Original Article

Introducing a New Technique for Correcting Nasal Soft Tissue Triangle Deformity Using a Modified Fine Graft (Cartilage Graft) and Evaluating Its Effect on Deformity Correction: A Prospective Study

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Received: 2023/05/15
Accepted: 2023/08/15

ABSTRACT

Background: The management of deformities of the nasal soft triangle (ST) is a difficult and very sensitive discussion in rhinoplasty. So far, the standard method for correcting these deformities has yet to be introduced. We aimed to introduce a new technique using modified fine graft (MMG) for correcting nasal ST triangle deformity and evaluate the effects of using this method.

Methods: This prospective study was conducted on 20 rhinoplasty candidates who underwent surgery at 15 Khordad Hospital, Shahid Beheshti University of Medical Sciences, Tehran, Iran between August 2021 to the February 2022 with the new technique of using an MMG to correct nasal ST triangle deformities. Follow-up was performed immediately after surgery, 3 and 6 months after surgery. Post-operative findings included ST deformity correction, graft exposure, graft visibility, recurrence rate, and the need for revision were evaluated by photography for all patients.

Results: The mean age of patients was 33.65± 11.047 years, 85% of the cases were female and 90% of surgeries were primal rhinoplasties. The ST triangle deformity was not corrected in 2 cases (10%). Both patients were women with primary rhinoplasty, and cartilage was removed from the septum in both. Graft exposure, recurrence, and visibility were not reported in any cases.

Conclusion: MFG was highly effective in correcting the deformity of the nasal ST triangle and did not cause serious complications in patients. This method is a suitable method with high efficiency for correcting nasal ST triangle deformity.

KEYWORDS
Rhinoplasty; Modified fine graft; SOFT triangle deformities

Please cite this paper as:
Mozafari N, Motamed S, Ayatollahi S, Mozaffari A, Mozaffari MA. Introducing a New Technique for Correcting Nasal Soft Tissue Triangle Deformity Using a Modified Fine Graft (Cartilage Graft) and Evaluating Its Effect on Deformity Correction: A Prospective Study. World J Plast Surg. 2023;12(3):37-43.
doi: 10.61186/wjps.12.3.37

INTRODUCTION

Rhinoplasty is one of the most common cosmetic surgeries performed to remove defects and defects of the nose[1,2]. Rhinoplasty is one of the most popular plastic surgeries, and at the same time, it is one of the

[DOI: 10.61186/wjps.12.3.37]

most difficult surgeries[3, 4]. Rhinoplasty is one of the most common cosmetic procedures in the world[5] and the most common cosmetic surgery in Iranian populations [6,7]. This surgery can be performed in a primary form to correct facial defects such as nasal obstruction or beauty or in a secondary (remedial) form to correct the defects of the primary surgery[8, 9]. A detailed assessment of the anatomy and the nasal airway before the rhinoplasty, along with understanding of the patient's expectations and the surgeon's goals, form the basis of success in this surgery[10, 11]. Rhinoplasty is one of the most challenging procedures in the anatomical condition of the face, which, like any other surgery, may be associated with complications, dissatisfaction, and even the need for revision [12-14].

The widening and irregularity of the tip of the nose are one of the most common deformities in rhinoplasty candidates. One of the parts of the nose that receives less attention in rhinoplasty is the soft tissue (ST) triangle, so any contraction, cut, or asymmetry of the soft triangles after the surgery can significantly affect the rhinoplasty results[15]. The location of the ST triangle is between the dome of the alar cartilage above and the margin of the nostril below[16]. The ST triangle should appear as a smooth, non-defined, or deep facet. The shape and appearance of the ST triangle are mainly influenced by the thickness of the lobular skin and the wing cartilage's strength, shape, and position [17]. The most common deformities of the ST triangle are retraction and notching, which the surgeon may encounter in any primary, secondary, or tertiary rhinoplasty. ST triangle deformities are very susceptible to retraction and notching due to the lack of a specific surgical protocol or method [18,19]. The management and surgery of ST malformations are challenging, pitfall, and very sensitive issues in open and closed rhinoplasty.

Therefore, considering the importance of this issue, we aimed to investigate the effect of using an MFG in the correction of ST deformity.

METHODS

This study was approved by the ethics committee of Shahid Beheshti University with the ethical code: IR. SBMU. MSP.REC.1400.2585.

This prospective observational study was conducted on 29 rhinoplasty candidates with ST triangle deformity who underwent primary or secondary rhinoplasty to correct the deformity and soft triangle augmentation using an MFG by open method 2 at 15 Khordad Hospital affiliated to Shahid Beheshti University of Medical Sciences, Tehran, Iran between August 2021 and March 2022. Before the surgery, the procedure was explained to the patients, and informed consent was obtained from all the patients before the surgery. All patients were operated by a plastic surgeon with more than ten years of experience. After checking the inclusion criteria, 20 patients were included in the study. The sampling of patients was done consecutively and with the available method.

The inclusion criteria included a diagnosis of ST triangle deformity, access to the photographic findings of patients before and during surgery, age over 18 years, cooperation of patients to participate in the study, informed consent for patients over 18 years old, and parental consent for patients under 18 years old. The previous surgical history was a correction of the ST triangle deformity; patients with wing grafts and congenital diseases such as cleft palate or cleft lip were defined as exclusion criteria.

Diagnosis and screening of patients prior to surgery were performed using the photograph. The diagnosis of ST triangle deformity was performed by a plastic surgeon using standard photography in four front, right, left, and basal planes. Photographs were taken before, during, and immediately after, and 3 and 6 months after. The presence of deformation was confirmed by two other independent surgeons from the same center. The deformity was corrected using a cartilage graft. This surgery technique was new and was carried out on these patients for the first time.

Cartilage graft harvest and surgical procedure

The Cartilage graft was harvested from the septum cartilage, if it was not possible to re-harvest cartilage from the septum, trimming of the lower lateral cartilage (LLC) was used, and if it was insufficient, concha cartilage was used. The size of the cartilage was designed according to the size of the ST defect, and the cartilage was briefly crushed (For more flexibility). In this method, the space designed for embedding the cartilage in the soft triangle should be larger than the size of the defect. An open rhinoplasty incision was used to design the space; if the size was not enough, the space was expanded. 0.6 nylon thread was used to pass the

[DOI: 10.61186/wjps.12.3.37]

graft for better positioning. In this method, the needle first passes through the outer layer of the media space. Then it is inserted from one side of the graft, crosses the width of the graft, and exits from the other side; the graft is placed inside the space. The needle passes through the lateral outer layer of the space, then the two ends of the thread placed on the skin of the soft triangle are tied. To prevent scarring on the skin of the nose, a delicate clamp is placed under the knot, the knot is tightened, and then the rest of the rhinoplasty closing steps are performed. The Cartilage and the lateral alar walls, the presence of ST, and the surgical procedures are described in detail in Figure 1.

The tampon is placed in the nose and briefly pressed under the insertion site. Two days after the surgery, the tampon is removed. 0.6 nylon thread is pulled for each patient on the seventh day after the surgery.

The surgeon followed up and evaluated the patients immediately after the operation, 3 and 6 months after the operation.

Data collection and outcome evaluation

Data was collected using a two-part checklist. The first part includes demographic characteristics (age, sex). The second part includes clinical information, radiography, photography, and outcomes, including (type of surgery, duration of surgery, amount of bleeding during the surgery, correction of deformity, degree of exposure of the graft, degree of visibility of the graft, the rate of recurrence and the need for revision). The outcomes of the surgery immediately after the surgery, 3 and 6 months after the surgery, were recorded for all patients. A plastic surgeon evaluated all outcomes.

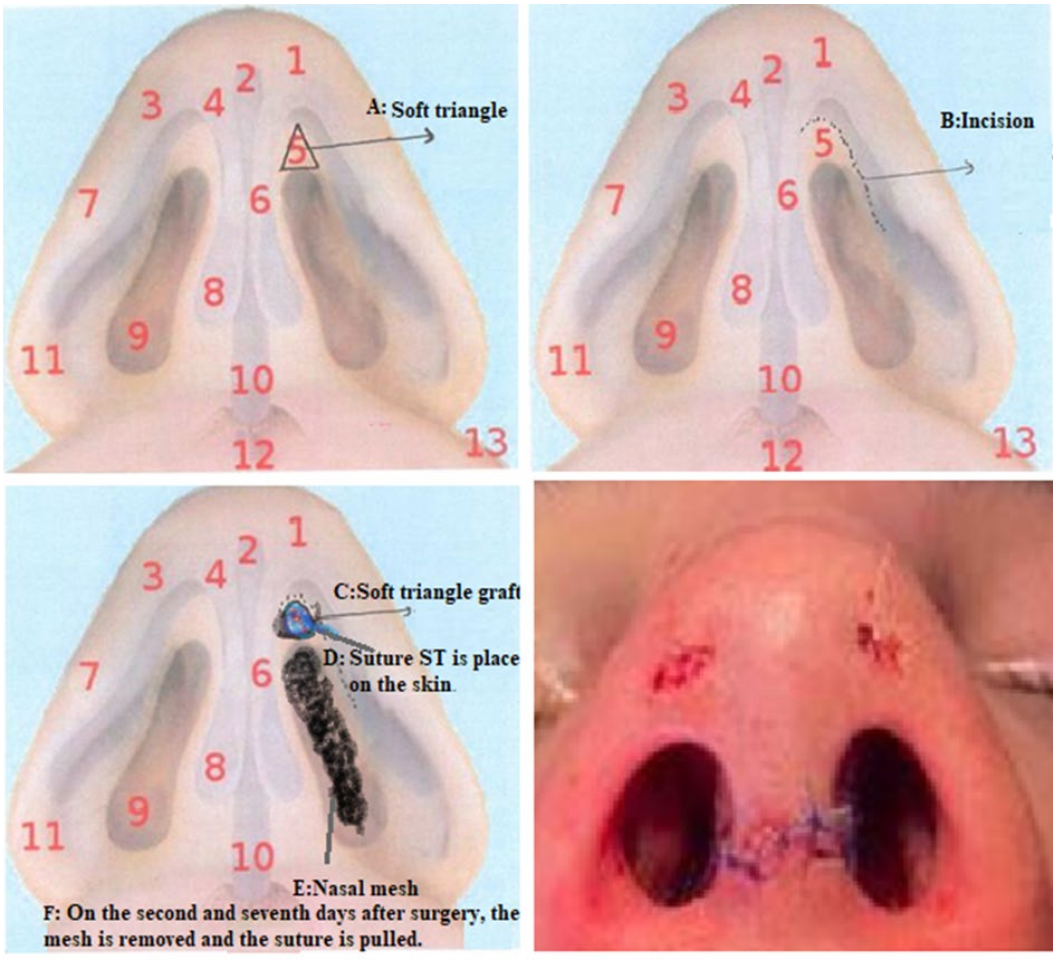

Figure 1: The Cartilages as well as the lateral alar walls and steps of correction of ST

[DOI: 10.61186/wjps.12.3.37]

Statistical analyses

The data were analyzed using SPSS 22 statistical software (IBM Corp., Armonk, NY, USA). Descriptive statistics (frequency and percentage) were used to provide qualitative variables. Quantitative variables were reported using mean and standard deviation. The chi-square test was used to compare quality variables. The normality of the distribution of quantitative variables was assessed by the Shapiro–Wilk test. To evaluate the outcomes before and after surgery, assuming a normal distribution of variables, Pair Test was used, and assuming non-normality, a non-parametric Wilcoxon test was used. A *P* value less than 0.05 was considered significant.

RESULTS

The mean age was 33.65 ± 11.047 years (range 18 to 60 years). Seventeen (85%) were female, and 3 (15%) were male. Eighteen of the surgeries were primary rhinoplasty, and two were secondary (Table 1).

In all cases of primary rhinoplasty, cartilage was removed from the septum. While in two secondary cases, cartilage was removed from the septum and the ear's concha in one case.

Table 1: Demographic characteristics of patients

Variable	(20 patients)
Age (yr)	33.65±11.047
Gender	
• Male	3(15%)
• Female	17(85%)
Rhinoplasty	
• Primary	18(90%)
• Secondary	2(10%)

Post-operative outcomes

After the operation, all four indicators of non-correction of ST triangle deformity, exposed graft, recurrence, and visibility were checked for all patients. Graft exposure, recurrence, and visibility were not reported in any of the patients. (Figure 2) No correction of ST triangle deformity was observed in 2 (10%) patients. Both cases were primary

Figure 2: Complete correction of ST before and after surgery

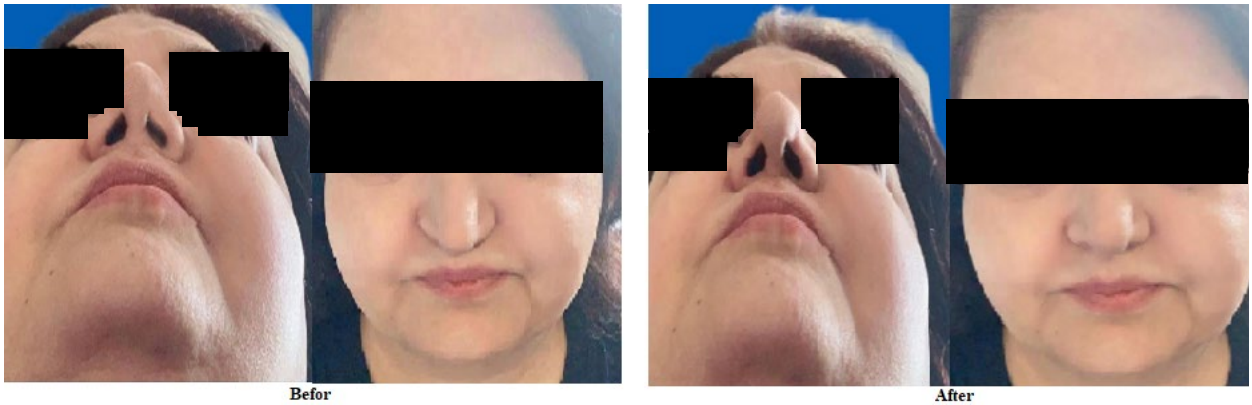

Figure 3: Comparison of the before and after photograph of a 60-year-old woman without deformity correction

[DOI: 10.61186/wjps.12.3.37]

Figure 4: Comparison of the before and after photograph of a 33-year-old woman without deformity correction

rhinoplasty type and were female. These two cases include a case of a 60-year-old woman who on the left side of the nose when removing the tampon on the second day after the surgery; the graft was removed from the nose along with the tampon, and the ST triangle deficiency on the left side was not corrected (Figure 3).

The second case includes a 33-year-old woman who underwent primary rhinoplasty, and due to the insufficient size of the cartilage graft on the left side, the ST triangle deficiency was not completely corrected (Figure 4).

DISCUSSION

The thickness of the skin of the nasal lobe area and the location and position of the alar cartilage determines the shape and appearance of the soft triangle of the nose. The ST triangle deformities are caused due to the lack of a specific surgical protocol [15, 17]. If the columellar incision is placed too high on the nostril, the open rhinoplasty procedure can lead to an ST triangle incision. Based on our search, so far, no study has investigated ST triangle deformity with the new technique of using MFG. Therefore, considering the importance of this issue, this study aimed to introduce a new technique for correcting ST triangle deformity using an MFG (cartilage graft) and evaluating its effect on deformity correction in a prospective observational study. Our study showed that most cases were women, and the ratio of women to men in rhinoplasty surgery candidates was approximately 8:2. The mean age of the patients was 33.65 years, and more than half were less than 30 years old. In only one case, the cartilage was removed from the ear's concha, and in the rest of the cases, the cartilage was removed from the septum. The results showed six months after surgery, no correction of soft triangle deformity was reported in two patients. Graft exposure, recurrence, and visibility were not reported in any cases. A very limited number of studies have evaluated the

[DOI: 10.61186/wjps.12.3.37]

correction of the soft triangle deformity with other methods, and according to our knowledge, no study has introduced and investigated the correction of this deformity using a cartilage clamp and its outcomes.

Foda et al. [16] Evaluated the outcomes of the correction of ST triangle deformities in 150 rhinoplasty candidates who, like our study, were mostly women by examining the thickness of the skin, the strength, and lines of the alar cartilage, the orientation of the lateral crus, length, and inclination of intermediate crura and horizontal and vertical dual angles between lateral and intermediate crura. In this study, all cases underwent surgery using an external rhinoplasty technique in which bilateral marginal incisions are connected through an inverted V-shaped columnar incision. The marginal incision is placed just on the caudal edge of the lateral crus on the outside. As we move inward, the marginal incision is directed away from the cartilage and toward the alar advantage, thus preserving the vestibular skin cuff [20, 21] . Their study showed that the ST triangle was corrected after surgery in 78% of cases that were inferior to our study. The lower rate of deformity correction in this study compared to our study can be justified due to the higher number of secondary surgeries and the different surgical techniques compared to ours. In their study, in contrast to our study, most cases were secondary rhinoplasty. Also, this study showed that no cases of infection, displacement, or extrusion were observed, which confirmed the results of our study. Yazar et al. [20] evaluated the correction of deformity by open rhinoplasty with reverse V trans-columellar incision and bilateral lip edge incision in 24 patients. In this study, the ST triangle deformity was not corrected in only one patient. Cartilage absorption or visibility of exposed cartilage and cartilage and the need for review three months after surgery were not reported in any patients. The results from this study were consistent with our study results with the new technique.

In this study, it was removed from the cephalic part of the septum or ULC and shaped like an ellipsoid. While in our study, the graft was removed from the septum and concha of the ear. These results show that the new technique is very efficient in correcting the deformations of the ST triangle. Chandawarkar et al. [21] investigated the effectiveness of using modified composite grafts to reconstruct and repair nasal defects in 50 patients. This study used modified composite grafts (MCG) to correct nasal deformities, which involved creating a skin pedicle on the graft and increasing the contact surface between the graft and the recipient substrate. Furthermore, surface cooling was used for transplants greater than 1.5 cm after surgery. This study showed that MCGs could be a simple and one-step alternative for the complex reconstruction of specific nasal areas with high efficiency.

They were considering that in this study, for the first time, we examined the effect of MFG in the correction of ST triangle deformity, and no study examined the results of this method. Also, the studies conducted in this field were very limited; we could no longer compare the results of our study with similar studies.

There were weaknesses in our study that must be pointed out. The most important weakness of the present study was the small sample size, the absence of a comparison group, and the shorter follow-up period of the patients, which can affect the estimation of the results. The design of prospective randomized clinical trials with a larger sample size and a longer follow-up period is recommended to estimate the results more precisely. The most important strength of the present study was the introduction of a new surgical technique to correct the ST triangle deformity using an MFG in a prospective study.

CONCLUSION

MFG was highly effective in correcting the deformity of the nasal ST triangle and did not cause serious complications in patients. Therefore, this method could be considered an appropriate method with great efficiency for correcting the nasal deformity of the soft triangle.

ACKNOWLEDGMENTS

No financial support was received for this study.

CONFLICT OF INTEREST

The authors declare that there is no conflict of Interest.

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[DOI: 10.61186/wjps.12.3.37]

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[DOI: 10.61186/wjps.12.3.37]