Comparison of Aesthetic and Functional Outcomes of Spreader Graft and Autospreader Flap in Rhinoplasty

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ABSTRACT

BACKGROUND

Although the assignment and suturing of the spreader graft to the septum is a routine part of rhinoplasty, it is a time wasting procedure and some problems may occur. Rather, autospreader flap is a new method that the dorsal part of the upper lateral cartilage is used as its own graft. In the present study, we intended to compare the functional and aesthetic outcomes of these two techniques of rhinoplasty.

METHODS

In a clinical trial, patients who referred to 15 Khordad Hospital for elective rhinoplasty during 2013-2014 were enrolled. The functional and aesthetic outcomes were compared between the two techniques of spreader graft and autospreader flap using rhinomanometry and satisfaction questionnaire in two stages before and one months after the surgery.

RESULTS

Total nasal airway resistance increased significantly by both spreader graft and autospreader flap, but the difference between the two methods was not statistically significant. The total nasal flow before and after the surgery significantly decreased using both techniques, but this reduction was not significant between the two methods of surgery. When questioned about the satisfaction with the surgery outcomes, 18 subjects (36%) had complete aesthetic satisfaction, 25 (50%) were partial satisfied and 7 subjects (14%) were unsatisfied from aesthetic results. The rate of patient's satisfaction in both groups was higher for functional outcome. Overall, 32 (64%) subjects were completely satisfied, 13 (26%) were partially satisfied and 5 (10%) subjects did not report satisfaction. Loss of respiratory function in both groups was inevitable due to short time post-operative period.

CONCLUSION

Both spreader graft and autospreader flap techniques can be used in the preservation and restoration of the normal internal nasal valve angle, as well as restoration of dorsal aesthetic lines of the nasal dorsum.

KEYWORDS

Spreader graft; Autospreader flap; Rhinomanometry; Rhinoplasty

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INTRODUCTION

In Iran, in recent years, cosmetic surgery that is almost provided by the private section has gained popularity despite its potential risks. Cosmetic surgery is performed not only to alter the appearance, self-esteem, self-confidence of the patient and level of satisfaction, it may also a reflection of specific personality patterns.[1] Cosmetic surgery, including rhinoplasty is one of the most common cosmetic surgeries conducted on the face and is mainly done on youth for beauty with a dramatic increase in Iran especially during the last two decades.[2] Informal statistics show that Iran has one of the highest rates of rhinoplasty in the world.[3]

In Iranian population; it has been named "the nose job capital of the world" as many as 200,000 Iranians undergo rhinoplasty every year.[3,4] Although, expert rhinoplasties improve the looks, self-confidence, and the breathing, but such a double-edged sword, complications and failures are part and parcel of any surgical procedures. Malfunction of the upper respiratory system after rhinoplasty was shown as a known reason to have a negative effect on the quality of life.[5] Other possible problems include the nose malformations, nasal congestion, sinus pressure and pain during the winter, growth of extra tissue or bone, and alteration in the sense of smell.[6] Even it seems that these effects on general health and quality of life except for its psychological health domain are not statistically significant.[7]

Potential failure and complications of rhinoplasty may result in nasal valve disorders too. The constriction can occur after dorsal hump reduction with the medialization of the lateral nasal wall for closing the open roof. For avoiding from this narrowing, a pin of cartilage preferably a septal cartilage is sited in a submucoperichondrial pocket. Although, the expansion is insignificant, the angle of the nasal valve is improved. Manafi et al. in correction of minor contour deformities in rhinoplasty introduced injectable cartilage shaving as an autologous and long lasting filler material in 27 males and 101 females and showed to be durable and predictable in long term follow ups.[8]

Spreader grafts was first proposed by Sheen in 1984 to prevent from a functionally collapse of the nasal valve following the nose reduction rhinoplasty.[9] After that the use of spreader grafts expanded to straightening a high dorsally deviated septum, reformation of harmonious dorsal aesthetic lines,[10] nasal tip support, lengthening of the nose on the cleft side and provision of a foundation to increase the nasal tip.[11]

Although the assignment and suturing of the spreader graft to the septum is a routine part of rhinoplasty, it is a time wasting procedure and some problems such as dropping the graft into the mucoperichondrial pocket and graft displacement may occur.[6] Rather, autospreader flap is a new method that the dorsal part of the upper lateral cartilage is used as its own graft.[7] In the present study, we intended to compare the functional and aesthetic outcomes of these two techniques of rhinoplasty.

MATERIALS AND METHODS

In a clinical trial, patients who referred to 15 Khordad Hospital for elective rhinoplasty during 2013-2014 were enrolled (IRCT of 86705503). The functional and aesthetic outcomes were compared between two techniques of spreader graft and autospreader flap using the rhinomanometry and satisfaction questionnaire in two stages before and one month after the surgery. Preoperative photographs were compared with the postoperative photographs and computer imaging before and after the surgery to measure the base and tip projection of the nose. The standard Visual Analogue Scale (VAS) was applied to evaluate the clinical complaints. The study protocol was approved by the Ethics Committee of Shahid Beheshti University of Medical Sciences and a written informed consent was obtained from each subject.

Rhinomanometry was performed following the Recommendation of International Standards Committee. All subjects underwent the rhinomanometric measurements in the same condition and by the same technician. After rhinomanometry, subjects were randomly assigned to one of the two surgery groups and all operations were performed by the same team of surgery. One group of subjects received the spreader graft and others received the autospreader flap. Subjects were followed one month after the surgery using rhinomanometry under the same condition of the first evaluation. The results were recorded as total nasal flow index based on milliliter per second (mL/s) and total nasal air-ways resistance. Subjective outcome

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was provided by questions on satisfaction of subjects for aesthetic and functional results. The data were analyzed by SPSS software (Version 18, Chicago, IL, USA) and the significance level was considered as $p<0.05$. Data were shown as mean±SD. Dependent T test was used for comparison of the means.

RESULTS

Fifty subjects were enrolled in two equal groups of 25 subjects. There were 6 males and 19 females in spreader graft and 7 males and 18 females in autospreader flap group. The mean±SD for the age of subjects in spreader graft and autospreader flap group was 29.64±9.02 and 24.64±5.08 years respectively. Five subjects in spreader graft and 2 in autospreader flap group had history of a previous surgery. In addition, 8 subjects of spreader graft and 13 of autospreader flap group had experienced a previous trauma

Clinical examination and rhinomanometry were performed for all subjects before and after the surgery. All subjects in both groups were referred for the cosmetic reasons but 15 in spreader graft (14 with bilateral and 1 with unilateral) and 12 in autospreader flap group (all with bilateral) had concomitant complain of obstruction. Mild, moderate and sever grade of septal deviation were noticed in 5, 9 and 6 subjects of spreader graft flap and 3, 13 and 6 subjects of autospreader flap group, respectively. Cottle sign was positive in 4 subjects of each group. Bilateral pinch was found in 4 subjects of spreader graft and 2 of autospreader flap group and unilateral pinch was found for 3 subjects of each group.

Septorhinoplasty was conducted for 16 and 15 subjects of spreader graft and autospreader flap group, respectively and remained only underwent rhinoplasty. The rhinoplasty for 4 subjects in spreader graft and 1 subject in autospreader flap group was unilateral. The results of rhinomanometry before and after the surgeries were shown in Table 1. Total nasal airways resistance increased significantly by both spreader graft and autospreader flap techniques ($p=0.05$), but the difference between the two methods was not statistically significant ($p=0.19$). The total nasal flow after the surgery significantly increased in both methods ($p=0.05$), but the difference was not statistically significant ($p=0.07$).

When the patients were questioned about the satisfaction with the surgery outcomes, 18 subjects (36%) reported complete aesthetic satisfaction, 25 (50%) were partially satisfied and 7 subjects (14%) were unsatisfied from aesthetic results. The rate of patient's satisfaction was higher about the functional outcomes in both groups. Overall, 32 (64%) subjects were complete satisfied, 13 (26%) were partially satisfied and 5 (10%) subjects were unsatisfied. The satisfaction values grouped by graft type were shown in Table 2.

DISCUSSION

Subjects may be candidate for a *rhinoplasty* for several reasons. The most common reasons are the anatomic *deformity* or *deviation* of the *nasal* septum which can be congenital or the result of trauma. Such *abnormalities* are often associated with functional impairments that require combined operation of cosmetic and functional septorhinoplasty. Manafi et al. compared the graft resorption between three methods of

Table 1: Results of rhinomanometry presented in both groups

Surgical technique	Nasal airway resistance			Flow rate		
	Before	After	P value*	Before	After	P value*
Spreader graft	0.26	0.38	0.005	483.08	265.04	0.0001
Autospreader flap	0.14	0.24	0.0001	412.14	276.62	0.0001

*Paired t test

Table 2: The patient's satisfaction presented by graft type in both groups

Surgical technique	Aesthetic satisfaction (No.)			Functional satisfaction (No.)		
	Highly satisfied	Partial	Not satisfied	Highly satisfied	Partial	Not satisfied
Spreader graft	8	14	3	17	6	2
Autospreader flap	10	11	4	15	7	3

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diced cartilage using surgical blade, electrical grinder and grater and showed no difference between the three methods in the 3 groups for graft resorption.[12] In another study by Manafi et al. it was shown that using both large and small auricular composite grafts resulted into favorable long term outcome for reconstruction of alar rim deformities. However, use of small grafts had more beneficial and applicability.[13]

In a study on high school girls, many teenagers were interested to undergo rhinoplasty in Iran.[9] The leading cause for requesting rhinoplasty was to change the appearance and for beauty. Although, the surgical plans were partially dependent on the subject's requests, the surgeon should be alert in taking whether to agree on such requests, as the outcome may not satisfy the subject for a long period of time.[13]

In the current study, the subjects expressed dissatisfaction on aesthetic outcomes (14%). The results were nearly close in two groups and similar to other studies in Iran. By analysis of 101 primary cosmetic rhinoplasty, 16% were unhappy from their aesthetic outcome.[10] Although the surgical plans were dependent on the subject's desires, the surgeon should be alert in taking whether to agree to such requests, as the outcome may not be satisfiable for subject during a long period of time.[14]

More than half of our patients (56%) had concomitant complains of cosmetic and obstruction and 62% of them underwent septorhinoplasty. Although, subjects in this study were more satisfied about the functional than aesthetic outcome, the rhinomanometric measurements revealed that the air ways resistance increased and air flow decreased after surgery in both groups. The changes were statistically significant before and after the surgery in each group, but the difference was not significant.

It was shown that the value of total nasal airflow was 761.82±267.87 before the surgery[15] which is higher than the value in our findings. The reason may be exclusion of subjects with any structural problem such as nasal obstruction in their study. We have enrolled even subjects who had concomitant complain of unilateral or bilateral obstruction. Thus, the difference after the surgery might be attributed to different inclusion criteria between two studies or difference in manometery techniques.

However, they found a value of 751.39±255.09 for airflow after the rhinoplasty using spreader graft. The reduction was very low and not significant, while subjects experienced much more decrease in both groups. In a similar way, it was demonstrated that airflow resistance to be 0.19±0.24 prior to and 0.20±0.14 after the surgery using spreader graft.[15] These measurements were 0.26 and 0.38 about our subjects before and after the surgery using spreader graft, respectively. Justification for this result may attributable for the short time interval between the surgery and our follow up by rhinomanometery. Due to low compliance of our subjects for rhinomanometery after longer duration, we could not do that. However, we suggest it to be performed after six months in any future studies and comparing the results again.

As mentioned before, there are some limitations for spreader graft technique. The spreader grafts is not capable to effectively maintain and lateralize the lateral nasal wall which lead to a decrease in its functional outcome.[16] Depending on how long the spreader graft would *require*, there may also be *other limitations*. Autospreader flap is an alternative technique that uses the transverse portion of the upper lateral cartilages move on it arranging the local spreader graft tail, as the same time decreasing the profile of the dorsum. This technique precludes the use of cartilage for grafting from other sites while protecting the function of the internal valve.[17,18]

Hussein et al. reported that autospreader flap was an effective spreader graft alternative. Adding the spring effect proposed in this study to the autospreader flap increased the width of the internal nasal valve, therefore; gaining two factors to support the internal nasal valve. The greatest advantage of this method was adding to the autospreader flap a spring action that widened the valve area as a reliable and simple method to be performed with fairly good results and patient satisfaction.[19] The autospreader flap was also used in 32 patients who were candidates for primary rhinoplasty. Spreader graft was an attractive technique in preserving the middle vault in nasal plastic surgery.[20]

A spreader graft, or autospreader flap, is a flap applied for dorsal reconstruction in primary rhinoplasty after cartilage dorsum excision. Regarding its significant advantages, the most common problem encountered in using a spreader graft was shown to be the technique's inability to provide adequate dorsal width

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compared with spreader grafts. Additionally, the use of a spreader graft has not been described for special cases such as crooked noses, cases with minimal dorsal humps, and secondary cases. Another drawback of the spreader graft method is its inability to address the lower third of the dorsum when not extending down to the anterior septal angle.[21]

The reports show that spreader grafts and flaring sutures can move the dorsal border of the upper lateral cartilage in a lateral direction and have identical preventive effects on nasal airway resistance after rhinoplasty.[22] Patients with an elevated tip was demonstrated to have a higher satisfaction rate than others. The satisfaction level of patients can increase when nose projection decreases.[23] In another study, the effects of spreader graft and overlapping lateral crural technique on rhinoplasty by rhinomanometry were compared in 50 patients. The overlapping lateral crura technique was shown to be a better surgical way for tip projection in comparison to spreader graft.[24]

We can conclude that both spreader graft and auto-spreader flap techniques can be used in the preservation and restoration of the normal internal nasal valve angle, as well as restoration of dorsal aesthetic lines of the nasal dorsum. However, loss of respiratory function in both techniques was inevitable during early post operative period which needs more follow ups.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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