

# Assessment of Aesthetic Outcomes of Spreader Graft for Primary Rhinoplasty in Patients with Mild Dorsal Hump Reduction, A Double Blind Clinical Trial

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## ABSTRACT

**Background & Objective:** The reduction of dorsal hump in rhinoplasty can result in significant cosmetic and functional compromise if appropriate supports, such as a spreader graft or flap is not provided. However, if the hump reduction is slight, the function of enhancing maneuvers cannot be defined with certainty. This study aimed to assess the aesthetic effects of spreader graft placement in the patients with less than 3 mm hump reduction.

**Materials & Methods:** This study was a double-blind clinical trial with 30 patients who were randomly divided into 2 equal sized groups. For patients in the control group, there were no augmentation techniques used during hump reduction; however, in the intervention group, spreader grafts were applied after hump reduction. After 6 months, the incidence of depression, step, narrowing, widening and asymmetry in dorsum was ascertained. Besides, the patients were asked to rate their satisfaction with their nasal dorsum aesthetics.

**Results:** Only one patient in the control group had an inverted-V deformity, and patients in the intervention group were more satisfied with the aesthetic results. These variations are clinically important even if they were not statistically significant.

**Conclusion:** Using a spreader graft in the primary rhinoplasty of patients with less than 3mm hump reduction, without causing serious complications, increases the patient's satisfaction with dorsum aesthetics.

**Keywords:** Rhinoplasty, Hump, Spreader Graft



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## Introduction

Rhinoplasty is one of the most common cosmetic surgeries which is performed over the world, and Iran ranks first in the world (1). On the other hand, it is the most concerned of all cosmetic surgeries, and a quarter of patients complain about its results. (2). This problem is somewhat related to the patient expectations and somewhat to complications of rhinoplasty (3).

One of the crucial steps in rhinoplasty is hump reduction. During this procedure, upper lateral cartilages are detached from the septum and reduced to achieve desired dorsal height. The dorsum and nasal bones may also be shrunk to the right size. The nasal bones must often be fractured by surgeons in order to stop an open roof malformation. This maneuver can reduce the size of internal nasal valve and cause obstruction of the nasal airway (4). The collapse of the internal nasal valve can result in an indentation in the middle third of the nose called inverted V deformity (5).

Currently, some procedures are used to prevent the disadvantages of hump reduction, such as spread graft, spread flap, and conchal cartilage butterfly graft (6, 7). Sheen developed the spreader graft in 1984 to repair the nasal dorsum. In order to achieve eyebrow-tip aesthetic lines and preserve internal nasal valve function, Sheen advised using it in all primary rhinoplasty when dorsal hump reduction was intended (8). A similar way to achieve a spreading effect is to use the upper lateral cartilages fold-in flap. Spreader flap is a new technique described by Fomon and later developed by Gruber. It is less invasive as the upper lateral cartilage is rolled on itself to form a fold-in flap instead of harvesting a cartilage graft (6, 9).

Although spreader graft showed acceptable results, its limitations include visible widening of dorsum, the need for a sufficiently long graft cartilage, a limited ability to support and lateralize the outer nasal wall, prolonged

surgeries in terms of the need to harvest the graft, and increasing overprojection of the dorsum (10, 11). As a result, there are only a few situations in which spreader graft implantation is appropriate, and its effectiveness has not been established in other contexts (12–15). These proven indications include: preservation of dorsal aesthetic lines after lateral osteotomies, correction of middle third nasal asymmetries, avoidance of inferomedial collapse of upper lateral cartilages after dorsal reduction, reconstruction of avulsed upper lateral cartilages, opening of the internal nasal valve, lengthening of a short nose, and removal of dorsal hump greater than 3 mm (16, 17). In these situations, there is no risk of endangering dorsal aesthetics or nasal function (18).

Sometimes in routine rhinoplasty, when there is no aforementioned indication for the placement of a spreader graft, as hump removal less than 3 mm, inverted-V deformity may appear after the postoperative swelling disappears. The significance of this issue is made more apparent when one considers that the second and third most frequent reasons for patients to have revision rhinoplasty are functional and aesthetically related issues with the middle nasal cavity (19). The main question that we tried to answer via this study was that if the spreader graft was placed in the patients with less than 3 mm hump removal, would it prevent complications such as step or inverted-V deformity or introduce new complications like widening of dorsum.

## Materials and Methods

This double-blind clinical trial study was conducted on 30 patients referred to the Department of Maxillofacial Surgery, Besat Hospital, Hamadan Medical Sciences University, Iran. The study protocol was approved by Ethics Committee of Hamadan Medical Sciences University (IR.UMSHA.REC.1395.480) and registered in the Iranian Clinical Trial Registration Center (IRCT 201702049926N5). Before enrolling the patients in the study, we went through the objectives and methods of the investigation. The participants gave their written agreement after being promised that their information would be kept private. All 30 patients were randomly assigned to one of two equal-sized surgical groups by 2-block randomization technique concealed in sealed envelopes. The patients were operated on by the same surgeon.

Patients with primary rhinoplasty who were ASA Class I and required less than 3mm of hump reduction were included. The patients with a history of breathing problems, septal deviation, bleeding disorders or current

drug consumption were excluded. Preoperative measurements were taken in each instance to determine how much nasal hump there was, with the dorsum being equal to a line drawn from the radix to the pronasale. The patients in both groups were operated on by open rhinoplasty. The surgical steps and procedures; except for the dorsal management, were similar in the both groups. The amount of dorsal hump was marked on the nose before surgery in both groups and was checked after the surgery. In the intervention group, bilateral spreader grafts were applied prior to epidermal closure and fixed with horizontal PDS 5-0 mattress sutures. The 2mm-thick transplants were harvested from the middle of the septum, a common location for cartilage harvesting. The patients were followed for 6 months and examined at the end of that month by one of the co-authors who was unaware of the group assignment. In each patient, the dorsum of the nose was carefully examined to determine the presence of depression, step, narrowing or widening (related to the distance among the inner corners of the right and left eyes) and asymmetry. In addition, patients were asked to rate their satisfaction with their nasal dorsum aesthetics with a “yes” or “no”.

Statistical Package for Social Sciences, version 20 (SPSS-V20, Chicago, IL, USA) software, was used for the analyses. To compare categorical variables, including the frequency of depression, step, narrowing, widening and asymmetry in nasal dorsum and also patients' satisfaction with dorsum aesthetic Fisher's exact test was used. All analyses were performed with a confidence level of 95 %. *P-values* < 0.05 were considered statistically significant.

## Results

There were 5 men and 10 women in the intervention group and 6 men and 9 women in the control group. The mean and standard deviation for the ages of subjects in the intervention group and the control group were 25.2 ±4.04 and 24.47±2.82 years, respectively. The intervention and control groups did not exhibit any instances of dorsum asymmetry, depression, widening, or step, according to the study's findings. Only one patient in the control group presented with an inverted-V deformity, although this difference was not statistically significant (Table 1). The satisfaction criteria was the personal aesthetic point of view of the patients. Patients satisfaction with dorsal aesthetics were higher in the intervention group (86.7%) than in the control group (73.3%), but this difference was not statistically significant.

**Table1. Frequency distribution of the variables for each group in the follow-up**

Variable	Intervention group ,n=15		Control group, n=15		P (Fisher's exact test)
	N	%	N	%	
Dorsum asymmetry	0	0.0	0	0.0	1.000
Dorsum depression	0	0.0	0	0.0	1.000
Dorsum widening	0	0.0	0	0.0	1.000
Inverted-V deformity	0	0.0	1	6.7	1.000
Dorsum step	0	0.0	0	0.0	1.000
Patient's satisfaction (Yes)	13	86.7	11	73.3	0.6513

## Discussion

In the case of humps larger than 3 mm, reconstruction of dorsum after hump reduction is considered necessary (20). Simple fusion of the superior lateral cartilages' cut margins with the septum may provide an inadequate functional and aesthetically pleasing outcome. Significant nasal congestion may be caused by an inability to replicate the internal nasal valve's angle between the septum's dorsal border and the margins of the two superior lateral cartilages. Besides, a visible inverted V deformity may occur due to inferomedial cartilage collapse that has visible bony margins (4). Dorsum reconstruction can be accomplished by using a retractor that moves away and laterally presses the edges of the upper lateral cartilages against the bone (6,7).

So far, various studies were performed on the effect of spreader graft on the function of olfactory (21), aesthetic improvement (22), nasal inspiratory flow (23), prevention of short nose-deformity after primary rhinoplasty (24), and functional and aesthetic effects on the patients with larger than 3 mm hump removal (25), but there are a limited number of articles on using spreader grafts in the patients with primary rhinoplasty with a hump removal less than 3 mm (26). In order to better understand the outcomes of spreader graft placement in patients with straight noses who needed primary rhinoplasty with a hump reduction of less than 3 mm, we conducted a study. This study was conducted by comparing the incidence of depression, step, inverted-V deformity, widening, and asymmetry in dorsum and patients satisfaction in those with and without a spreader graft.

The results of the present study indicated that rhinoplasty with spreader graft technique in the patients with less than 3 mm hump reduction, reduces the probability of inverted-V deformity occurrence and increases patient satisfaction with the nasal dorsum, although it is not statistically significant.

In 2018, 210 patients in Iran who were having rhinoplasty with a nasal hump reduction of less than 3 mm participated in a clinical research done by Atighechi et al. Three groups of controls, spreader

flaps, and spreader grafts were randomly allocated to patients. They evaluated postoperative deformity and nasal valve patency before and after rhinoplasty during a 6-months follow-up. Based on the results, nasal valve patency was similar in 2 techniques but significantly better than in the control group. Due to some limitations of the spreader graft method, they recommended using a spreader flap instead of a graft in patients with a nasal hump less than 3 mm (26). Contrary to these researchers, Gruber et al. in a case series that published in 2007 stated that although spreader flap could be used for reconstruction of middle vault, it is better to use spreader graft when the hump reduction is mild, and there is not adequate flap for suturing (27).

In a study conducted by Rahbar et al in 2021 in Iran, using and not using spreader (graft or flap) were evaluated in primary rhinoplasty of the patients with humps larger than 3 millimeters. This double-blind clinical trial study was performed on 60 patients in 2 interventions groups (spreader graft and spreader flap) and control group (without spreader). At a 12-month follow-up, the results demonstrated that the implantation of a spreader graft or flap had no adverse effects on nasal respiratory function. However, there was a substantial statistical difference in nasal attractiveness satisfaction between the intervention and control groups (25). Their results agree with our study, although this difference was not statistically significant in our study. This difference may be related to the smaller sample size of present study. The results of Shafaei and Jafari Zare,s study did not agree with our results. Their study indicated that placement of a spreader graft increases the incidence of nasal hump while use of a spreader flap results in an increase in the incidence of obstructive sleep apnea, even though there was no significant difference between these two techniques (11). Spreader techniques are precise maneuvers and any problem with fixation can lead to respiratory or cosmetic complications.

Nagib et al. compared spreader graft and flap techniques aesthetically, functionally, and in operative time. While both are quite successful in treating

internal nasal valve insufficiency, their investigation found that the spreader graft had a better cosmetic result. The spreader flap, however, operates for a shorter period of time (28). Analysis of the sparse studies in this field showed that both are effective techniques for performing rhinoplasty. Although they sometimes produce certain aesthetic or respiratory adverse effects (22), there is no significant difference among them in this regard (7, 29).

## Conclusion

The results of this study showed that although there is no statistically significant difference between surgical outcomes of using or not using the spreader graft in patients with a dorsal hump reduction of less than 3mm, spreader grafted patients are more satisfied with their aesthetic outcomes.

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## Authors' Contribution

MR. J., A. N., R. M., and T. R. conceptualized and designed the study. MR. J. performed the Rhinoplasty. A. N. and R. M. acquired the data. T. R. and A. P. observed the data. A. P. made the statistical analysis. R. M. and T. R. contributed to the writing and revision of the manuscript. All authors have read and approved the manuscript.

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## Conflict of Interest

The authors have declared no potential conflicts of interest in researching, authoring and/or publishing this article.

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