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Concurrent Excision of Dorsal Nasal Scars and Reduction Rhinoplasty: A Retrospective Cross-sectional Study

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Background: Skin lesions and traumas can affect the skin by leaving scars. The purpose of this study was evaluating the results of a new technique in reconstructive surgery of scars on the nose. In this technique, extra skin remaining from reduction rhinoplasty is applied to the defect remained from removing the scar.

Methods: This is a retrospective cross-sectional study performed on 33 patients who underwent reduction rhinoplasty from 2013 to 2018 due to scars on the dorsal nasal skin. Five sets of standards, criteria, and questionnaires were used to evaluate the cosmetic outcomes, scars, and nasal function. These included the Cakir concept, visual analogue scale, patient reported outcome measurement, Stony Brook scar evaluation scale, and sino-nasal outcome test-22.

Results: According to the surface polygon concept, or Cakir concept, the number of affected polygons due to scars decreased in all included patients ($P < 0.05$). In addition, constant improvement in patients' satisfaction, based on patient reported outcome measurement ($P < 0.001$) and visual analogue scale ($P \leq 0.05$), as well as physicians' satisfaction, based on Stony Brook scar evaluation scale, were determined. Furthermore, evaluating the patients' breathing, based on sino-nasal outcome test-22 criteria ($P < 0.09$), indicated no adverse effects.

Conclusion: Excision of scars from dorsal nasal skin and conducting rhinoplasty surgery from the same access can be considered an option for reconstructing nasal scars. *(Plast Reconstr Surg Glob Open 2021;9:e3908; doi: 10.1097/GOX.0000000000003908; Published online 4 November 2021.)*

INTRODUCTION

Nasal skin may be altered by benign and malignant tumors or congenital lesions such as giant congenital nevus and hemangiomas, as well as by scars caused by leishmaniosis, burns, or trauma.[1,2] In general, if these lesion or burns are large, they can affect the underlying structures.[3] In this regard, several reconstructive methods for removing the scars have been studied.[4]

If the scar is large, the initial removal and repair may lead to a wide scar deformity on the nostrils, columella, or ala, and result in hypo- or hyperpigmentation. Applying grafts, in addition to deformity and morbidity, may cause asymmetry and disfigurement.[5] The use of bilobed and forehead flaps, V-Y advancement flaps, and nasolabial graft may result in additional scars on the margins of the nose and is not recommended for small defects.[6] Furthermore, forehead flaps may cause additional scarring in the forehead area.[7,8] Nevertheless, techniques that provide extra skin from the same area may be helpful.

Due to the three-dimensional structure of the nose, especially in cases where the nose and the scar are large, the scar can be removed and then rhinoplasty can be performed from the same access. It contributes to having extra skin. This has led to a hypothesis for the authors to use extra skin around the scar as an advancement flap to cover the defect.[9] This method has been studied by other researchers to some extent.

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Performing a wide-open dorsal approach for droopy nose has been investigated.[10] Also, the same procedure for the sebaceous nose was examined.[11]

In this regard, evaluating concurrent removal of dorsal nasal scars and reduction rhinoplasty from five aspects, before and after the surgery, was the main aim of this study. It included the number of facial polygons affected by the scar, patients' and physicians' satisfaction, pain, and breathing disturbances.

METHODS AND MATERIALS

This is a retrospective cross-sectional study performed based on archived patient records in 2020 in Isfahan, Iran. The current study was approved by the research committee of Isfahan University of Medical Sciences and the ethical committee, number IR.MUI.MED.REC.1398.261.

The inclusion criteria were undergoing rhinoplasty in Isfahan educational centers between 2013 and 2018, having cosmetic and clinical indications in addition to the desire to do rhinoplasty, and being at least two years out from the primary wound. Exclusion criteria included loss of availability or willingness to cooperate, having a comorbidity such as an airway problem, patients with well-balanced, dimensional noses, and instability of personality. In this respect, 51 patients who underwent this procedure, from 2013 to 2018, entered this study by considering inclusion/exclusion criteria. Informed consent was obtained from the included patients to use their archived data, including the assessment forms and photographs before and after the surgery. The primary reason for visiting the doctor in all patients was the scar. Patients with clinical indications for reduction rhinoplasty were consulted to be informed about the benefits and potential risks of this technique. Figures 1 and 2 illustrate the scars of two patients before surgery.

Takeaways

Question: Is conducting concurrent excision of dorsal nasal scars and reduction rhinoplasty surgery effective in reconstructing nasal scars?

Findings: This is a retrospective cross-sectional study. According to the results, the number of aesthetic facial polygons affected by scars was decreased in all included patients. In addition, constant improvement in patient's satisfaction, as well as physician's satisfaction, were determined. Furthermore, evaluating the patients' breathing indicated no adverse effects.

Meaning: Conducting concurrent excision of dorsal nasal scars and rhinoplasty surgery from the same access can be considered an option for reconstructing nasal scars.

To start, the area affected by the scar was assessed by the surface polygon concept, or Cakir concept.[12] The patient's breathing status was also noted by using the sinonasal outcome test (SNOT-22).[13] Outcomes of intervention were evaluated using the visual analogue scale (VAS), the patient-reported outcome measurement (PROM), and the Stony Brook scar evaluation scale (SBSES). To evaluate the quality of intervention in the patients' perspective, PROM[14] was used. In addition, VAS[15] was used to check patients' perception of their nasal appearance subjectively. Two experts, trained for this evaluation, were involved independently. Furthermore, the scar was

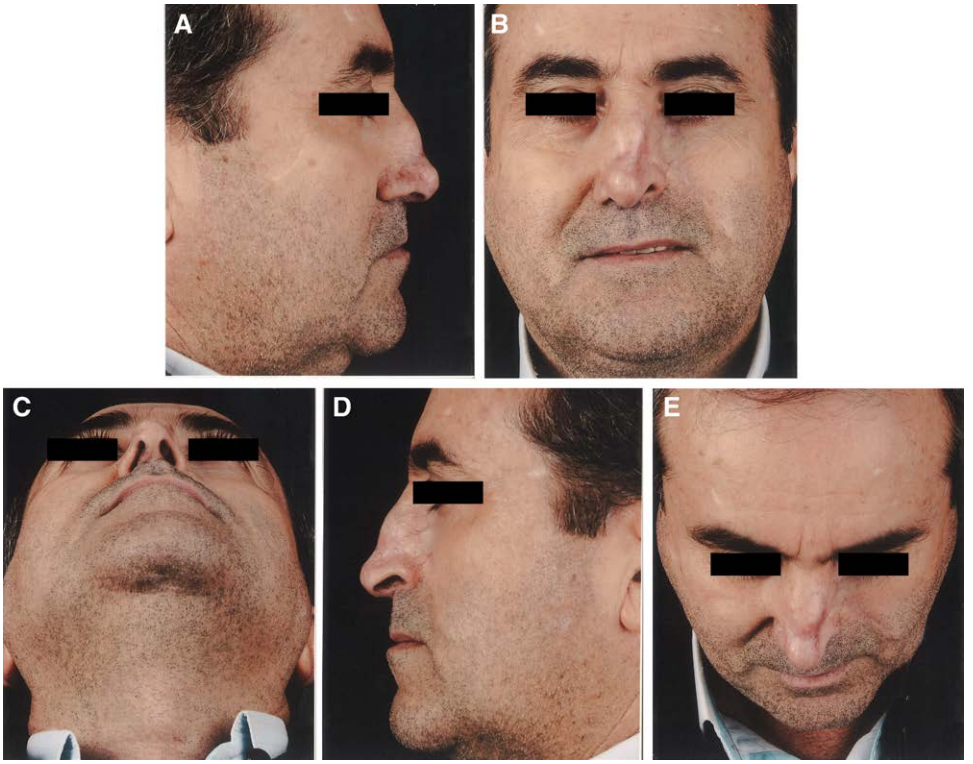

Fig. 1. Preoperative views of a patient before the intervention. A, Right lateral view. B, Frontal view. C, Inferior view. D, Left lateral view. E, Superior view.

Fig. 2. Another candidate for intervention; preoperative status. A, Frontal view. B, Right lateral view. C, Superior view. D, Left lateral view. E, Inferior view.

studied by an additional tool, SBSES.[16] Cakir concept, SNOT-22, and SBSES were used before surgery and after 6 months. However, VAS and PROM were put into measurement at four time points, including immediately after the surgery, after one month, 6 months and 12 months. Lastly, the SPSS-22 program was used for data analysis.

The surgery consisted of three stages. Firstly, the scar was removed (Fig. 3). Secondly, reduction rhinoplasty was performed from the same access (Fig. 4). Thirdly, extra skin remaining from this procedure covered the defect as an advancement flap (Fig. 5). In cases in which the scar was transverse, after excision of the scar, the defect was brought to the middle by dissection of skin from both sides. Also, the origin of the defect was restored. Then, similar to the other rhinoplasty procedures, a mesh was inserted into the nostrils and a splint was placed on the nose.

In the majority of patients, this reduction rhinoplasty consisted of removal or resection of the cartilage and bones of the dorsal nasal hump in addition to external lateral osteotomy. In 10 patients, the reduction was conducted from the caudal part of the septum. Interdomal and transdomal sutures were used for tip-plasty.

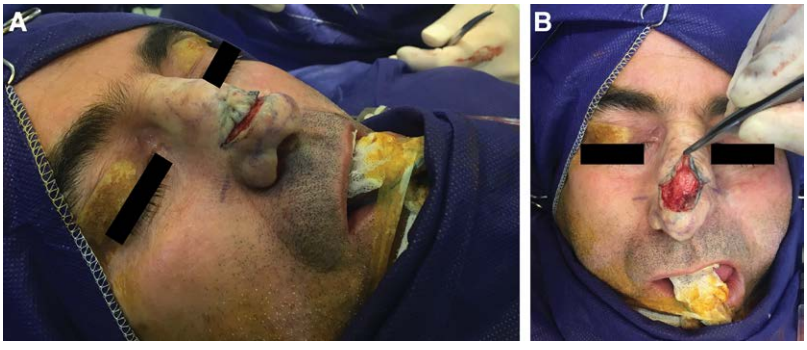

Fig. 3. The scar removal process. A, Trilateral view. B, Frontal view.

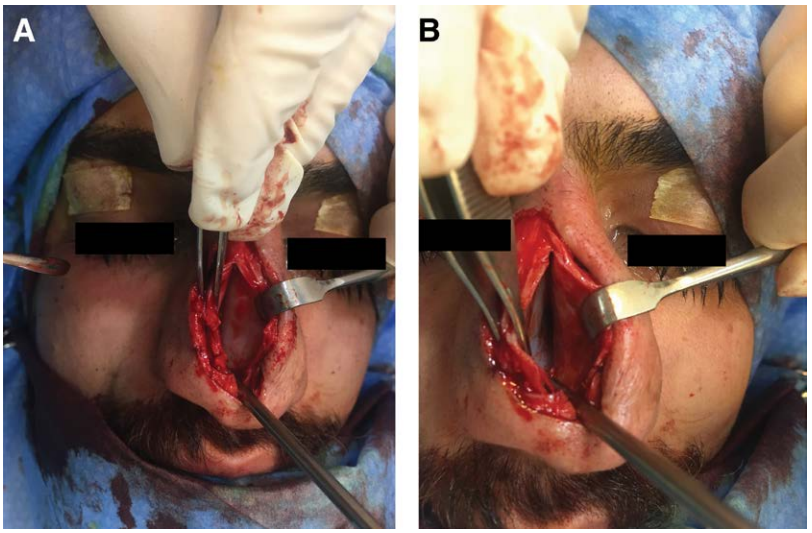

Fig. 4. Reduction rhinoplasty from the same incision. A, Reaching to the field to perform rhinoplasty. B, Reduction rhinoplasty performed from the same access.

Fig. 5. The patient right after the surgery. The defect that remained from removing the scar is covered by the extra skin, which remained from reduction rhinoplasty. A, Frontal view. B, Lateral view.

Table 1. Demographic Characteristics of Patients

Characteristic		Absolute Frequency	Percentage
Job	Housewife	10	30.3
	Employee	15	45.5
	Other (ie, self-employed, freelance, and so on)	4	12
Education	Less than high school	2	6.1
	High school diploma	17	51.5
	Post high school graduated, bachelor degrees, and undergraduate degrees	11	33.3
	Postgraduate degrees (ie, master's and PhDs)	1	0.3
Cause of scar	Leishmaniosis	16	48.4
	Burn	4	12.6
	Hemangioma	2	6
	Trauma	6	18
	Giant congenital nevus	2	6
	Cancer	3	9

RESULTS

Of the 51 patients, 33 patients completed the study. From 33, 17 participants (51.5%) were men and the rest were women. The mean age of participants was 30.3 ± 6.9, and the age of participants ranged between 20 and 50 years. According to the demographic features of the included patients listed in Table 1, the majority of them were employees (45.5%), and the most frequent education degree was less than high school (51.5%). In addition, six reasons for deformity were detected in patients, including leishmaniosis, burn, hemangioma, trauma, giant congenital nevus, and cancer. The most common cause of scarring was leishmaniosis (48.4%).

In these patients, scars affected more than one skin unit. Also, due to the lack of sufficient elasticity of the skin, it was not possible to close the defect easily after removing the scar. In details, the average length of the scar was 3.1 ± 0.35 cm and its average width was 1.53 ± 1.6 cm. The area affected by the scar was evaluated by the surface polygon concept before and after 6 months from the surgery. Paired-sample *t* test was 4.43 ± 1.4 and 1.5 ± 0.6 ($P < 0.05$) before and after surgery, respectively, which indicated a significant decrease (Table 2).

Results of PROM questionnaire started with 0.57 ± 0.75 before surgery and constantly increased to 2 ± 0.86 after 12 months ($P < 0.001$) (Table 3). It indicated improvement in patients' satisfaction from the intervention (one-way ANOVA). In the same way, constant improvement in patients' perception of their nasal appearance was noted, from 0.9 ± 0.45 and 0.66 ± 0.64 (before surgery) to 2.3 ± 0.64 and 1.75 ± 0.79 (12 months after the intervention). For comparisons of the VAS scale between four different time points of interest, the paired-sample *t* test was used. *P* values of 0.05 or less were considered significant. Results are presented in Table 3.

Cosmetic assessment of the healing wound was performed by a scoring system, SBSES at two time points, before and after 6 months from the surgery. Results indicated significant improvement after the intervention ($P < 0.001$) (Table 4).

Table 2. Evaluation of Scar Size Using Cakir Concept, before and after the Surgery

No. Units Affected by the Scar Based on Cakir Concept	Mean	SD	*P*
Before surgery	4.43	1.4	0.05
After surgery	1.5	0.6	0.05

Number of polygons affected by scars before surgery was compared with that after surgery.

Table 4. Checking the Scar before and after Surgery Based on SBSES Criterion

	Mean	SD	*P*
Scar before surgery	2.7	0.7	0.001
Scar 6 months after surgery	3.9	0.8	

Table 5. Checking the Respiratory Condition Based on SNOT-22

	Mean	SD	*P*
Respiratory before surgery	11.2	8.2	0.09
Respiratory 6 months after surgery	8.6	7.6	

The mean preoperative SNOT-22 score was 39.95 (62.47). The mean postoperative score was 21.22 (6 2.24). The surgical improvement measured by the SNOT-22 was highly significant ($P < 0.0001$). The mean preoperative SNOT-22 score was 11.2. The mean postoperative SNOT-22 score was 8.6. The surgical improvement measured by SNOT-22 was highly significant ($P < 0.09$) (Table 5).

DISCUSSION

In this work, two challenges of plastic surgery were studied: firstly, removing a scar on the nose that affects the cosmetic appearance, and secondly, performing reduction rhinoplasty from the same access for providing extra skin. Total removal of the scar may lead to a wide scar. Therefore, to repair the defect remaining from removing the scar, either a full-thickness skin graft, a nasolabial flap, a bilobed flap, or a forehead flap can be used. However, they may have side effects such as swelling and edema of the nasal passages and around the nose, as well as deformity along with contouring of the nasal skin. Also, it may leave scars on the donor site.[3,6] Nevertheless, a limited number of research studied concurrent removal of the scar or lesion and performing rhinoplasty.

A small number of published studies centered on the outcome of this surgery. Joseph studied 43 patients who underwent rhinoplasty along with scar removal.[17] Similarly, Ozturan et al[18] treated the droopy nose by removing extra skin with an incision, and performed rhinoplasty using the same access. However, no study was identified that includes a precise report evaluating the results of the surgeries.

In this study, removing scar plus rhinoplasty ultimately lead to removing a scar, providing extra skin for covering the defect and reducing the nasal height or elevating tip.

Table 3. Evaluation of Scar Specifications at Different Times by the Evaluators

Evaluator	T0 (mean C±SD)	T1	T6	T12	*P* value
VAS (Doctor 1)	0.9±0.45	1.4±0.61	1.9±0.61	2.3±0.64	<0.001
VAS (Independent doctor 2)	0.66±0.64	1.2±0.72	1.48±0.75	1.75±0.79	<0.001
PROM (Patient satisfaction)	0.57±0.75	1.03±0.88	1.8±0.76	2±0.86	<0.001
P value		>0.05	>0.05	>0.05	

T= time (0, 1,6,12 months).

Fig. 6. Postoperative status. The patient 1 month after the intervention. A, Frontal view. B, Right Lateral view. C, Left lateral view.

Moreover, the tip was improved from being flat with nasal tip-plasty. According to the results, based on the surface polygon concept, the scar size and skin units affected by the scar decreased significantly after the surgery.

Caughlin et al[19] suggested using various flaps or grafts to cover the defects. However, apart from that, the patients may suffer from additional scars due to incisions; the repaired parts were normally under tension due to the embossed nasal structure and the size of the scars. Also, patients and physicians were not normally satisfied with the results. In comparison, the results of the current study indicated a significant increase in patients' and physicians' satisfaction, using PROM, SBSES, and VAS. Figure 6 illustrates patient after 1 month intervention. Figure 7 presents intervention outcomes after 6 months.

Fig. 7. Postoperative status. The patient 6 months after the intervention. A, Right lateral view. B, Frontal view. C, Superior view. D, Inferior view.

CONCLUSIONS

Excision of large scars on the nose and reduction rhinoplasty from the same access can contribute to satisfactory results since firstly, it improves the nose appearance along with a small scar and secondly, the scar will not widen later. Therefore, according to the results obtained and its evaluation and comparison with other methods, concurrent scar excision and reduction rhinoplasty from the same access can be an effective method for eligible patients.

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PATIENT CONSENT

The patients provided written consent for the use of their images.

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