



Comparative Scar Analysis Between V and Inverted-V Incision in Open Rhinoplasty of Patients Referred to Rasht Amir-Almomenin Hospital

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ABSTRACT

Rhinoplasty has become one of the most commonly used surgeries in recent years. The visible columella scar is one of the problems of open Rhinoplasty. This study aims to compare the two common V and the inverted-V incisions in terms of their scar after open Rhinoplasty among patients. This comparative cross-sectional study was carried out on 394 open rhinoplasty patients from 2015 to 2016 in Amiralmomenin Hospital of Rasht. Half of the patients were treated with V incision and the other half with inverted-V. Subjective and objective scar assessment was done at least 12 months after surgery by using PSAS and CSAS questionnaires. Of 394 patients under study, 81% (319 cases) were female and 19% (75cases) were male. The subjects were at around the age of 28 ± 6 years and their Rhinoplasty surgery was performed 18 ± 6 months ago. In the subjective study, the final score of PSAS and its items (pain, itching, color, stiffness, thickness, irregularity) were not significantly different in the two studied incisions ($p > 0.05$). Also, in the objective study, the CSAS final score and its items (satisfactory, pigmentation and irregularity) didn't show a significant difference in two under study incisions ($p > 0.05$). No significant difference was observed in forming scars in terms of individual and social variables and skin thickness in two groups ($p > 0.05$). The two v and inverted-v incisions have similar scar qualities. Besides, scar formation is not related to skin thickness and sex.

Key words: Incision, Plastic Surgery, Open Rhinoplasty, Scar

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INTRODUCTION

Rhinoplasty is one of the most common procedures performed by the facial plastic surgeon [1]. Rhinoplasty can be carried out with an endonasal (closed) or an external (open) procedure. Transcolumellar incision and lifting the soft tissue are the only major differences

between open and closed rhinoplasty [2]. Today, surgeons who prefer the open rhinoplasty use different Transcolumellar incisions such as the

horizontal cut, Z, V, W, and inverted-V [3-6]. This incision is located in the narrowest part of the columella's center. Most of these incisions may create scars in varying degrees, including the notching or stepping of the columella and the irregularity of the inner edge of the septum [7]. Patients are often concerned about the apparent outcomes of columellar scar in the external procedure [8].

The V and inverted-V incisions provide a suitable path for placing the suture which can prevent scar dent and gaps in the cutting place [9].

Regarding the high prevalence of cosmetic rhinoplasty in the world, and especially in our

country, and the sensitivities associated with post-operative scars, researchers and surgeons are seeking to identify the best incision with the lowest numbers of scares appropriate for each patient. Therefore, in this study, we decided to compare two types of the most common open rhinoplasty incisions which are v and inverted-v incisions among patients of the Amiral-Momenin hospital of Rasht, and to weigh the consequences in order to take few steps identifying the proper incision and satisfy the patients as much as possible.



Figure 1: a. V incision b: Inverted-V incision

MATERIALS AND METHODS

This study is a comparative cross-sectional study that was conducted on 394 open-rhinoplasty patients from 2015 to 2016. Rhinoplasty was performed by two surgeons at Amiral-momenin Hospital of Rasht. Half of the patients were treated with V incision and the other half with inverted-V. Exclusion criteria: if rhinoplasty is performed due to illness or trauma or in case of having a secondary or modifiable rhinoplasty, then it will be excluded from the study. Same rules will apply when the type of the incision is not clear.

At least 12 months after the operation, patients received a phone call inviting them to the clinic to assess the scars. Demographic data and the skin's thickness in tip and supra-tip region were recorded (thin, thick and moderate).

For subjective assessment as in Erickson's study [8], we used the PSAS (Patient Scar Assessment Scar) questionnaire, which is a six-question questionnaire that measures the symptoms and appearance of scars in front of a normal skin. The components of this questionnaire include pain, itching, color, stiffness and thickness of the scar. Patients scored from 1 to 10 for each question. Number 1 means there is no complaint or no difference between the scar and the normal skin and number 10 means the worst possible mode of the scar. Finally, the total sum of the numbers resulted in the final rank (6 to 60). (Table 1)

Table 1: PSAS (Patient Scar Assessment Scale)

	1	2	3	4	5	6	7	8	9	10
Is scar tissue painful?										
Is the scar itchy?										
Is the scar color different from normal skin?										
Is the scar stiffer than normal skin?										
Is the scar thickness different from normal skin?										
Is the scar notching?										

For objective assessment similar to the research of Ihvan and Aksu [9,10], we used CSAS (Columellar Scar Assessment Scale), which is a scar ranking criterion, that is developed using the Vancouver and Manchester scar criteria and satisfactory, the pigmentation and notching of the scar is evaluated by it. Each component is scored as excellent, good and weak (1, 2, 3). (Table 2)

Table 2: CSAS (Columellar scar assessment scale)

Satisfactory scar	Excellent (1)	It cannot be detected from a distance of 2 meters
	Good (2)	Can be weakly detected from a distance of 2 meters
	Weak (3)	Can be detected from a distance of 2 meters
Pigmentation	Excellent (1)	Patient's normal skin color
	Good (2)	Pigmentation on the scar
	Weak (3)	Hyperpigmentation
Notching	Excellent (1)	No irregularities on Columella and rims
	Good (2)	Irregularities on Columella or dented scars
	Weak (3)	Irregularities on Columella and rims

Also, the overall satisfaction of the evaluator was recorded as satisfied, relatively satisfied and dissatisfied. Finally, the data collected are analyzed by SPSS software using descriptive and analytical statistical tests. In this study, $p < 0.05$ was considered to be the level of significance for the tests.

RESULTS

81% (319 people) were female and 19% (75 people) were male. The studied subjects were at the age of 28 ± 6 years. The majority of subjects were college graduates (60.7%). Generally, the Rhinoplasty surgery of patients was carried out 18 ± 6 months ago which was statistically significant in two groups ($p < 0.0001$), so that, the time period passed since the last operation in the inverted-v group was about 3 months longer than that of the V group.

In the initial review, there was no significant difference in the PSAS final scores in 2 types of open rhinoplasty ($p = 0.78$). However, in evaluating the PSAS components, in terms of the pain of the scar, the inverted-V incision was better than the V incision ($p = 0.03$), so that the score of inverted-v, in terms of the pain, was less than V incision (1.1 ± 0.53 versus 1.21 ± 0.69). On the contrary, the score of the V incision in open rhinoplasty, in terms of scar stiffness was lower than that of inverted V-incision ($p = 0.05$) (2.07 ± 1.82 versus 2.83 ± 4.88). However, regarding that the period of time passed from the rhinoplasty surgery was statistically significant in V and inverted-V incision, therefore, to compare the final PSAS score and its components in two groups, ANCOVA analysis with covariant control of time elapsed from the surgery was used. The information of (Table 3) illustrates that after controlling the time period passed from surgery the scores of 2 incisions under study were not significant ($p > 0.05$).

Table 3: Estimating the mean and standard error of PSAS scores after adjusting the effect of time period passed from the surgery

P*	95% Confidence Interval			Standard error	Mean	Incision Type of open rhinoplasty	Dependent Variable
	Upper Bound	Lower Bound					
	0.210	1.278	1.105				
	1.199	1.026	.044	1.113a	Inverted V		
0.228	1.492	1.242	.064	1.367a	V	Scar itching	
	1.382	1.132	.064	1.257a	Inverted V		
0.698	1.595	1.255	.087	1.425a	V	Scar color	
	1.643	1.303	.087	1.473a	Inverted V		
0.058	2.610	1.564	.266	2.087a	V	Scar stiffness	
	3.334	2.288	.266	2.811a	Inverted V		
0.673	1.813	1.424	.099	1.619a	V	Scar thickness	
	1.753	1.365	.099	1.559a	Inverted V		
0.455	1.852	1.458	.100	1.655a	V	Scar notching	
	1.745	1.351	.100	1.548a	Inverted V		
0.975	10.142	8.637	.383	9.390a	V	PSAS Final Score	
	10.159	8.655	.383	9.407a	Inverted V		

*ANCOVA ANALYSIS

Also, we are witnessing that stiffness in both V and inverted-V groups has the highest score. The lowest score in both groups is also related to pain in the scar.

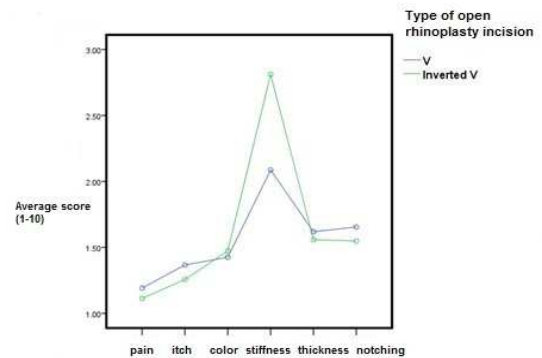


Figure 2: Comparison of PSAS scores and components in two V and inverted-V incision

In accordance with data presented in (Table 4), scar satisfactory for V incision was: 78.7% excellent, 19.3% good and 2 % weak and was 76.1% excellent, 22.3% good and 1.5% weak in inverted-V incision.

Table 4: Frequency distribution of scar satisfactory, pigmentation and notching and CSAS final score of two V and inverted-V incision

P*	Incision Type of open rhinoplasty				Percent	Number	Percent	Number	Total
	Inverted-V		V						
	Percent	Number	Percent	Number					
0.743	76.1%	150	78.7%	155	Excellent	Scar satisfactory			
	22.3%	44	19.3%	38	Good				
	1.5%	3	2.0%	4	Weak				
	100.0%	197	100.0%	197	Total				
0.889	85.3%	168	84.3%	166	Excellent	Pigmentation			
	14.7%	29	15.2%	30	Good				
	0.0%	0	0.5%	1	Weak				
	100.0%	197	100.0%	197	Total				
0.999	83.8%	165	83.2%	164	Excellent	Notching			
	15.2%	30	15.7%	31	Good				
	1.0%	2	1.0%	2	Weak				
	100.0%	197	100.0%	197	Total				

*Chi Square Test, Mann Whitney Test

Pigmentation in V incision was: 84.3% excellent, 15.2% good and 0.5% weak and was 85.3% excellent 14.7% good, 0% weak for inverted-V incision ($p = 0.889$).

Notching in V incision was: 83.2% excellent, 15.7% good and 1% weak and 83.8% excellent, 15.2% good and 1% weak were in the inverted-V incision ($p = 0.999$).

Therefore, the frequency distribution of components in V and inverted-V incisions was similar and not statistically significant.

Table 5: Comparison of CSAS tools in terms of individual social variables and skin thickness

		Incision Type of open rhinoplasty											
		Total			Inverted-V			V					
		PSAS final score			PSAS final score			PSAS final score					
P	median	Standard deviation	Mean	P	median	Standard deviation	Mean	P	median	Standard deviation	Mean		
0.432	6.00	3.35	8.28	0.338	6.00	3.60	8.50	0.874	6.00	3.19	8.06	Under 20	
	6.00	5.48	9.32		6.00	5.73	9.32		6.00	5.24	9.32	20-30	
	6.00	5.34	9.92		8.00	5.18	10.18		6.00	5.54	9.64	Over 30	
0.015	8.00	6.10	10.31	0.06	9.00	6.32	10.46	0.123	7.50	5.92	10.12	Male	
	6.00	5.09	9.18		6.00	5.17	9.24		6.00	5.02	9.13	Female	
0.028	6.00	4.43	8.07	0.148	6.00	9.24	11.33	0.139	6.00	2.42	7.25	Under diploma	
	6.00	4.46	8.73		6.00	4.44	8.56		6.00	4.50	8.87	Diploma	
	7.00	5.75	9.87		7.00	5.76	9.90		6.50	5.78	9.84	Collegiate	
0.009	6.00	5.02	9.04	0.061	6.00	5.15	9.03	0.151	6.00	4.92	9.05	Student and university student	
	10.00	5.99	11.40		10.00	5.61	11.35		10.00	6.64	11.47	Employee	
	6.00	5.25	9.19		6.00	5.51	9.31		6.00	5.02	9.08	Free	
0.0001	7.00	5.47	10.28	0.039	8.00	5.78	10.61	0.003	6.50	5.20	9.93	Thick	
	7.00	5.50	9.81		7.00	5.48	9.70		7.50	5.54	9.92	Medium	
	6.00	4.62	8.14		6.00	5.05	8.44		6.00	4.20	7.86	Thin	

According to information in (Table 5) which deals with CSAS objective tools based on individual social variables (age, sex, education, occupation) and skin thickness, no significant difference was generally seen in two groups of v and inverted v incision ($p > 0.05$).

In investigating the frequency distribution of the evaluator's level of satisfaction, no significant difference was observed in two groups based on Chi-Square test for both methods. In fact, the level of satisfaction in both studied groups was above 87%.

DISCUSSION

Open rhinoplasty is one of the most popular plastic surgical procedures. In similar studies carried out in Iran and Turkey, as in this study, we have witnessed that rhinoplasty is more commonplace among women [9, 11, 12]. It seems that rhinoplasty is more common in the educated class so that in our research and Rezaei's study [11], 60% of rhinoplasty patients had university education.

Considering the variability of incisions in Columellar region of open rhinoplasty, many studies have been carried out in recent years with the aim of comparing different types of these cuts in terms of scars, that our study is one of the largest studies of its kind in terms of sample size. In 2003, columella scar after running W incision and V incision were compared in 129 patients by Celik. The running W incision group showed a

better quality of scar compared to the V incision group [13]. In 2008, Aksu compared the scar remained on Cleumella after transverse and inverted-V incisions on 84 patients and found that inverted-V incision is a better choice in open rhinoplasty than transverse incision [9]. In 2016, Rezaee compared 3 different types of incisions on 120 patients: V, Inverted-V and stair-step incision. There was no significant difference between the incisions [11]. In 2017, Ihvan compared W and Inverted-V incisions on 93 patients. Both W and inverted-V incisions had scars with same qualities [10]. In all studies conducted, incisions with more cutting angles had better scar quality and incisions with the same cutting angles had the same quality. As Celik explains in his study, the main reason of scar reduction in the running W incision compared to V incision is that the W incision has smaller angles in the corners [13]. In our study, the two V and inverted-V incisions with the same number of angles showed no significant quality difference.

In this study, scar pain and scar stiffness respectively acquired the lowest and the highest scores in the subjective evaluation. In Erickson study [8], scar pain had also the lowest score but the highest score was related to the color of the scar and stiffness was in the second rank. Differences observed in this study may be due to differences in sample size, because in the Erickson study only 25 patients completed the PSAS questionnaire.

In the current study, the comparison of CSAS score, based on individual social variables (age, sex, education, occupation) and skin thickness in tip and supra-tip region generally showed no significant difference in two groups of V and inverted-V incisions ($p > 0.05$). Similar to our study, no significant relationship was seen between age, sex, and thickness of the type and scar formation in Kim's study [14].

Also, in the study of Verim, no significant difference was observed between the improvements of Cleumella scar and skin thickness ($p > 0.05$). However, male sex was a significant factor in scar improvement in that study ($p < 0.05$) [15]. In Kilci's study, no significant relationship was seen between skin type and scar formation in open rhinoplasty ($p > 0.05$) [16]. So, it seems that skin thickness is not related to scar formation.

In this study we learned about the role of time elapsed since surgery and its effect on pain and scar stiffness, so that, as more time passes from the surgery, the columellar scar becomes stiffer. This issue can be proved in studies with separated and longer time intervals.

CONCLUSION

The current study showed that two V and inverted-V incisions have the same scar quality. We also found that scar formation is not related to skin thickness and sex.

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