

**The Effect of Septorhinoplasty on Quality of Life and Nasal Function in Asians**

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Running head: **Effect of Septorhinoplasty on QOL in Asians**

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## **Abstract**

This is the first study that aimed to assess the effects of septorhinoplasty on quality of life (QOL) in an Asian population. The study consisted of two parts. First the Derriford Appearance Scale (DAS-59) was translated into Korean, and the reliability and validity were assessed by administering the DAS-59K, and SF-36 to 88 inpatients scheduled for operations. Then a prospective study was conducted which included 31 patients who underwent primary septorhinoplasty from October 2008 through May 2009. The changes in QOL and nasal symptoms were evaluated by comparing the preoperative and postoperative 3 month DAS59K and NOSE scales. Principal component analysis of the DAS59-K showed an optimum five-factor and the Cronbach's  $\alpha$  for each factor was above 0.7. Significant correlation was found between DAS-59K and SF-36. Objective evaluation showed at least an improvement in every patient. After septorhinoplasty, there was improvement at scores related to general self-consciousness, negative self-concept, and physical stress ( $P < 0.05$ ). The pattern of improvement differed by sex, age, and the presence of external nose deviation. Mean NOSE scores decreased significantly after surgery. DAS-59K is a reliable and valid test, which can be a useful tool to assess individual response to living with problems of appearance. Septorhinoplasty improves both QOL and nasal function which should be taken into consideration in future counseling of individual patients expecting septorhinoplasty.

**Key Words:** Rhinoplasty; Quality of life; Nasal function; Asian

## Introduction

Patients who seek septorhinoplasty usually have complaints which include both aesthetic and functional aspects of the nose. The surgical goal in these patients involves managing both the cosmetic and functional problems that will eventually lead to improvement in their quality of life (QOL). Traditional assessment modalities of surgical success after surgery have been focused on morbidity, complications, and objective changes in nasal shape. However, the true surgical success of septorhinoplasty lies in improvement in QOL associated with self-perceived postoperative changes.

Only few studies have evaluated subjective improvement in QOL after septorhinoplasty,<sup>1,2</sup> as it is difficult to measure patients' psychosocial and subjective satisfaction precisely. Several instruments, such as the Glasgow Benefit Inventory (GBI), the Medical Outcomes Study's 36-item short-form health survey (SF-36), and the World Health Organization's QOL assessment (WHOQOL) have been introduced to assess QOL

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quantitatively. However, these methods are limited in that their items are not directed specifically toward cosmetic surgery. The Derriford Appearance Scale 59 (DAS-59) is a self-reported scale that evaluate distress and dysfunction in problems of appearance.<sup>5</sup> Previous studies using the DAS-59 have proven it to be a reliable method of assessing appearance

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related QOL after aesthetic surgeries.

The DAS-59 contains 59 self-reported items designed to generate a comprehensive assessment of the disruption of everyday living, problems with personal relations, and psychological distress associated with a perceived problem of appearance.<sup>5</sup> Two items measure physical distress and dysfunction and are not included in the total scoring. The items are subdivided into 6 factors, which are as follows: Full scale score, 57 items; Factor 1, General Self-consciousness of Appearance (GSC) (17 items); Factor 2, Social Selfconsciousness of Appearance (SSC) (20 items); Factor 3, Self-consciousness of Sexual and Bodily appearance (SBSC) (9 items); Factor 4, Negative Self-concept (NSC) (5 items); Factor 5, Self-consciousness of Facial Appearance (FSC) (4 items); Factor 6, Physical Distress and Dysfunction (PDD) (2 items). A higher score on the DAS-59 is associated with a greater degree of image-related distress and

dysfunction.

The objective of this study was first to perform the translation of the DAS-59 questionnaire into Korean and to perform its psychometric validation. Then we assessed the effect of septorhinoplasty on the QOL and nasal function using the validated DAS-59K.

To our knowledge this is the first study to evaluate changes in QOL of patients undergoing rhinoplasty in Asians. Asian patients differ not only in anatomy, goals and expectations but also the psychology behind cosmetic surgery certainly has some differences that stems from differences in culture.

## **Materials and Methods Validation of the Korean version of DAS-59 (DAS-59K)**

First, a linguistic and cultural translation of the DAS-59 from English to Korean was performed. Then a prospective instrument validation study was performed at the Boramae Medical Center (BMC), Seoul, Korea. The study was approved by the institutional review board at the BMC.

### ***Translation and Psychometric validation of DAS-59K***

The DAS-59 questionnaire was translated and adapted to the Korean language, with permission from the original authors, following internationally accepted guidelines.<sup>9,10</sup> Ninety-six patients (53 male and 43 female), aged 18 years to 60 years (mean 36.5), scheduled for any otolaryngologic surgery between 2009 March and August 2009 were the subjects of the psychometric validation. Patients who did not elect to participate in this study because of perceived time pressure or disinterest or any other reason were excluded, leaving 88 patients. Reliability was estimated by the internal consistency (Cronbach's  $\alpha$ ). Internal consistency was considered good if  $\alpha$  exceed 0.70.

To determine construct validity, correlation of the DAS-59K with the mental component

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summary of the SF-36 questionnaire was evaluated. The present study used the Korean version of the SF-36. The relationship of DAS-59K with SF-36 was assessed by Spearman's correlation.

### **Effect of septorhinoplasty on QOL and nasal function**

A prospective study was performed on patients who underwent septorhinoplasty from October 2008 to May 2009. Informed consent was obtained from all patients prior to enlisting their participation in the study. From a total of 72 patients, 31 patients (21 males, 10 females) who completed both the preoperative and postoperative questionnaires and were willing to participate with the objectives of the study were included. Age ranged from 15 to 65 years, with a mean age of 29 years. Patients with chronic sinusitis, intractable allergic rhinitis, and a history of rhinoplasty, septoplasty, or turbinoplasty were excluded. Patients without complaints of nasal obstruction were excluded from this study.

### ***Outcome measure***

Initial diagnosis, surgical procedures and complications were evaluated. Pre and postoperative 3months photographs were evaluated for objective changes in the appearance of the nose by two rhinoplasty surgeons who were blinded to the objectives of this study. The postoperative result was graded in a 4 point scale (1 = worse, 2 = no change, 3 = improved, 4 = much improved).

To evaluate the changes of QOL and nasal function after surgery, DAS-59K and the nasal obstruction symptom evaluation (NOSE) scale<sup>13</sup> was administered preoperatively and three months after surgery.

### ***Surgical procedure and follow up***

Septorhinoplasty was performed, focusing on both aesthetic and functional aspects. All procedures were performed by the senior author (H.R. Jin.). Autologous cartilage (septal, auricular or rib) was used for grafting purposes. External or endonasal approaches were chosen according to the type and severity of the nasal and septal deformity. Clinical follow-up included a complete physical examination, including rhinoscopic, endoscopic, and palpation of the nose, as well as regular photographs of the face. A representative case from our series is depicted in Figure 1.

### ***Statistical analysis***

Statistical analyses were performed using the SPSS statistical software package (version 16.0; SPSS Inc, Chicago, IL, US). *P* values of less than 0.05 were considered to indicate statistical significance. DAS-59K and the NOSE scale were analyzed pre-and postoperatively using both paired *t*-tests and the Wilcoxon test. The mean percentage changes by sex, age, and the presence of a deviated nose were analyzed using the Mann-Whitney test to determine significant differences according to each group. The study was approved by the Institutional Review Board of the BMC.

## **Results Validation of the Korean version of DAS-59 (DAS-59K)**

### ***Reliability and validity of DAS-59K***

The translation was successful. After minor adjustments, the back-translation was compared with the original English version and did not show any conceptual content discrepancies between each version. The DAS59-K showed excellent results of principal component analysis and had strong internal consistency reliability with all domains showing Cronbach's  $\alpha$  over 0.7. Significant correlation was found between DAS-59K and the mental component summary of the SF-36.

## **Effect of septorhinoplasty on QOL and nasal function**

### ***Initial diagnosis, surgical procedure, objective outcome and complications***

The two most common indications for septorhinoplasty were deviated nose (15 patients, 48.4%) and saddle nose (12 patients, 38.7%). Other diagnosis of the external nose included hump nose (6 patients, 19.4%), low profile nose (4 patients, 12.9%) and short nose (1 patient, 3.2%).

The surgical procedures performed are listed in Table 1. Surgical procedures to enhance cosmetic outcome included dorsal augmentation, hump removal, osteotomy, tip augmentation and other tip modifying techniques. Septal deviations, turbinate hypertrophy, and narrow nasal valves were corrected using septoplasty, submucosal turbinoplasty, spreader grafts and alar batten grafts.

Average post operative objective score of the appearance of the nose was 3.6 with every patient showing at least an improvement (improved & much improved). No major complications occurred related to the surgical procedures.

### ***DAS-59K scores***

Total baseline DAS-59K scores and scores according to sex, age ( $\leq 30$  and  $>31$ ), and the presence of a deviated nose are summarized in Table 2. The mean baseline total DAS-59K score in males and age group of equal or less than 30, showed a tendency for a higher score than that in females and age group of older than 30. A statistically significant difference was observed in the mean baseline total DAS-59K score between the deviated nose group and non-deviated nose group (95.6 and 71.1 respectively,  $P < 0.05$ ).

Mean total score of the DAS-59K decreased 3 months after surgery (79.8 vs 72.8). Scores for general self-consciousness (24.1 vs. 20.6;  $P = .040$ ), negative self-consciousness (13.7 vs. 12.6;  $P = .033$ ), and physical distress and dysfunction (1.7 vs. 1.5;  $P = .048$ ) showed statistically significant decrease after surgery (Table 3).

The mean percentage change in the DAS-59K score was analyzed by subtracting the preoperative score from the postoperative score. The mean percentage change for the entire group showed a decrease in total score, GSC, NSC, and PDD while SSC, SBSC and FSC did not (Figure 2).

Although the FSC score increased in the male group, it decreased in the female group. The PDD score decreased greatly in the male group compared to the female group ( $P = .032$ )(Figure 3).

A different pattern of response was observed between two age groups arbitrarily divided into younger and older than 30 years of age, with respect to the GSC score (Figure 4). While the younger age group showed a decrease in mean percentage change, the older age group showed an increase.

The non-deviated nose group showed a decrease in the mean percentage change of GSC and FSC scores whereas the deviated nose group showed an increase (Figure 5) and was also observed after controlling for sex.

### ***The NOSE score***



In the baseline scores for the NOSE scale, males showed statistically higher NO1 and NO2 scores than females (2.8 vs. 2.1,  $P < 0.05$ ) (Table 1). The mean scores of the NOSE scale decreased in all patients after septorhinoplasty. Patients experienced statistically significant improvement in each of the five items on the NOSE scale (Table 2).

## Discussion

This study aimed at evaluating the changes in QOL of Asian patients undergoing septorhinoplasty. The DAS-59, a psychometric scale for the evaluation of patients with aesthetic problems of appearance, was chosen for our investigation because it has been shown to demonstrate excellent validity, reliability, and internal consistency in both clinical and general populations.<sup>6,7</sup>

To introduce the DAS-59 in our study population, it had to be translated and culturally adapted to the Korean language. It was also psychometrically validated to ensure its accuracy. To obtain these two goals, the first part of this study consisted of translation and validation of the Korean version of the DAS59 (DAS-59K). The original English version of DAS-59 was

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successfully translated into the Korean language according to guidelines. The Korean version (DAS-59K) showed excellent reliability and internal consistency reflected by a Cronbachs alpha greater than 0.7 for every factors. Construct validity was proven in a population expecting surgery, by showing that the composite score of the DAS-59K correlated with the mental component summary of the SF-36, which is one of the most

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popular tools to evaluate QOL.

There was a difference in baseline scores between non-deviated and deviated nose group in total score and General Self-consciousness of Appearance (GSC), which implies that patients with non-deviated nose (saddle nose, hump nose, low profile nose, and short nose) had more appearance-related emotional concerns. We can speculate that among different types of external nasal deformities, the saddle nose, hump nose and short nose exerts more emotional concern than a deviated nose, at least in Asians. The baseline scores for the males and in the less than 30 year age group were higher compared to their counterparts but did not show statistical difference.

Among the 6 factors evaluated in the DAS-59K, the current study showed significant improvement on F1 (General self-consciousness of appearance), F4 (Negative self-concept) and F6 (Physical distress and dysfunction) after surgery while total score (FT), F2 (Selfconsciousness of Sexual and Bodily Appearance) and F3 (Social Self-consciousness of Appearance) and F5(Self-consciousness of Facial Appearance) failed to show statistical improvement.

Our results show discrepancies from the original study of DAS 59 where all domains including the total score showed improvement after the same follow up period of 3 months.<sup>5</sup> Few explanations for this discrepancy may include the following. First, the original study was developed to evaluate QOL changes after facial cosmetic surgery not for septorhinoplasty alone. Rhinoplasty alone may have less impact in self consciousness of sexual and bodily appearance (SBSC) or self consciousness of facial appearance (FSC) compared to patients receiving breast augmentation or reduction abdominoplasty or aging-face surgery which showed a greater reduction in scores related to SBSC or FSC.<sup>14</sup> Thus, rhinoplasty can provide better QOL through improvement in GSC and Negative self-concept (NSC), whereas other surgeries that manipulate general facial features or sexual body parts may improve FSC and SBSC.<sup>5</sup> Second, cultural differences between the East and the West can be another reason for this discrepancy. Although it is not prudent to generalize the psychology of Asian patients undergoing rhinoplasty, Asian patients are somewhat modest in expressing their feelings and are more conscious of other people in their social life than Western people. They may be afraid of being depicted by others of their change in appearance, and consciously or unconsciously keep hiding the fact that they had surgery. This may have been reflected on the total score and SSC scores. Third, the concerns of the patients from our study group were a little different from concerns of patients with purely cosmetic issues, because they had concurrent functional issues. Even though a cosmetic procedure was involved, the main interest in some could have been focused on functional issues rather than their appearance.

When the patients were grouped according to their sex, two salient features were noted. There was a discrepancy in the change of score in FSC, while the mean percentage change in females showed improvement, it showed worsening in males and there was a considerable improvement in PDD in the male group. Although a definitive conclusion cannot be drawn, the main concerns in septorhinoplasty appear to differ between the two sexes. That is, females are more sensitive to their appearance whereas males are more sensitive to physical dysfunction. A previous study has shown similar results of worsening of scores in the facial self consciousness and the authors speculated that this was because cosmetic surgery is less socially acceptable for males and early results in a visible area such as the face, can cause more distress in males.<sup>15</sup>

When the mean percentage of change in score was compared between two arbitrary age groups, the equal or less than 30 year old age group showed decreased levels of postoperative discomfort in GSC compared to the older age group (>30). This may indicate that the younger population tends to be more favorable in accepting their changes in the short postoperative period. This result is in line with the report that appearance-related concern decreases with age; so young people pay more attention to their appearance and tend to be more sensitive to changes of facial features than old people.<sup>5</sup> However in another Western study, the youngest subgroup (16-30) was observed to have slightly increased levels of postoperative discomfort in the areas of self-consciousness compared to other age groups. We think that this also reflects the difference between the two cultures. Recently, in Asia, the young people feel more comfortable with the idea of cosmetic surgery as celebrities frequently appear with altered looks, as opposed to the more traditional age group who tend to be more conservative.

The greater change in DAS-59K score after surgery in the non-deviated nose group compared with the deviated nose group is noteworthy. Our data also showed that baseline DAS-59K scores in the non-deviated nose group were higher than the deviated nose group in all factors. Although very little is known about the psychological differences between the two groups, these findings collectively indicate that the non-deviated nose group, which includes low profile nose, hump nose, and saddle nose, experiences more distress and are more concerned about their external nasal features compared to the deviated nose group. This might be because the deviated nose group has a tendency to be more concerned about the recovery of their nasal function.

Finally, the current study showed that septorhinoplasty improves nasal breathing function, which corresponds well with earlier studies that report functional improvement after rhinoplasty.<sup>1,6</sup> We believe that procedures such as septoplasty, turbinoplasty and nasal valve

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surgery were certainly helpful in improving nasal obstruction.

The limitations of this study include its small number of patients and relatively short follow-up period. A larger patient group with a long-term follow up would certainly add to the validity of the current study.

## **Conclusion**

This is the first study that evaluates the changes in QOL after septorhinoplasty in an Asian population. DAS-59K is a reliable and useful tool that can be used to assess individual response to living with problems of appearance in Korea. Our study suggests that septorhinoplasty may have a positive effect on QOL in Asians. The pattern of improvement differs according to sex, age, and the presence of external nose deviation. These factors should be taken into consideration in future counseling of individual patients who are expecting septorhinoplasty.

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## Legend for figures

**Fig 1.** Preoperative frontal, lateral and basal photographs (A, C, E ) of a 32 year old patient from our series showing combined bony and cartilaginous deviation. Postoperative frontal, lateral and basal photographs show improvement of her external nose deviation (B, D, F).

**Fig 2. The mean percentage of change in scores for the entire group.** The mean percentage of change in GSC(F1), NSC(F4), and PDD(F6) scores decreased. The greatest decrease in the mean percentage of change occurred in the PDD(F6) score, while an increase was observed in SSC(F2) and SBSC(F3) and FSC (F5).

**Fig. 3. The mean percentage of change in scores by sex.** The mean percentage of change in FSC(F5) increased in the male group, while it decreased in the female group. The PDD(F6) score decreased greatly in the male group.

**Fig. 4. The mean percentage of change in scores by age.** The mean percentage of charge in GSC (F1) score showed different response between the young group and the old group.

**Fig. 5. The mean percentage of change in scores according to the existence of a deviated nose.** The non-deviated nose group showed a decrease in total scores while the deviated nose group did not. The decreased mean percentage of change in GSC (F1) and FSC (F5) was only noted in the non-deviated nose group.



**Table 1. Surgical procedures performed (N=31)**

**Mainly cosmetic procedures**

<b>Mainly</b>				<b>functional procedures</b>
	Dorsal augmentation	23 (74.2%)		
	Osteotomy	17 (54.8%)		
	Tip augmentation	14 (45.2%)		
	Tip refinement	12 (38.7%)		
	Humpectomy	4 (12.9%)		
	Septoplasty	15 (48.4%)		
	Spreader graft	13 (41.9%)		
	Turbinoplasty	20 (64.3%)		
	Alar batten graft	6 (19.4%)		
<b>DAS-59K</b>				

Dorsal augmentation	23 (74.2%)
Osteotomy	17 (54.8%)
Tip augmentation	14 (45.2%)
Tip refinement	12 (38.7%)
Humpectomy	4 (12.9%)
Septoplasty	15 (48.4%)
Spreader graft	13 (41.9%)
Turbinoplasty	20 (64.3%)

\* The numbers are not mutually exclusive.

**deviation**

**deviation**

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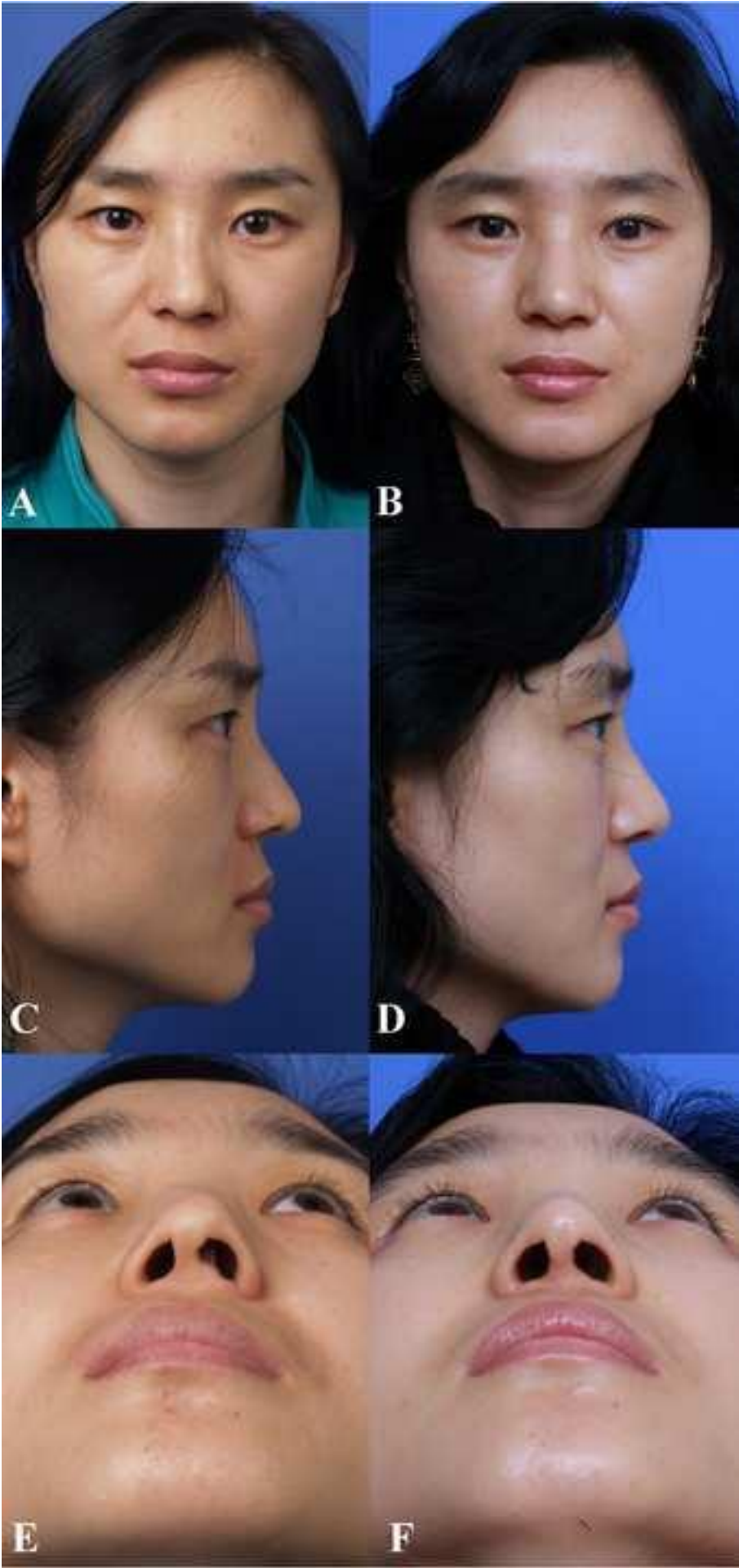


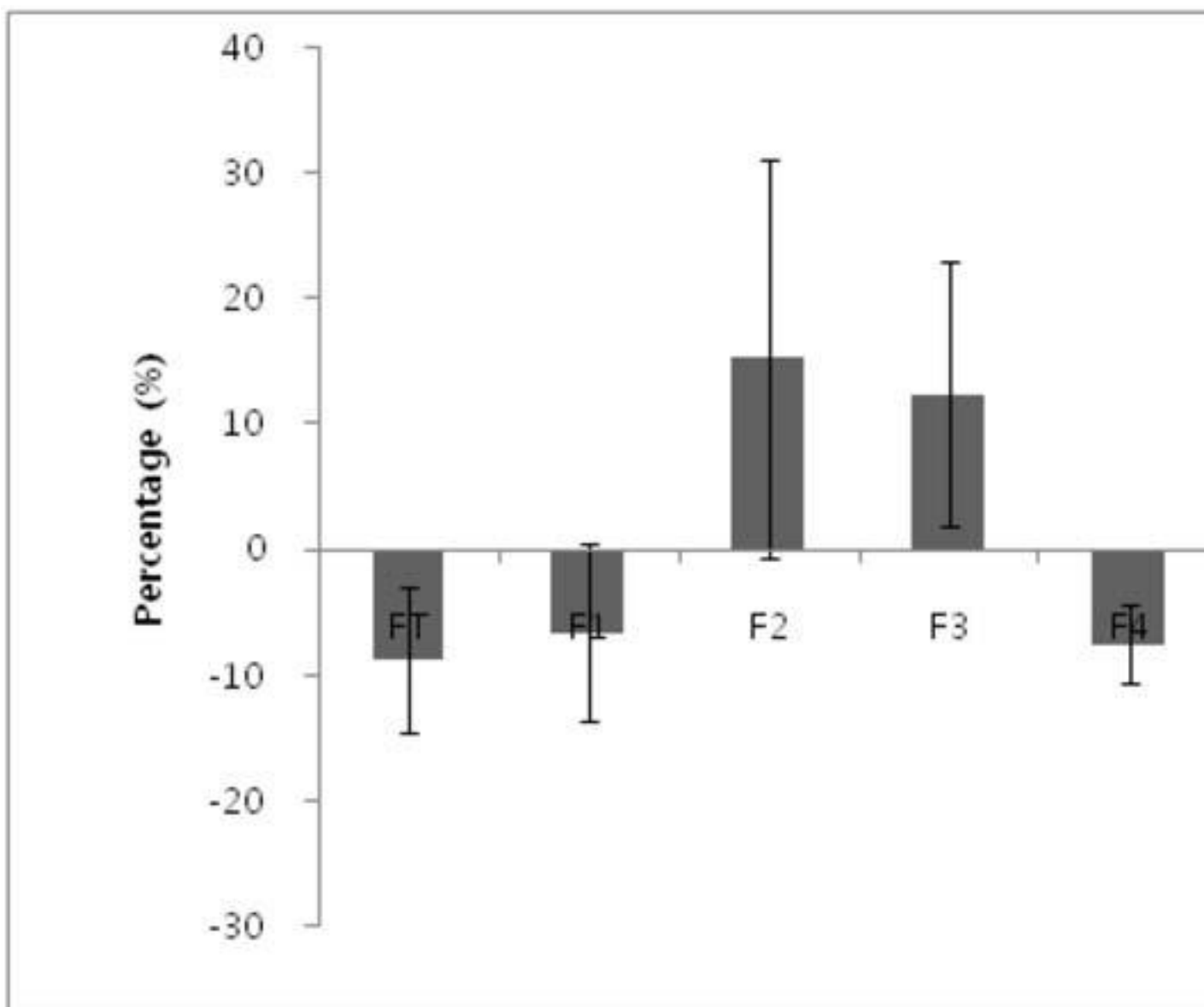
**Table 3. Preoperative and postoperative DAS-59K and NOSE scores**

NOSE scale	Dorsal augmentation		23 (74.2%)					<0.000	NO2	2.2	1.4	-0.8				
	Osteotomy		17 (54.8%)													
	Tip augmentation		14 (45.2%)													
	Tip refinement		12 (38.7%)													
	Humpectomy		4 (12.9%)													
NO1	2.4	1.3	-1.1	Septoplasty		15 (48.4%)					-1.5	<0.000	NO4	1.8	0.6	-1.2
<0.000	NO3	2.3	0.8	Spreader graft		13 (41.9%)					-1.3	<0.000				
<0.000	NO5	2.0	0.7	Turbinoplasty		20 (64.3%)										
GSC: General			Alar batten graft		6 (19.4%)					Self-consciousness of						
			DAS-59K													
Appearance, SSC:	Total score		79.8	81.2	76.7	85.7	69.0	91.8	Social Self-consciousness of							
	Factor 1, GSC		24.1	23.8	24.9	26.3	20.1	29.8								
Appearance, SBSC:	Factor 2, SSC		21.4	22.8	18.5	23.4	17.8	23.1	Self-consciousness of Sexual							
	Factor 3, SBSC		10.5	11.2	9.0	11.6	8.5	11.1								
and Bodily	Factor 4, NSC		13.7	13.0	15.1	13.4	14.1	14.1	Appearance, NSC: Negative							
	Factor 5, FSC		6.1	6.4	5.7	6.8	5.0	7.1								
Self-concept, FSC:	Factor 6, PDD		1.7	2.1	2.0	2.3	1.7	2.8	Self-consciousness of Facial							
Appearance, PDD:	NOSE scale															
	NO1		2.6	2.8*	2.1*	2.8	2.3	2.7	Physical distress and							
dysfunction, NO1:	NO2		2.3	2.6*	1.8*	2.5	2.1	2.5	Nasal congestion, severity,							

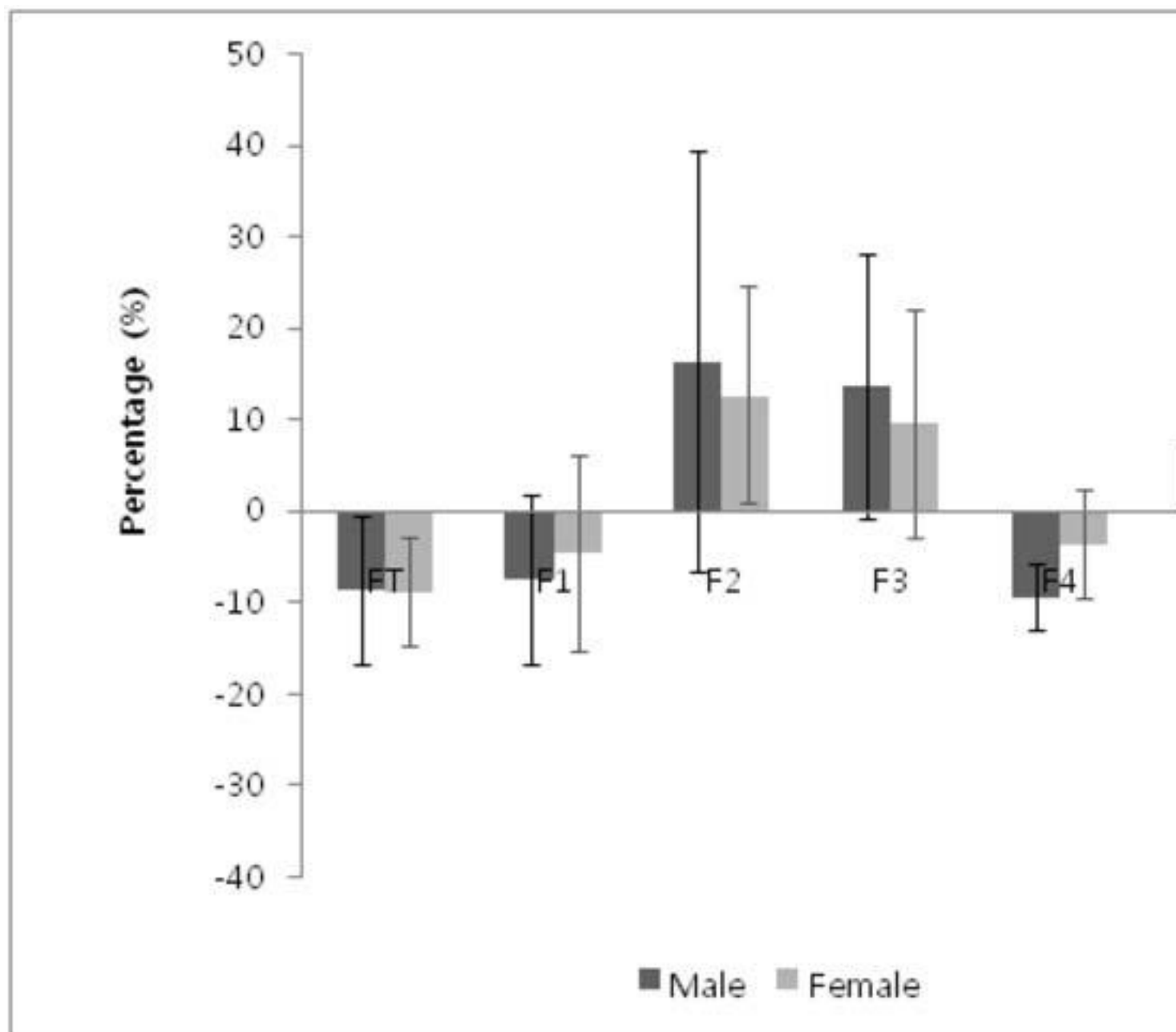
NO2: Nasal obstruction, frequency, NO3: Trouble breathing, NO4: Trouble sleeping, NO5: Trouble exercise \*: paired *t*-test was used.

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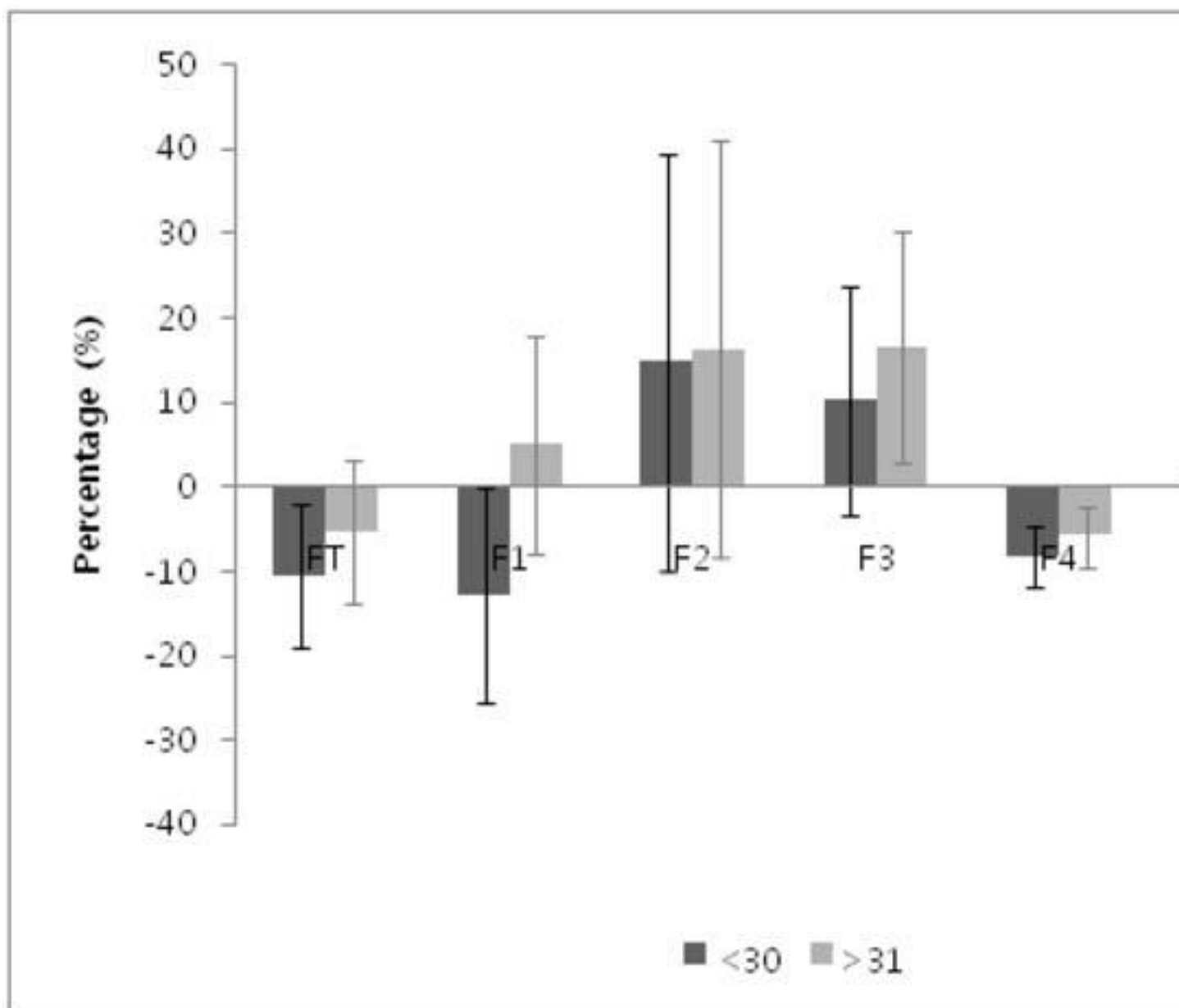




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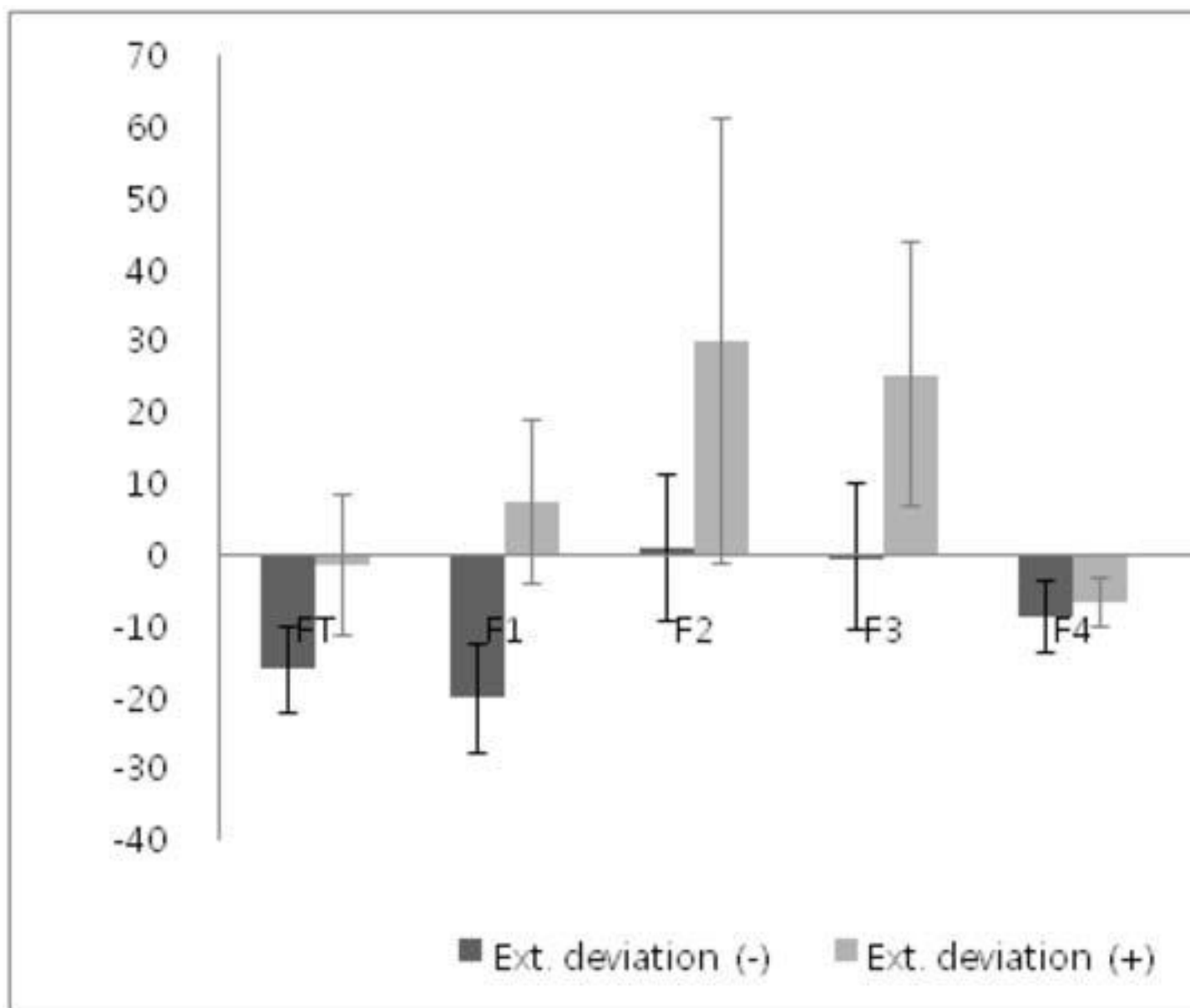


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Reviewer #1: Thank you for reviewing our submission. We appreciate your comments and opinions.

1. The title, the procedure is commonly referred to as a septorhinoplasty.

⑩ The name of the procedure has been changed to septorhinoplasty as instructed.

2. The grammar, sentences such as 'physical stress is improved after surgery' do not make sense.

⑩ grammar has been reviewed and corrected.

3. Over 50% of the content is devoted to explaining and testing the reliability and validity of the DAS. Most of this is superfluous to the main message.

⑩ This is the first article that has used the DAS-59 questionnaire in Koreans. Therefore it had to be psychometrically validated to ensure its accuracy. We tried to show the validation process as much in detail as possible. However, we agree with the reviewer that it may be superfluous. Part of the manuscript testing the reliability and validity of the Derriford Appearance Scale part has been reduced.

4. Too many abbreviations are included in the discussion (one particular sentence contains 6) and the reader constantly has to refer to other sections.

→In accordance to the reviewer's comment, the use of abbreviations has been limited in the discussion section.

5. The prospective study only contains 31 patients and the follow-up is only 3 months.

⑩ As mentioned in the discussion this is the main weakness of our study. Enrolling patients who are involved in facial plastic surgery has limitations even when anonymous participation is guaranteed. Our initial number of patients was 72 but only 31 patients finalized the study. We believe that this high drop-out rate is also characteristic of patients receiving facial plastic surgery. Regarding follow up, we believe that 3 months (although short) allows for enough time for early healing and settling so that the patient can assess changes of their altered body image. Further studies with a larger number of patients and longer follow up will be planned.

Reviewer #2: This is important as plastic surgery literature has to gain more balance and include for more cultural and ethnic variability. This measure of assessing patient perception and feelings and the cultural variations and the availability of tools to objectively measure such psychosocial outcomes is important. Other than the utility of such a tool, this study adds little to further the knowledge about septorhinoplasty in general.

⑩ We thank the reviewer for his comments. We think that the primary value of our study, as mentioned by the reviewer, lies in adding more ethnic variability to the rhinoplasty literature. Also, although not substantial we think it adds to further our knowledge about the changes in QOL after septorhinoplasty.

#### Associate Editor Review:

1. Too much time is spent detailing validation of translation of the DAS-59 into Korean in the introduction, results and discussion. It should merely be stated that it was translated and validated. This will not interest the reader.

⑩ This is the first article that has used the DAS-59 questionnaire to evaluate changes in appearance in Koreans. Therefore it had to be psychometrically validated to ensure its accuracy and we tried our best to show the validation process as much in detail as possible. However, we agree with the reviewer that it may be somewhat superfluous. Part of the manuscript testing the reliability and validity of the DAS-59 has been reduced.

2. The authors report small patient numbers (31 total) and there is a preponderance of males (21 males, 10 females) which is somewhat unusual for aesthetic rhinoplasty evaluation.

⑩ Enrolling patients who are involved in facial plastic surgery has limitations even when anonymous participation is guaranteed. Our initial number of patients was 72 but only 31 patients finalized the study. We believe that this high drop-out rate is also characteristic of patients receiving facial plastic surgery.

The preponderance of males in our study can be because of the academic nature of our institution and more drop out shown in our female patients.

3. The authors use age as one variable. However, they arbitrarily group "young" patients as 30 years old and less, and "old" as 31 years of age and greater. The authors are, therefore, suggesting that patients are young at 30 and old at 31. The authors should make the dichotomy in age greater, perhaps young (<30) and old (>40). Otherwise the analysis based on age is questionable.

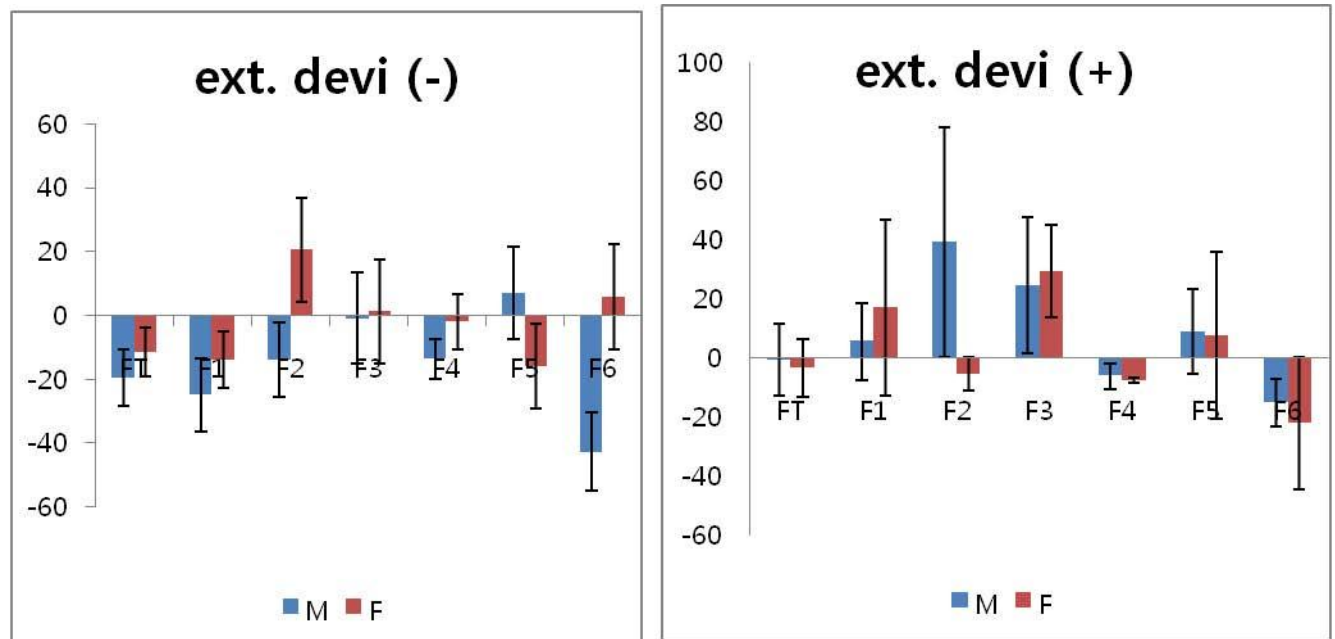
⑩ We agree with the reviewer's comment regarding our arbitrary use of young and old group to distinguish the two age groups. A meticulous stratification according to age would have been ideal but it was not possible due to the limited number of patients in our study. Instead we have renamed our age group to equal or less than 30 and more than 30 age groups.

4. The authors found differences in patient satisfaction depending on whether the nose was deviated or not deviated. Was deviation/non-deviation controlled for sex?

⑩ This is an excellent point, since sex can serve as a confounding factor. When controlled for sex, we could still observe that patient satisfaction differed on whether the nose was deviated or not (GSC and FSC parameters). This point was added in the results.

5. As suggested by the authors, follow-up of three months is short.

⑩ We agree that 3 months is short to assess long term changes. However, we believe that 3 months allows for enough time for early healing and settling so that the patient can assess short term changes of their altered body image. Further study with



a larger number of patients and longer follow up is planned.

6. Aesthetic evaluation must be accompanied by before and after photos to convince the reader.

⑩ before and after photographs of a representative patient from our series has been added.

7. The authors state that quality of life data will improve with greater time interval between surgery and evaluation (discussion). This is totally hypothetical and cannot be assumed.

⑩ We agree with the reviewers comment. Further follow up data is necessary to support this opinion. This part has been deleted from the discussion section.

8. There are too many tables and figures. Tables 1 and 2 can be incorporated into the text or deleted. Figures should be reduced in number.

⑩ Tables 1, 2 has been deleted.

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