ORIGINAL RESEARCH

Investigating nasal deviation and need for corrective grafts in Iranian patients referring for aesthetic rhinoplasty

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Abstract

Introduction: Rhinoplasty is one of the most challenging plastic surgeries in which achieving the desired outcome requires high techniques as well as a great aesthetic vision. The aim of the current study is to compare the functional and aesthetical priority of the unilateral placement of the spreader graft in the concave side of the nose over the convex side.
Material and Methods: A descriptive study was conducted on 282 volunteer patients for primary rhinoplasty during from 2011 to 2013. Nasal examination and desirable lab data's photography of face and nose was taken. Preoperative nasal deviation from midline of face was evaluated with the guide of preoperative photo. Then it was compared with intraoperative finding and nasal septal deviation evaluated with type and number of cartilage graft .
Results: A total of 282 of patient consisting of 195 females and 87 males with a age range of 17-51 years old underwent primary rhinoplasty and were evaluated. Most operations performed on patients who are under 30 years old and 69.1% of patients were females. Two hundred and eighty cases were done through open rhinoplasty and 2 case closed rhinoplasty. One hundred and ninety one patients (67.7%) for the cause of aesthetic and 91 patients (32.3%) for the cause of aesthetic plus functional came for primary rhinoplasty. Amount of pre-operative nasal deviation degree was (71.5%) and intra operative septal deviation was (91.5%), which septorhinoplasty was mostly performed (91.5%). Fifty nine patients (20.9%) had mild deviation and 146 (51.5%) had moderate and 77 (27.3%) patients had sever deviation.
Conclusion: Success in rhinoplasty needs to pay attention to the patients desire as well as careful nasal analysis and evaluation of its subunits together. More than 99% of patients had an open septorhinoplasty that mostly had moderate nasal deviation (51.8%). These patients were treated with spreader graft (unilateral or bilateral) ± scoring or batten graft usage of different surgical techniques was like other scientific and reliable centers in world.

Keyword: Rhinoplasty, Nasal deviation, Surgical method

Introduction

Rhinoplasty is one of the most challenging plastic surgeries, in which achieving the desired outcome requires high techniques as well as aesthetic vision. Rhinoplasty used to create the proportionate form of the nasal components relative to each other and relative to other parts of the face and resolve the nasal dysfunction (1). Primary rhinoplasty provides the best opportunity to achieve the highest success in terms of aesthetics and function, which requires precise planning and analysis of the surgery along with the use of appropriate surgical techniques. Studies and experiences have encouraged surgeons toward some specific methods from among numerous methods for correction of the nasal septum deviation. Any method has its own advantages and disadvantages; therefore, it is necessary to investigate and compare the previous methods with the existing statistics in the available references in terms of reliability (acceptability) of different methods. The patients referring for rhinoplasty surgery do not have enough information about the nasal septum deviation, which might result in the patient's respiratory problem (2,3). Rhinoplasty is one of the most common cosmetic surgeries in Iran; thus, due to the significance of nose and explicitness of the surgery's result, it is necessary to have an appropriate therapeutic planning along with an accurate scientific and aesthetic vision in order to achieve the desired outcome as well as the patient's satisfaction (3). Due to the popularity of rhinoplasty among both patients and plastic surgeons, it is imperative to be familiar with various methods and have the ability to remove the aesthetic and functional defects of the nose through various methods as well as the knowledge of the limitations and advantages of different methods in order to use them at the appropriate time and according to the needs of each patient, because using a routine method for all the patients would lead to unacceptable results both for the patient and the surgeon (4). Correction of nasal deviation is one of the most difficult rhinoplasty surgeries (rhino surgeries) in terms of nasal function and aesthetics (1-4), which can cause many problems for the surgeon as it is usually associated with several anatomical disorders such as changes in the nasal septal cartilage, displacement of the septal cartilage on the maxillary bone, rotation of the nose tip, and asymmetries and deformities of the nasal bones (1). More importantly, the majority of the patients with nasal deviation have different degrees of airway obstruction and difficulty in breathing due to the septal deviation and external nasal anatomy. Deviated nose is often caused by a previous nasal trauma (5, 6), however some patients might be born with congenital nasal deviation, which may increase during the process of growth and maturity. In terms of external shape, nasal deviations divided into 3 types, including C-Type, S-Type, and L-Type. In C-Type deviation, one side of the dorsum is concave and the other side is convex. According to the deviated side of the nose, the surgical treatment includes reconstruction of the nose in a more midline position, which can be performed through anatomical reconstruction (2) or using the main C-Type deviation correction method, including placement of the lateral cartilaginous grafts such as spreader grafts. Spreader grafts are placed between the anterior border of septum and the upper lateral cartilages. These grafts may be placed in one side (unilateral) or both sides (bilateral) of the nasal septum. Spreader grafts are commonly removed from autologous cartilages (such as nasal septum, ear, and ribs) (8); however, they can be made from synthetic materials such as hyaluronic acid (restylane) (9), calcium hydroxylapatite (Radiesse) (10), medpor high density porous polythylene (11 and 12), and polylacticpolymer and polyglycolic acid (lactosorb) (13). Depending on the deviation type to be corrected, the spreader graft can straighten the septal anterior border, caudal septum, and cartilage in ous dorsum, prevent the middle vault's collapse and the inner nasal value's constriction, correct the asymmetries of the cartilaginous dorsum, and create a connection between the septum and columella. On this basis, the spreader grafts play an important role in achieving long-term satisfactory results in a wide range of nasal deformities, especially nasal deviation.

Although many studies have been conducted on the outcomes of placement of the spreader grafts, there are still few findings that can help surgeon choose the most appropriate side of the septum (concave or convex) for placing the spreader grafts in order to achieve the best functional and aesthetic results. The scar contracture-caused forces as well as thickening and deformity of the cartilages might lead to the deviated nose's resistance against the surgical corrective techniques and, consequently, result in its recurrence. Achieving good and permanent aesthetic and functional results requires a full understanding of the nasal 3D pathology, anatomy, physiology, and precise analysis before the operation; besides, a full understanding of the cartilage's physiology and its repair as well as the ability to precisely perform the stages of the required surgical procedure is needed to change the control of the nasal septum in order to prevent recurrence (11-13).

As a result, the present study is aimed to compare the functional and aesthetical priority of the unilateral placement of the spreader graft in the concave side of the nose over the convex side.

Methods

The present study is a prospective cross-sectional conducted on 282 patients referring to 15 Khordad Hospital in Tehran, Iran for primary rhinoplasty from September 2011 to September 2013. After preparing the patients' medical history and performing the internal and external nasal examinations as well as the necessary tests and photography, the nasal defects were analyzed. The photography calculations and anthropometric analysis were performed in the frontal view; furthermore, frequency of the nasal deviation deformity relative to the facial midline with nasal dorsum deviation from the line connecting the mid glabella to the mentone was measured in millimeters and then compared with the preoperative internasal examinations and the perioperative nasal septal deviation. To determine the dorsal deviation in photography, a line was drawn from mid glabella to mentone in the frontal view; so that, in case of no deviation, this line should divide the septum, upper lip, and cupid bow into two equal halves and pass exactly through the two central incisor teeth.

Surgical technique

Afterwards, the surgical technique to be used to correct the deformities was determined based on the description of the patient's surgery and, in some cases, by asking the surgeon during the surgery; furthermore, the prevalence of each method was assessed according to the intended deformity, and the deviation rate was graded based on the number, type, direction, and unilateralness or bilateralness of the cartilaginous spreader ± batten graft. The mild, moderate, and severe types of deviation were defined, respectively, when only SMR was performed without using any graft, when the spreader± batten cartilaginous graft was used, and when both grafts were used along with scoring.

To correct nasal deviation, the septum was widely released to return the deviated part of the septum to the midline, and then the caudal septum was separated from ANS. The upper LAT cartilages were separated from the septum, and the lower LAT cartilages were separated from the upper LAT cartilages by removal of the cephalic cartilage; then, the deviated part of the septum was resected while preserving at least 8-10 mm of the caudal and dorsal areas of the septum (L. STRUT). In some cases, septum concave side scoring or batten was used to smooth out the caudal area and scoring and unilateral or bilateral spread was used to smooth out the dorsum. In case of the inadequacy of the above measures, the spreader graft or flap was used, and in case of the septal bone deviation, osteotomy was used for smoothing.

Ethical considerations

The present study was conducted on patients referring voluntarily to 15 Khordad Hospital in Tehran for primary rhinoplasty, and the required information was obtained through conventional procedures according to the routine hospital methods, including examination, history, photography, and contents of the patents' records. Nothing beyond these measures was done, and no additional cost was imposed on the patients. Patient satisfaction was obtained based on the consent letter available in the medical records of all patients admitted for rhinoplasty.

Statistical analysis

Analytical and descriptive statistics was carried out using SPSS 17.0 software (SPSS Inc., Chicago, IL, USA). Descriptive statistics

were reported in terms of percentage for categorical and mean for continuous variables. Chi-square test was applied to access the association between independent variables and outcome. $P < 0.05$ was considered to be statistically significant.

Results

The present study was conducted on 282 patients referring to 15 Khordad Subspecialty Hospital in Tehran for rhinoplasty surgery and undergoing primary rhinoplasty surgery from October 2011 to September 2013, including 195 female and 87 male patients aged between 17 and 51 years old with the mean age of 28.4±7.4 years old. The highest frequency of the surgeries was related to the age group of under 30 years old (188 cases), most of whom were female (69.1%) (Table-1). Out of 282 rhinoplasty surgeries, the open and closed rhinoplasty techniques were used for 280 and 2 cases, respectively (Table 2). One hundred ninety one (67.7%) patients had referred merely for aesthetic purposes, while and 91 (32.3%) patients had referred due to the deviated septum-caused functional problems, including breathing problems, snoring at night, and daytime sleepiness, besides aesthetic reasons. The majority of the female (70.8%) and male (60.9%) patients had referred for aesthetic reasons, most of whom aged less than 30 years old.

Based on the clinical examinations and preoperative photography of the rate of the nasal deviation relative to the facial midline, 210 patients (74.5%) had preoperative nasal deviation, 79% and 64.4% of which were female and male, respectively, who were mostly under 30 years old. Moreover, 79.1% of these patients underwent septorhinoplasty (Table 3). Based on the perioperative findings, 258 patients (91.5%) had nasal septum deviation, 177 (90.5%) and 81(93.1%) of which were female and male, respectively. In general, most of these patients were under 30 years old. Out of the 282 patients, 24 patients (8.5%) underwent only rhinoplasty surgery due to the lack of perioperative nasal septal deviation, but 258 patients (91.5%) underwent septorhinoplasty and SMR due to the intraoperative nasal septal deviation, most of whom aged less than 30 years old (93.1%). Out of the 282 patients, 258 cases (91.5%) underwent only SMR, most of whom were under 30 years old. Out of 282 patients, 59 cases (20.9%) had no septal deviation so no graft was used for them; however, in 138 cases, only spreader (unilateral or bilateral) along with scoring was used. Batten grafts in the caudal septum was used for 8 patients (2.8%); while, in 77 cases (27.3%), both spreader grafts (bilateral) and scoring + batten graft were used due to severe septal deviation.

Based on the number and type of grafts used in surgeries, 59 patients (20.9%) had mild deviation (only SMR without graft), 48 and 11 of them were female and male, respectively. Moderate deviation was observed in 146 patients (51.8%), 90 and 56 of whom were female and male, respectively. Also, severe deviation was seen in 77 patients (27.3%), 57 and 20 of whom were female and male, respectively. On the whole, 29.2% of the female sand 23% of the male had severe septal deviation.

Discussion

Nasal fitness and aesthetics is one of the fundamental factors of facial beauty. Due to the anatomical location and centrality of the nose in face, the rhinoplasty surgery's result is visible and exposed to the judgment of everyone; therefore, achieving the desired outcome in rhinoplasty surgery is of great importance both for the patient and the surgeon. Over the time, rhinoplasty has changed considerably, and several methods have been introduced for correction of various nasal deformities. Considering the growing demands for rhinoplasty, it is necessary for the plastic surgeon to be familiar with various rhinoplasty techniques.

The main goal of the modern rhinoplasty is to construct a nose based on the patients' aesthetic purposes and in accordance with their face and race as well as resolving their respiratory problems. It is difficult for surgeons to correct nasal deviation because such patients often have both functional problems (airway obstruction) and aesthetic problems, which should be taken into consideration together.

A beautiful face requires specific and certain harmonies among the face's components. The nose, at the center of the face and as the most prominent member, attracts the most attention in the frontal and lateral views. To have a successful rhinoplasty surgery, a few points should be considered: 1) the patient's request, which motivates him/her to refer for rhinoplasty; 2) recognizing the nose's proportion to other facial components; 3) evaluating the proportion of the nasal subunits relative to the whole nose; 4) recognizing the nasal defects and deformities in terms of function and aesthetics; 5) exact surgical planning; 6) using meticulous surgical technique.

Undoubtedly, those nasal defects that are expressed by the patient, if true, would play the main and important role in the surgery and surgical planning; however, some deformities should be diagnosed and determined by the surgeon in the preoperative examinations since if such deformities are not diagnosed and treated, the desired functional and aesthetic outcomes will not be achieved. The reasons that patients' referring for rhinoplasty might include a wide range of deformities and defects such as alar flairing, columellar hanging, long or short nose, nasal deviation, wide base, alar hanging, retraction, etc. But, investigating the articles and reference books reveals that one of the main nasal deformities considered as the fundamental basis of rhinoplasty, is nasal deviation; so that, appropriate pre-surgery diagnosis and trying to treat it in the primary rhinoplasty as well as preventing creation of such deformities in the primary rhinoplasty surgical technique would lead to the aesthetic and functional satisfaction of both the patient and the surgeon. Selecting the most appropriate surgical technique is based on the simultaneous correction of the aesthetical parameters and protection of the airway. In recent decades, numerous surgical techniques have been used for this purpose. Currently, the use of spreader grafts produces the most desirable results in patients with nasal deviation undergoing rhinoplasty and even secondary rhinoplasty surgery.

Removing the spreader graft and placing it at an appropriate place is a common complicated surgical technique used in rhinoplasty. This technique was originally introduced by Jack Sheen in mid-1980, who proposed the use of spreader grafts for reconstruction of the middle part of the nasal bridge. Subsequently, the indications for spreader grafts placement in rhinoplasty have been significantly increased. The spreader graft is made from a rectangular cartilage, which can be taken from various sources such as cartilage of the nasal septum, ear, and ribs (8). In patients with normal nasal septum, this source of cartilage is usually the first choice for preparing the spreader graft. However, in some patients, especially those undergoing secondary rhinoplasty, the nasal septum cartilage might not be available in adequate quantities, so the ear cartilage is an appropriate alternative in such cases. The rib's cartilage is less used to make spreader grafts due to the risk of pneumothorax and wrapping.

In the present study, out of 282 patients studied during the two-year period, women accounted for 195 cases, indicating the importance of beauty for women, which is consistent with the results of other studies on rhinoplasty.

In a study conducted by Ponsky and Ghayouran, out of 100 patients undergoing rhinoplasty surgery, 80 were female, so it seems true that the women have more tendencies toward rhinoplasty in different societies. The maximum and minimum age of the patients were 17 and 51 years old, respectively, with the mean age of 28.4 years old. The young population of the study indicates that mostly the young individuals are demanding for rhinoplasty. In Ghayouran's study, the mean age was 37 years old, which is higher than the mean age of the participant in the present study and indicates that paying attention to beauty and demanding for rhinoplasty occurs at earlier ages in our study.

The open and closed rhinoplasty techniques were used in 280 and 2 cases, respectively, which indicates the higher tendency toward the open rhinoplasty. The rate of open rhinoplasty, due to its better exposure, has been higher than 90% in most of the studies; further, it was 99% in our study, too. In the study conducted by Rohrich in 2012, 98% of the surgeries were performed using the open technique. In Ponsky's study, all the patients underwent open rhinoplasty, who considered the low rate of revision (2%) as the result of choosing the open technique.

Among the reasons of the patients' referring for primary rhinoplasty surgery, the highest

frequency was related to merely aesthetics (67.7%) and functional problems such as respiratory problems (32.3%), indicating the high tendency toward beauty among the patients, the majority of whom were female. Frequency of the preoperative and perioperative septal deviations was 74.5% and 91.5%, respectively, which indicates the high rate of deviation among the patients. The majority of these patients had moderate septal deviation (51.8%). 2.46% female and 4.64% male was reported.
In total, graft was used for 223 patients (79%). In 77 cases (27.3%), both batten and spreader grafts along with scoring were used (to improve the form and function of the nose and to correct the septal deviation). In the present study, spreader graft was used in 78% of the patients; besides, the spreader graft had been used for 74% of the patients in Ponsky's study. Thus, the results of both studies are consistent.
Among the possible limitations of the present study was the non-standard photography, including the patient's inappropriate body positions during photography or non-life size photography, for elimination of which in similar cases, photography was repeated in desirable conditions. The information obtained from photography was matched with the examination results in all cases and, if necessary, various professors were consulted in this regards and the results were compared with intraoperative findings.

Conclusion

In this study, by comparing the use of the rhinoplasty surgical techniques in this center and other credible and advanced centers and the use of various surgical techniques for correction of nasal deviation and in the proper position, similar frequencies were obtained indicating that the plastic surgeons in this center were familiar with various methods of plastic surgery and had the ability to choose the appropriate technique in necessary cases. Furthermore, based on the findings of the current study, the main reason for patients referring for rhinoplasty, which were mostly female, was merely aesthetics. The majority of these women had moderate septal deviation and their functional problems could be resolved using septorhinoplasty surgery and the desired results would be achieved.

Conflict of interest

Authors declare no conflict of interests.

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Table 1. Frequency of demographic characterization of precipitant based on the age and sex.

Age	No. (%)	Sex		Total
		Female	Male	
<30y	No.	132	56	188
	%	70.2	29.8	100
30-40y	No.	52	22	74
	%	70.3	29.7	100
>40y	No.	11	9	20
	%	55	45	100
Total	No.	195	87	282
	%	69.1	30.9	100

Table 2. Frequency of the applied methods based on sex.

Sex	Frequency	Method		Total
		Open	Closed	
Female	No.	194	1	**195**
	%	99.5	0.5	**100**
Male	No.	86	1	**87**
	%	98.1	1.1	**100**
مجموع	No.	282	2	**282**
	%	99.3	0.7	**100**

Table 3. Distribution of the type of surgery, based on preoperative deviation

Type of Surgery	Frequency	Deviation pre-op		Total
		Yes	no	
Rhinoplasty	No.	6	18	24
	%	25	75	100
Septorhinoplasty	No.	204	54	258
	%	79.1	20.9	100
Total	No.	210	72	282
	%	74.5	25.5	100