 2011 145: 910 originally published online 30 September 2011
DOI: 10.1177/0194599811424119

The online version of this article can be found at:
<http://oto.sagepub.com/content/145/6/910>

Published by:



<http://www.sagepublications.com>

On behalf of:



[American Academy of Otolaryngology- Head and Neck Surgery](#)

Additional services and information for *Otolaryngology -- Head and Neck Surgery* can be found at:

Email Alerts: <http://oto.sagepub.com/cgi/alerts>

Subscriptions: <http://oto.sagepub.com/subscriptions>

Reprints: <http://www.sagepub.com/journalsReprints.nav>

Permissions: <http://www.sagepub.com/journalsPermissions.nav>

>> [Version of Record](#) - Nov 30, 2011

[OnlineFirst Version of Record](#) - Sep 30, 2011

[What is This?](#)

Septoplasty Improves Life Quality Related to Allergy in Patients with Septal Deviation and Allergic Rhinitis

Young Hyo Kim, MD, PhD¹, Beom Joon Kim, MD¹,
Kang Hyun Bang, MD¹, Yoonseok Hwang, MD¹, and
Tae Young Jang, MD, PhD¹

Sponsorships or competing interests that may be relevant to content are disclosed at the end of this article.

Abstract

Objective. Evaluate the effect of septoplasty on the clinical course of allergic rhinitis by comparing (1) symptom change using the Visual Analogue Scale (VAS), (2) change of the medication score, and (3) improvement of the quality of life using a questionnaire.

Study Design. Prospective pilot.

Setting. Academic tertiary rhinological practice.

Subjects and Methods. Sixty-two patients who had undergone septoplasty and turbinoplasty for septal deviation and allergic rhinitis were enrolled in group A. Twenty-six patients who had undergone only turbinoplasty for allergic rhinitis were enrolled in group B. The VAS score, the Average Rescue Medication Score (ARMS), and the Rhinasthma Questionnaire for the quality of life were all obtained from each patient. These parameters were compared before and after the surgery and between the groups.

Results. Both groups showed significant improvement of the VAS score ($P < .001$). When the change of VAS was compared between groups, there was a significant difference in group A only for nasal obstruction ($P = .047$). Comparison of the ARMS between groups showed significant improvement in both groups after the surgery ($P < .01$). However, there were no differences between the groups. The Rhinasthma score of group A was significantly lowered after the surgery (56.4 ± 13.2 to 34.1 ± 12.3 , $P < .001$). The Rhinasthma score of group A was significantly lower than that of group B after the surgery ($P = .004$).

Conclusions. This is the first research about the potential effect of septoplasty on the clinical course of allergic rhinitis. Further studies are needed to elucidate the mechanisms underlying these effects.

Keywords

septal deviation, allergic rhinitis, septoplasty, turbinoplasty

Otolaryngology—
Head and Neck Surgery
145(6) 910–914
© American Academy of
Otolaryngology—Head and Neck
Surgery Foundation 2011
Reprints and permission:
sagepub.com/journalsPermissions.nav
DOI: 10.1177/0194599811424119
http://otojournal.org


Received May 5, 2011; revised August 8, 2011; accepted August 31, 2011.

For patients with septal deviation and compensatory turbinate hypertrophy, septoplasty combined with turbinate surgery is more effective in alleviating nasal obstruction than septoplasty alone. Hilberg et al¹ suggested that patients who underwent septoplasty and turbinoplasty were more satisfied with the results. Grymer et al² also suggested that volume reduction of the turbinate was necessary for achieving symptomatic improvement in patients with severe septal deviation.

However, there is still much controversy about the cases with septal deviation and turbinate hypertrophy due to allergic rhinitis. In one study, the patients with septal deviation and concomitant allergic rhinitis reported less symptom improvement after septoplasty.³ Therefore, it was suggested that patients with septal deviation and allergic rhinitis should be considered as a less favorable group to undergo septoplasty than those patients with septal deviation alone.³ Stewart et al⁴ suggested that allergic rhinitis had no effect on the symptom improvement and subjective satisfaction of patients after septoplasty.

Those previous studies were all about the effect of allergic rhinitis on septoplasty. But there is still no study about the reverse, in other words, the effect of septoplasty on allergic rhinitis. We have observed that patients with septal deviation and allergic rhinitis reported improvement of their allergic symptoms after septoplasty in our clinic. So we aimed to evaluate the effect of septoplasty on the clinical course of allergic rhinitis by comparing (1) the change of symptoms using the Visual Analogue Scale (VAS), (2) the change of the medication score, and (3) the improvement of life quality using a questionnaire in patients who have

¹Department of Otorhinolaryngology–Head and Neck Surgery, Inha University School of Medicine, Incheon, Korea

Corresponding Author:

Tae Young Jang, MD, PhD, Department of Otorhinolaryngology–Head and Neck Surgery, College of Medicine, Inha University, 3-Ga Shinheung-dong, Jung-Gu, Incheon, Korea, 400-711
Email: jangty@inha.ac.kr

undergone septoplasty and turbinoplasty and compared with those patients who have undergone turbinoplasty alone.

Methods

Patients

Sixty-two patients who were undergoing septoplasty and radiofrequency tissue volume reduction (RFTVR) under the diagnosis of septal deviation and allergic rhinitis (54 females and 8 males; age range, 11-66 years; mean age, 28.5 ± 11.0 years) from January 2008 to December 2010 were enrolled in group A. As a control, 26 patients who were undergoing only RFTVR under the diagnosis of allergic rhinitis (16 males and 10 females; age range, 8-57 years; mean age, 19.8 ± 11.3 years) during the same period were enrolled in group B. The demographic variables such as age and severity of condition according to the ARIA (Allergic Rhinitis and its Impacts on Asthma) 2008 guideline were not significantly different between groups. Septal deviation was diagnosed or ruled out by rigid nasal endoscopy. In group A, the middle turbinate was only partially visible or not visible because of septal deviation. In group B, the middle turbinate was totally visible with a straight septum. Allergic rhinitis was diagnosed according to the typical clinical symptoms of more than 1 year and a strongly positive result of more than 3 mm or 3+ on a skin prick test (SPT) or a Multiple Allergosorbent Test (MAST) to any provocative antigen. None of the enrolled patients had a history or clinical symptoms of allergic asthma. Patients who had used inhaled or systemic steroid or allergy medication within a month, those with unstable systemic disease, pregnant or lactating women, patients with a history of nasal surgery other than septoplasty and RFTVR within the previous 3 months, those with nasal polyp or chronic sinusitis (which was confirmed by typical symptoms of chronic sinusitis such as nasal stuffiness, purulent rhinorrhea, postnasal drip, or facial fullness combined with endoscopic findings and plain radiograph or computed tomography of the paranasal sinuses), and those with chronic exposure to chemical irritants were excluded from this study. All the patients gave us their written informed consent before the initiation of the enrollment, and this study was approved by the INHA University Institutional Review Board Committee on Studies Involving Human Beings.

Measured Parameters

Before the operation, the baseline symptom scores for nasal obstruction, rhinorrhea, sneezing, and itching were obtained using the VAS. The VAS used a 10-cm line with a dot at every centimeter, and the patients marked the severity of their symptoms from 0 to 10 on the line. The medication score for the previous 6 months before the surgery was checked by the Average Rescue Medication Score (ARMS) system.⁵ It uses a 4-point scale for each day during the follow-up period (0, no medications; 1, oral antihistamines; 2, intranasal corticosteroid; and 3, oral corticosteroid). The Rescue Medication Score (RMS) of each day is the highest score of that day (eg, if a patient took oral antihistamine and used intranasal steroid, then the RMS of that day was

2). The ARMS is the average of the RMS during the entire follow-up period. Therefore, the ARMS ranged from 0 to 3. For the evaluation of the quality of life associated with allergy, we used the Rhinasthma Questionnaire.⁶ It consists of 30 questions about the quality of life related to allergic symptoms, and the patient responds to each question from 0 (*not at all*) to 5 (*very much*). The sum of the scores is converted so that the highest score equals 100. The higher the score, the poorer is the quality of life of that patient.

The VAS, the medication score, and Rhinasthma Questionnaire were all obtained before the operation, and these were repeated after a long-term follow-up period (range, 15-21 months; mean follow-up, 18.4 ± 1.5 months). All scores were obtained by 2 impartial interviewers who were totally blinded about the aim of the study and the surgical procedure each patient received.

Statistical Analysis

We used paired *t* tests and independent *t* tests to compare each of the parameters in a group and between groups. SPSS 17.0 software (SPSS Inc., Chicago, Illinois) was used, and *P* values less than .05 were considered to be statistically significant.

Results

Baseline VAS scores in each group were not significantly different. Group A and group B all showed significant improvement of the VAS score for all nasal symptoms of nasal obstruction, rhinorrhea, itching, and sneezing (paired *t* test, *P* < .001 for all), except for the change of itching in group B (*P* = .110, **Figure 1**).

The change of VAS between the groups revealed that there was significantly more improvement in group A only for nasal obstruction (independent *t* test, *P* = .047). The changes of VAS for the other symptoms were not significantly different between the groups (**Figure 2**).

Comparison of the ARMS before and after the operation revealed that group A and group B subjects all showed improvement of the medication score after the surgery (*P* < .01). However, there were no differences between the groups (**Figure 3**).

The Rhinasthma score of group A was significantly lowered after the surgery (56.4 ± 13.2 to 34.1 ± 12.3 , *P* < 0.001). Although the score of group B was also decreased after the surgery, that change was not statistically significant (54.5 ± 13.2 to 45.3 ± 18.6 , *P* > .05). The Rhinasthma score of group A was significantly lower than that of group B after the surgical management (*P* = .004, **Figure 4**). Determining the change of the Rhinasthma score for each question as the preoperative score minus the postoperative score, we found that group A showed more improvement compared with group B for 9 questions (**Table 1**).

Discussion

In our study, the change of the VAS score for nasal obstruction was greater in group A. This is not surprising and would seem to bear little relation to allergic rhinitis. Surely,

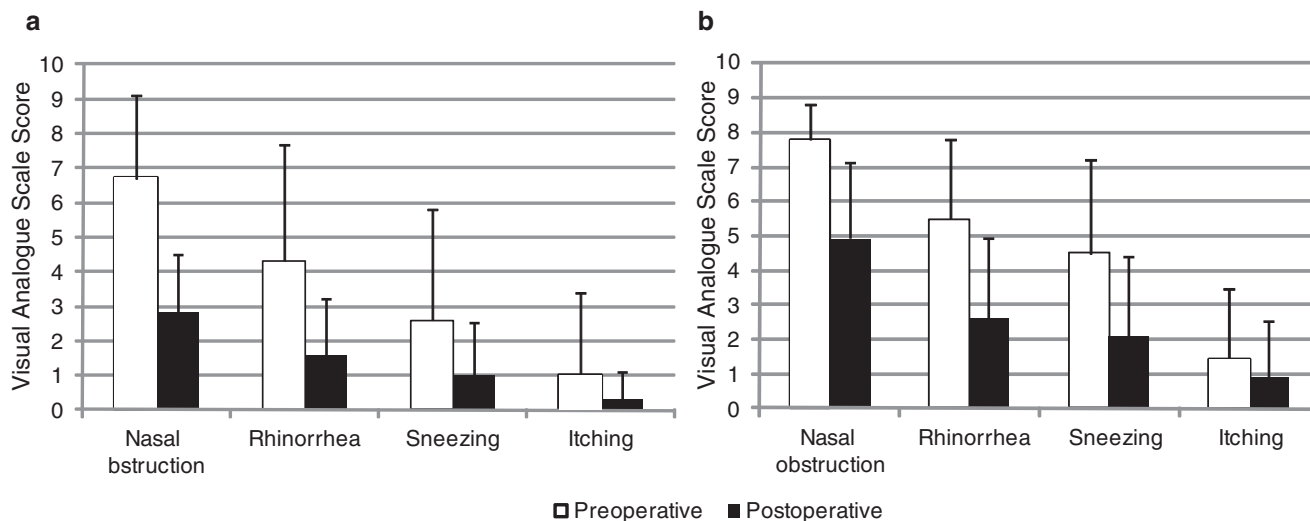


Figure 1. The Visual Analogue Scale score for each nasal symptom before and after surgical management in (a) group A and (b) group B. All the nasal symptoms were significantly improved in both groups except for itching in group B (paired *t* tests, ****P* < .001).

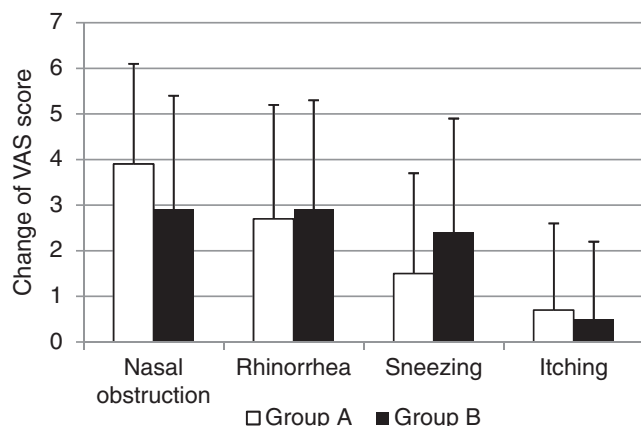


Figure 2. Comparison of the change of the Visual Analogue Scale (VAS) score between the groups. A significant difference was found only for nasal obstruction (independent *t* tests, *P* = .047).

surgical correction of the deviated septum will improve the nasal airway and nasal obstruction. This result is also well correlated with the findings of a previous study.⁷ Correction of septal deviation with concomitant volume reduction of the turbinate might be more effective in alleviating nasal obstruction by improving the nasal patency. Although there was no difference between groups, the VAS scores for nasal obstruction, rhinorrhea, and sneezing did significantly improve after surgery for both groups.

However, the Rhinasthma Questionnaire revealed that the life quality of group A showed significantly more improvement (a larger decrease of the Rhinasthma score) compared with that of group B. There are several possible explanations for this phenomenon. The first possible explanation is the restoration of mucociliary transport (MCT). In a previous study, impaired MCT due to septal deviation was normalized 3 months after the septoplasty.⁸ This restoration

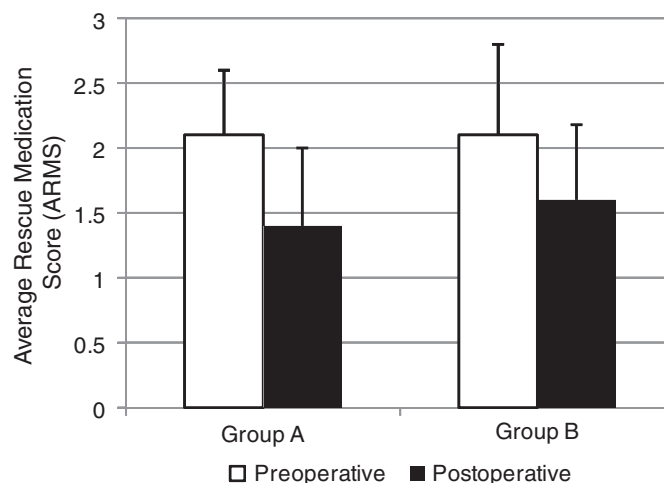


Figure 3. Change of Average Rescue Medication Score (ARMS) before and after surgical management in both groups. Both groups showed a meaningful decrease of the ARMS. Although the postoperative ARMS of group A was lower than that of group B, there was no statistical significance (independent *t* test and paired *t* test, ***P* < .01).

of MCT could contribute to the early washout of the allergenic materials from the nasal cavity so there was improvement of the symptoms.

Another factor is the recovery of normal airflow. According to Jang et al,⁹ the infiltration of inflammatory cells was significantly increased on the concave side of a deviated septum. Those investigators suggested that increased airflow at the concave side could cause an infiltration of inflammatory cells. Therefore, the recovery of normal airflow by septoplasty could contribute to the decrease of the inflammatory cell infiltration. To prove this hypothesis, further research with histological examination is needed in the near future.

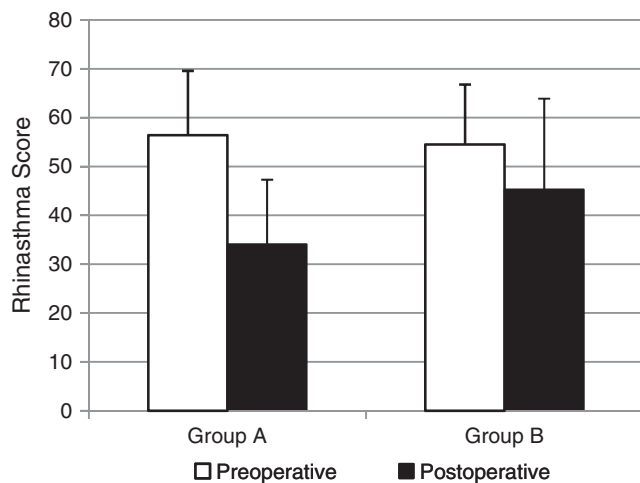


Figure 4. Change of the Rhinasthma score before and after surgical management in both groups. Group A showed a significant decrease of the Rhinasthma score compared with group B (independent *t* test and paired *t* test, ****P* < .001).

Another important point to consider is that the topical anti-allergy spray medications could reach the nasal mucosa better than before because of the resolution of the mechanical barrier. In fact, several components related to medication showed significant improvement on the Rhinasthma Questionnaire in our study. Therefore, the increased effect of topical steroid could have minimized the need for carrying other medications, and this could have improved the quality of life. As a result of an increased anti-allergy effect, the quality of life related to allergic symptoms such as runny nose, sneezing, and clearing the throat could also be improved.

This same tendency was found in the medication score. The medication score of group A tended to be lower after treatment compared with that of group B. However, there was no statistical significance. It is possible that further studies with more patients could yield more statistically significant results.

The Rhinasthma Questionnaire is a reliable and reproducible questionnaire for evaluating the quality of life of

patients suffering from allergic rhinitis or allergic asthma.⁶ In our study, no patients complained of impaired quality of life related to asthmatic symptoms such as wheezing or chest tightness. There was no statistical difference between the groups either (data not shown). As is well illustrated in **Table I**, significant differences were only found for the items related to the symptoms of allergic rhinitis and their medications.

One pitfall of our study is that we evaluated only the subjective symptom scores and quality of life reported by the patients. In fact, patients who had septoplasty might suffer from recall bias and a halo effect, reporting more favorable results because they underwent a more involved surgical procedure and want to feel better, especially when compared with a group with a single turbinate reduction procedure. Therefore, measuring the change of the nasal cavity volume and dimensions after nasal provocation with provocative antigen could better prove the procedures' effects.

Another flaw in our study is that there was no randomization. All patients with septal deviation and allergic rhinitis received both septoplasty and RFTVR, whereas patients with allergic rhinitis alone received FRTVR alone. However, for randomization, some patients with septal deviation could not receive septoplasty and another patient without septal deviation could receive unnecessary septal surgery. Both of them are ethically not acceptable.

Significant overlap exists in reportable symptoms between nasal obstruction secondary to septal deviation versus turbinate hypertrophy. Therefore, the symptom of nasal obstruction is not attributable to the anatomic or allergic component alone. In this aspect, further study with another group composed of patients with nonallergic rhinitis with hypertrophic turbinate could draw another meaningful conclusion.

In conclusion, this is the first research about the potential effect of septoplasty on the clinical course of allergic rhinitis. Further large population-based studies with histopathological examination are needed to elucidate the mechanisms underlying these effects.

Table I. Changes of the Scores for Each Question on the Rhinasthma Questionnaire with a Significant Difference (Independent *t* Tests)

	Group A, mean ± SD	Group B, mean ± SD	<i>P</i> Value
Difficulty in concentrating on problems	1.3 ± 1.0	0.5 ± 1.9	.021
Eye redness	1.3 ± 1.5	0.3 ± 2.3	.030
Runny nose	0.8 ± 1.8	0.0 ± 1.6	.017
Sneezing	1.3 ± 1.3	0.3 ± 2.1	.023
Always having to carry tissues	0.9 ± 1.7	0.0 ± 1.9	.047
Necessity of medical controls	1.2 ± 1.7	0.3 ± 1.8	.041
Having to take drugs	1.3 ± 1.7	0.2 ± 1.8	.020
Having to carry drugs	1.4	0.3 ± 1.3	.030
Having to clear one's throat	1.1 ± 1.3	0.0 ± 1.9	.003

Abbreviation: SD, standard deviation.

Author Contributions

Young Hyo Kim, main writer, study design; **Beom Joon Kim**, interpretation of data, English interpretation; **Kang Hyun Bang**, acquisition of data; **Yoonseok Hwang**, interpretation of data, statistical analysis; **Tae Young Jang**, study conception, design.

Disclosures

Competing interests: None.

Sponsorships: None.

Funding source: INHA University research grant.

References

1. Hilberg O, Grymer LF, Pedersen OF, Elbrønd O. Turbinate hypertrophy: evaluation of the nasal cavity by acoustic rhinometry. *Arch Otolaryngol Head Neck Surg.* 1990;116:283-289.
2. Grymer LF, Illum P, Hilberg O. Septoplasty and compensatory inferior turbinate hypertrophy: a randomized study evaluated by acoustic rhinometry. *J Laryngol Otol.* 1993;107:413-417.
3. Karatzanis AD, Fragiadakis G, Moshandrea J, Zenk J, Iro H, Velegarakis GA. Septoplasty outcome in patients with and without allergic rhinitis. *Rhinology.* 2009;47:444-449.
4. Stewart MG, Smith TL, Weaver EM, et al. Outcomes after nasal septoplasty: results from the Nasal Obstruction Septoplasty Effectiveness (NOSE) study. *Otolaryngol Head Neck Surg.* 2004;130:283-290.
5. Clark J, Schall R. Assessment of combined symptom and medication scores for rhinoconjunctivitis immunotherapy clinical trials. *Allergy.* 2007;62:1023-1028.
6. Baiardini I, Pasquali M, Giardini A, et al. Rhinasthma: a new specific QoL questionnaire for patients with rhinitis and asthma. *Allergy.* 2003;58:289-294.
7. Jun BC, Kim SW, Kim SW, Cho JH, Park YJ, Yoon HR. Is turbinate surgery necessary when performing a septoplasty? *Eur Arch Otorhinolaryngol.* 2009;266:975-980.
8. Ginzel A, Illum P. Nasal mucociliary clearance in patients with septal deviation. *Rhinology.* 1980;18:177-181.
9. Jang YJ, Myong NH, Park KH, Koo TW, Kim HG. Mucociliary transport and histologic characteristics of the mucosa of deviated nasal septum. *Arch Otolaryngol Head Neck Surg.* 2002;128:421-424.