

# Comparison between Step Incision and Inverted V Incision in Columellar Scar in Open Rhinoplasty

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## ABSTRACT

**Background:** During recent decades open approach rhinoplasty and then, to obtain better transcolumellar scar results, some incisions like z, v, and reversed v were introduced. Different authors describe step and inverted v incisions as the two most common transcolumellar incisions. Thus, the present study was conducted to compare postoperative transcolumellar scars using these two patterns.

**Methods:** A total of 62 aesthetic rhinoplasty candidates were randomly divided into two groups of step pattern and inverted v pattern. Then, all the patients were operated by one surgeon in similar operative conditions using similar suture materials and operation techniques.

**Patient follow-ups for transcolumellar scars were done in three ways:**

1. According to the clinical scar assessment scale (SCAS),
2. According to the observer team scores (1-10 scoring system) (Two plastic surgeons, an aesthetic ward nurse, and a non-aesthetic ward nurse)
3. According to patient's evaluation (1-10 scoring system). Finally, data were collected and submitted for analysis.

**Results:** Both groups had similar mean ages. After six months, analysis of transcolumellar scars were done according to the three criteria previously mentioned. According to the findings, compared with step incision, inverted v incision produced higher scores and better quality for both patients and observer team.

**Conclusion:** The results of the present study showed that inverted v transcolumellar incision produces better scars in comparison to step incision in the views of patients and observer team. As a result, we advise inverted v pattern for transcolumellar incision in open rhinoplasty.

**Key words:** Rhinoplasty, Transcolumellar, Step incision, Inverted v incision, Scar, Assessment scale (CSAS)

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## INTRODUCTION

Nowadays, rhinoplasty is one of the most common aesthetic operations in the world. It is also among the most common aesthetic operations in Iran. Because nose is the central structure in the face, minimal changes in it are comparatively more obvious, so the operation on the nose is one of the most difficult procedures in aesthetic surgery [1-3].

On the other hand, due to the increasing use of open approach in rhinoplasty, the problem of skin scar is the most prominent, outstanding, and constant concern for all

plastic surgeons. So, finding a good pattern for collumellar incision is an important endeavor.

The modern rhinoplasty started since late 18<sup>th</sup> century [1-3]. At first plastic surgeons used closed technique and only intra nasal incision [4-6]. Later, they noted that closed approach prevented full comprehension of cartilage, bones, and nasal structure, and then many external skin incisions for good exposure and careful concern of corrective manoeuvres were developed [7-9].

Since 20<sup>th</sup> century, significance of collumella for its location on nose has been known and transcolumellar approach has become predominant [10-12]. Nowadays, surgeons who select the open rhinoplasty apply various Transcolumellar incisions including the horizontal cut, Z, V, W, and inverted-v [12-15].

Previous studies have shown that the majority of these incisions can generate scars in different grades, such as the notching or stepping of the columella and the abnormality of the inner edge of the septum [16-18].

The present study was therefore conducted to compare post-operative scars as a result of using these two patterns.

**MATERIAL AND METHODS**

**Patients**

The present blind randomized clinical trial was conducted between 2016-2017 in 15<sup>th</sup> Khordad Educational Hospital in Tehran. A total of 62 patients (sample size was based on previous studies and available sampling) who had the inclusion criteria to enter the study were randomly divided into two groups: 31 patients in the step pattern group and 31 patients in the inverted v pattern incision group.

**Surgery procedure**

The surgery conditions, suture materials, and the instruments were all similar in both groups, except for the pattern of incisions.

After injection of 10 cc lidocain 2% with 1 in 100/000 epinephrine solution in sub mucopricondrial space in both sides of septum for vasoconstriction and hydrodissection, the marginal incision in the caudal part of the lower lateral crura cartilage was performed using number 15 blade while alar rims was retracted and everted using skin hook [19]. Then, using a blade number 11 trans-collumellar incision was performed in the central part of collumella in step or inverted v patterns. T

o decrease the risk of ischemia in the tip of v incision, the angle of the tip of v incision was made to be 90° [20-22]. These incisions were continued to join the collumellar extension of marginal incision, which is located two mm posterior to the edge of lateral collumellar crura, to the collumellar incision [23,24]. Then the soft tissue was elevated and dissected in supra chondrial plan [25-27].

**Scar assessment**

There are objective and subjective methods for assessment of scar and currently there is no consensus on the most suitable way for assessment of scar [28,29]. In 1990, Vancouver burn scar assessment for scar assessment was published (Table 1) and has been used for the assessment of scar alteration and scar maturity and response to treatment [30-33].

This is a non-invasive clinical assessment tool which scores scars according to pathologic changes relative to deviation of normal skin. Four components are considered in Vancouver burn scar assessment: 1. Pigmentation, 2. Vascularity, 3. Pliability, and 4. Height. It has been accepted in the literature that Vancouver system requires a minimum of three observers to achieve more acceptable results.

Yet, there are other objective systems for assessing scars, too. Beausang et al. [34] described a clinical scar assessment system which was successfully compatible with histologic findings [32-35]. This system has the preference of using it for a vast majority of scars, including surgical scars and non-burn treatment scars (Table 2).

There are several acceptable coding systems for the classification of scars and lacerations [36-39], including current procedural terminology code of the American Medical Association, International Classification of Disease, etc.

**Table 1: The vancouver burn scar assessment for scar assessment [40]**

The Vancouver Scar Scale	
Pigmentation	
0	Normal: Colour that closely resembles the colour of the rest of the body
1	Hypopigmentation
2	Hyperpigmentation
Vascularity	
0	Normal: Colour that closely resembles the colour of the rest of the body
1	Pink
2	Red
3	Purple
Pliability	
0	Normal
1	Supple: Flexible with minimal resistance
2	Yielding: Giving way to pressure
3	Firm: Inflexible, not easily moved, resistant to Manual pressure
4	Banding: Rope-like tissue that blanches with extension of the scar
5	Contracture: Permanent shortening of the scar, producing deformity or distortion
Height	
0	Normal: Flat
1	<2 mm
2	<5 mm
3	>5 mm

**Table 2: Clinical assessment score [41]**

Visual analogue scale	
Excellent ----- -Poor	
(A) Colour (compare with surrounding skin) (Lighter or darker)	
Perfect	1
Slight mismatch	2
Obvious mismatch	3
Gross mismatch	4
(B) Sheen	

Matte	1
Shiny	2
(C) Contour	
Flush with surrounding skin	1
Slightly proud/indented	2
Hypertrophic	3
Keloid	4
(D) Distortion	
None	1
Mild	2
Moderate	3
Severe	4
(E) Texture	
Normal	1
Just palpable	2
Firm	3

Hard	4
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MCFONTZL classification is a more complex system for classification of face lacerations, which combines the anatomic location with the intensity assessment (Table 3) [42-44]. Table 4 shows the disruptive factors in wound healing.

It is believed that these factors decrease the chance of intensifying scar in all wound types, including open rhinoplasty incision [42-44].

In the current study, eight month after surgery, the patients were evaluated and scored between 0-10 by the observation team, including two plastic surgeons, one nurse who was working in the aesthetic ward, and one nurse who was working in other wards, as well as by the patients themselves and in accordance with the CSAS system information collected by the above three criteria's.

The results were analysed using SPSS, version 1.6, running t-tests. In addition, prior to the operation, the patients were provided with explanations about the technique of operation.

**Table 3: MCFONTZL assessment system [45]**

MCFONTZL assessment system		
A	Area	MCFONTZL aesthetic unit designation
S	Side	-
T	Thickness	Depth of penetration
E	Extension	Branching
R	Relaxed skin tension Directionality (relaxed skin tension lines)	-
Line conformity		
I	Index laceration	Laceration with maximum continuous skin interruption
S	Soft-tissue defect	-
K	Coding	Current procedural terminology code

**Table 4: Factors that impair wound healing [46]**

Intrinsic Factors	Extrinsic Factors
Ischemia	Nutritional deficiencies
Infection	Diabetes mellitus
Foreign bodies	Chronic renal failure
Cigarette smoking	Steroids
Venous insufficiency agents	Chemotherapeutic
Radiation fibrosis Old age malignancy	Distant
Repeated trauma	Old age
Local toxins	Liver disease
Cancer	Other drugs

**RESULTS**

The results of the present study are shown in Tables 5-14. The means and standard deviations of the studied patients were 26 years [15-37] and  $87 \pm 6$  in the step incision group and 28 years [14-36] and  $77 \pm 7$  in the inverted v incision group.

As shown in Table 12, in accordance to CSAS scores, there is no meaningful difference between the two groups of

patients, but in accordance to the scores by observer team and scores by the patients themselves, there is a meaningful difference between the two groups. Also, we found that the scar of inverted v incision had a better quality for observer team and the patients and this better quality of scar was more clear and marked for the patients themselves.

**Table 5: Number of patients in each group according to colour and adjustment of scar with skin around the collumella**

S.No.	Colour	Number in group 1	Number in group 2 (inverted v)
1	Perfect	23	24
2	Slight mismatch	4	4
3	Obvious mismatch	4	3
4	Gross mismatch	-	-

**Table 6: Number of patients according to matte or shining of surface of collumellar scars**

S.No.	Colour	Number in group 1	Number in group 2 (inverted v)
1	Matte	25	30
2	Shiny	6	1

**Table 7: Number of patients according to the contour of scar of collumella**

S.No.	Contour	Number in group 1 (step)	Number in group 2 (inverted v)
1	Flush with the neighboring skin	24	28
2	Slightly proud/indented	2	3
3	Hypertrophic	5	-
4	Keloid	-	-

**Table 8: Number of patients according to distortion of scar of collumella**

S.No.	Distortion	Number in group 1 (step)	Number in group 2 (inverted v)
1	None	24	26
2	Mild	4	4
3	Moderate	3	1
4	Severe	-	-

**Table 9: Number of patients according to texture of scar of collumella**

S.No.	Texture	Number in group 1 (step)	Number in group 2 (inverted v)
1	Normal	24	28
2	Just palpable	5	2
3	Firm	2	1
4	Hard	-	-

**Table 10: Number of patients according to mean scoring by observer team**

Group\Score	1	2	3	4	5	6	7	8	9	10
Group 1 (step)	-	-	-	-	1	1	11	10	6	2

Group 2 (inverted v)	-	-	-	-	-	-	6	12	9	4
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**Table 11: Number of patients according to mean scoring by the patients**

Group\Score	1	2	3	4	5	6	7	8	9	10
Group 1 (step)	-	-	-	-	-	5	9	5	6	6
Group 2 (inverted v)	-	-	-	-	-	-	3	6	10	12

**Table 12: Comparison of the results of step and inverted v incisions scoring according to CSAS Table**

Group	Frequency	Mean CSAS score	Standard deviation	Mean standard Error
Step	31	6.42	2.203	0.396
Inverted v	31	5.77	1.875	0.337

t Test=1.24, P=N.S.

**Table 13: Results of scoring according to scores given by observer team in both groups**

Group	Frequency	Mean observer score	Standard deviation	Mean standard Error
Step	31	7.81	1.1	0.2
Inverted v	31	8.4	1	0.2

t Test=2.1, P=0.041

**Table 14: Results of scoring according to scores given by patients**

Group	Frequency	Mean patient scores to themselves	Standard deviation	Mean standard Error
Step	31	8	1.4	0.25
Inverted v	31	9	1	0.2

t Test, P=0.001

## DISCUSSION

More than 100 years have passed since performing the first modern rhinoplasty [7,8]. So far, frequent changes have been introduced in the general approach to rhinoplasty, including type of approach (open/closed), use of different kinds of cartilaginous grafts, and columellar incision [10,26-31].

Review of the related literature showed that comparison between scars of different incisions in collumella is of a great importance; a subject that has not been studied so far.

In general, many researchers have advocated the two common incisions in collumella (i.e. step and inverted incisions) based on their experiments [7-27].

In the study conducted by Habibi et al. [47] on 394 open rhinoplasty patients that 50% of were treated with V incision and the rest with inverted-V, the result showed that the final score of PSAS and its items (pain, itching, color, stiffness, thickness, irregularity) were not significantly different in the two studied incisions ( $p>0.05$ ); in addition, in the CSAS final score and its items (satisfactory, pigmentation and irregularity) no significant difference in two under study incisions ( $p>0.05$ ) was observed [47]. In the other study

conducted by Kilci et al. on 28 consecutive adult male patients to explore the association of the columellar incision scar with the type of skin and columellar incision type in a Turkish population; they reported no significant difference was seen between columellar scar scores according to skin type and columellar incision type used for external septorhinoplasty [48]. The present study was conducted to compare the resultant scars of step and inverted v incisions in collumella. According to the findings of the current study, there was no meaningful difference between demographic variables including age-gender between the two groups. An interesting point observed in the present study is that according to CSAS Table, there was no meaningful difference between step and inverted incisions but according to scores by observer team and by the patient themselves, there was a meaningful difference between two groups and the quality of scar in collumella in inverted v incision group was better and the scar was less marked.

## CONCLUSION

In spite of lack of a meaningful difference between step and inverted v incisions in collumellar region in open septorhinoplasty patients according to CSAS system, according to the observations of the observer team and

especially the patients themselves, the quality of scar in inverted v incision, compared to step incision, was better and the scar was less marked, so the patients and medicinal team suggest the inverted v incision in open septorhinoplasty.

#### COMPLIANCE WITH ETHICAL STANDARDS

All procedures performed in the present study were in accordance with the ethical standards of the institutional and/or national research committee and 1964 Helsinki declaration and its later amendments or comparable ethical standards.

#### INFORMED CONSENT

Informed consent was obtained from all individual participants included in the present study.

#### CONFLICTS OF INTEREST

The authors declare that they have no conflict of interests.

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