

Nasal Tip Remodeling by Non-Destructive Techniques

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Abstract

Background: Nasal tip surgery is regarded as the most challenging aspect of plastic surgery. Control of nasal tip contour has always been a key component of a successful rhinoplasty. Creating a natural-appearing nasal tip contour is a complex task and requires a 3-dimensional approach.

Aim of Study: In this study we aimed to study and implement the different non-destructive surgical techniques for the management of the various nasal tip deformities.

Patients and Methods: Fifty patients with various tip deformities were operated by an open approach either by sutures, various grafts or both.

Results: Decreased need for irreversible techniques, with a concurrent increase in conservative techniques as sutures and grafts techniques that had been done in most of our patients for each.

Conclusion: We concluded that management of nasal tip deformities with both suture and grafting provides best results.

Key Words: Graft – Nasal tip – Rhinoplasty – Sutures.

Introduction

NASAL tip surgery is generally recognized as the most complex portion of rhinoplasty, and tip irregularities are a common cause of revision rhinoplasty [1].

Attaining a well-defined and properly projecting nasal tip is a vital component for success in tip shaping and is predicated on a fundamental understanding of the anatomical components that provide nasal tip support and their influences on tip projection and shape [2].

One of the factors that makes rhinoplasty a continuous challenge is the complicated dynamic interplay that occurs with each maneuver, resulting

in additional changes that may or may not be in agreement with the aesthetic goals, when a number of maneuvers are carried out simultaneously, the associated changes with each maneuver become difficult to predict, thus creating an enigma for the surgeon, knowledge of these effects garnered through experience and reading the related literature will ultimately lead to more predictable rhinoplasty outcomes [3].

Shaping the nasal tip by scoring, morselization, resection, or transection of the alar cartilages (destructive techniques) disrupts the structural integrity of the alar arches sacrificing support and introducing variables surgeons cannot control [4].

In the 21st century, there was a rapid transition from disruptive cartilage altering techniques to procedures that made use of precision suture placement for reshaping of the nasal tip cartilages without serious disruption of its components [5].

Nasal tip sutures allow the surgeon to manipulate the tip with a high degree of precision and better long-term clinical outcomes [6].

The clinical effects of sutures depend largely on the magnitude of suture tightening, the intrinsic forces on the cartilages, cartilage thickness, and the degree of soft-tissue undermining. The nasal tip complex is perhaps the most intricate of the nasal structures and exhibits subtle but evident responses to manipulations [7].

Intraoperative, the surgeon can determine the exact effect of each suture placed by observing the movement of the lower lateral cartilages as the suture is tightened, the degree to which a suture is tightened typically governs the magnitude of the response observed in the cartilages. As the desired cartilage movement is obtained intraoperative [8].

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Some of advantages of suture techniques; their negative effects can be controlled, and reversible intra-operatively without disruption the structural integrity of the tip elements [8].

There are several basic suture techniques used in remodeling nasal tip as a part of nondestructive technique that include: Interdomal Suture, Transdomal Suture, Middle Crura Suture, Medial Crura Suture, Lateral Crura Spanning Suture, Tip rotation suture, Lateral crural steal suture, Septo-columellar suture, Lateral crural mattress suture, Medial Footplate Suture and Tongue-in-groove technique [9].

When cartilage is missing or extraordinarily weak, grafting is necessary. Tip grafts, columellar struts, spreader grafts, and others will not lose their significant roles in rhinoplasty simply because suture techniques are available [10].

Patients and Methods

This study was done in Otolaryngology Department in Al-Zaharaa University Hospital between 2013 and 2018. It included 50 patients after having a written consent from each patient and after approval of the Ethical Committee of the Hospital. They underwent rhinoplasty due to different types of nasal tip deformities, they were (15) males and (35) females, their age ranging from 18 to 50 years old. All patients underwent extensive preoperative evaluation in the form of history taking, thorough physical examination, complete laboratory investigations, psychiatric evaluation, and photographic evaluation and documentation.

Patients were classified according to types of tip deformity into: Under-projected nasal tip, Over-projected nasal tip, under-rotated nasal tip, Over-rotated nasal tip, broad, ball, bulbous nasal tip, boxy nasal tip, smiling nasal tip and tension nose.

Surgical approaches to the patients:

The classic steps in open rhinoplasty under general anesthesia were done including septoplasty, the inverted V incision, skeletonization, bony rhinoplasty, nasal tip work, and closure.

Nasal tip:

After exposure, the lower lateral cartilage can be assessed for the degree of concavity, convexity, resilience, position length/width, and symmetry. Also analysis of the medial crura is critical for tip support. Each tip deformity has been evaluated and the underlying pathology identified. The nasal tip contouring maneuvers that have been evaluated in this study divided into: 1- Tip suture alone 2-

Tip graft alone as Columellar strut, Shield type tip graft, caudal extension graft, Cap graft, umbrella graft, buttress tip graft and extended spreader graft. 3- Combined suture and graft.

Post-operative follow-up: This was ranging from 6 to 18 months.

Postoperative photographs: We used the same 5 standard views used for the preoperative photographs, and we compared the pre- and the post.

Results

This study included 50 patients, who underwent rhinoplasty due to different types of nasal tip deformities, they were (15) males and (35) females, their age ranging from 18 to 50 years old. The most encountered deformities were over-projected nasal tip in 14 patients (28%), only 9 patients (18%) had under-rotated nasal tip. 7 patients (14%) had either broad or bulbous nasal tip, but 5 patients (10%) only had boxy one and another 4 patients (8%) had under-projected nasal tip. Smiling or tension nasal tip diagnosed in 2 patients each (4%) Table (1).

Nasal tip contouring maneuvers used in our study have been classified into suture, grafts and combined sutures and grafts.

In our study: Inter-domal sutures had been done for 40 patients (80%), while trans-domal and Medial crural spanning sutures had been done for 35 patients (70%). Lateral crural spanning sutures had been done for 15 patients (30%). Septo-columellar sutures had been done only for 10 patients (20%), tip rotation suture in 10 cases (20%), 3 patients (6%) operated with lateral crural steal sutures. Medial footplate 3 patient's. Table (2). In each patient we can use one or more than one suture.

Regarding grafts used: Coulmellar strut had been done for 35 patients (70%), while shield type graft, caudal extension graft and extended coul-mellar strut had been done only for 5 patients (10%) each. Lateral crural batten, extended spreader strut and cap graft had been done for 2 patients (4%) each and finally; umbrella graft had been done for only one patient (2%). Table (3).

Regarding the outcome:

Majority of patients (90%) were very satisfied, 6% of patients were fairly satisfied, and only 4% of patients were not satisfied. The Majority of cases (94%) were very satisfied for the doctor, while only one case wasn't satisfied for the doctor. 2 only cases (4%) showed fair satisfaction for the doctor.

Table (1): Shows preoperative aesthetic deformities, number and percentage of patients for each deformity.

Deformity	Total No. of cases = 50	
	No.	%
Over-projected tip	14	28
Under-rotated tip	9	18
Broad tip	7	14
Bulbous tip	7	14
Boxy tip	5	10
Under-projected tip	4	8
Smiling nasal tip	2	4
Tension tip	2	4
Cleft nose	0	—
Ball tip	0	—

Table (2): Shows numbers and percentages of different suture techniques for nasal tip modifications.

Types of sutures	No.
Inter-domal	40
Trans-domal	35
Medial crural suture	35
Lateral crural spanning	15
Septo-columellar	10
Tip rotation suture	10
Medial footplate	3
Lateral crural steal	3

Table (3): Shows numbers and percentages of patients underwent nasal tip modifications by using graft techniques.

Types of sutures	No.
Columellar strut (floating)	35
Shield type graft	5
Extended columellar strut	5
Caudal extension	5
Cap Graft	2
Lateral crural batten graft	2
Extended spreader graft	2
Umbrella	1
Buttress graft	—

Table (4): Shows numbers and percentages of different suture techniques for nasal tip modifications.

Types of procedures	No. of cases	Degree of satisfaction
Sutures only	7	95%
Grafts only	3	90%
Sutures and grafts	40	98%



Fig. (1): Male patient 40 years old, average skin thickness, long underrotated nasal tip with narrow nasolabial angle, nasal hump (bony cartilaginous). Operation: Septoplasty, Hump resection, Columellar strut, Transdomal suture, Interdomal suture, Medial crural suture, Lateral spanning suture, Septocolumellar suture and rotation suture.



Fig. (2): Male patient 42 years old with boxy nasal tip. Operation: Septoplasty, transdomal suture, interdomal suture, lateral spanning suture, columellar strut, medial crural suture.



Fig. (3): 30 years old female with bony cartilaginous hump and Underprojected tip. Operation: Septoplasty hump resection, lateral osteotomy medial crural suture, domal Interdomal suture columellar strut graft. Dorsal reduction cause the nose to appear cephalically rotated pseudo increase in projection.

Discussion

Tip management is among the most challenging parts in rhinoplasty, a successful treatment plan depends on an understanding of the anatomic variations of the soft tissues and cartilaginous framework of the tip, factors that influence tip support and their interrelation, and the effect of each surgical modification on the final surgical results [11].

The goal of nasal tip surgery is to obtain a stable, symmetric, projected and sufficiently rotated nasal tip triangular at its base and harmonious with the rest of the nose [12].

In our study different nasal tip deformities were included: 28% had over projected nasal tip, 18% under-rotated nasal tip, 14% broad, 14% of patients had bulbous nasal tip, 14% boxy, 10% underprojected nasal tip, 4% smiling nasal tip, and 2% tension nose.

A multivariate analysis of nasal tip deprojection in the study of (Jacob et al., 2012) reported 34% of patients had have overprojected nasal tip and 64% of cases having other tip deformities [13].

Shaping the nasal tip by scoring, morselization, resection, or transection of the alar cartilages (destructive techniques) disrupts the structural integrity of the alar arches sacrificing support and introducing variables that surgeons cannot control [14].

In the last few decades, numerous grafting and suture techniques have been developed to sculpt the nasal framework in primary and secondary rhinoplasty. These techniques have originated from the basic principle that maintenance of the major supporting structures of the nose is fundamental for aesthetic and functional purposes. Failure to maintain or furnish needed support results in sub-optimal results with deformities that are challenging to correct [15].

In our study different nasal tip sutures have been used as follows: Inter-domal sutures had been done for 80% of patients, medial crural fixation sutures had been done for 70%, and trans-domal sutures had been done for 70% of patient's, lateral crural spanning 30% of cases columellar-septal sutures had been done for 20% of patients, tip rotation suture in 20%, and lateral crural steal 6% of cases.

(Goldman, 1957) described the suturing of the two medial crura to provide adequate support to the tip, this method as a novel technique for the improvement and stabilization of the tip without

the use of grafts, but this didn't provide adequate support, especially in cases of thick skin and weak cartilages.

In our study a columellar strut was placed between the two medial crura in 70% of our patients, this strut is usually cartilaginous, and harvested from the septum, shield graft, caudal extension graft and extended columellar graft used in 5% of patients for each.

In the study of (Hodges et al., 2013) columellar strut had been done for 60% of patients, only tip graft 14%, plumping and caudal extension grafts had been done for 10% each, shield graft 8% [16].

In our study we combined suture and graft use in 80% of cases and the degree of satisfaction was about 98%. A method of utilizing both suture and tip grafts techniques was proposed to make a good tip definition, rotation and smooth outline.

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دراسة أثر استخدام الطرق الجراحية الغير متلفة في تجميل مقدمة الأنف

لا تزال جراحة تجميل قمة الأنف هي الأكثر تحدياً في جراحات تجميل الأنف، مع العلم بأن الهدف من عمليات تجميل الأنف هو الحصول على نتائج ممتازة من حيث التماثل في الشكل مع الحفاظ على وظيفة الأنف.

إن التركيب التشريحي ثلاثي الأبعاد لقمة معقد، لذلك يوجد العديد من التشوهات في قمة الأنف تنتج من التغيير في التركيب التشريحي.

إن التعديل في شكل مقدمة الأنف عن طريق الطرق المتلفة يؤدي إلى نتائج غير متوقعة ولا يمكن الإصلاح فيها.

مؤخراً تم إستبدال هذه الطرق المتلفة للغضاريف بطرق أخرى أكثر حداثة وهي استخدام الخيوط الجراحية.

وإستخدام الخيوط في التغيير في شكل مقدمة الأنف يؤدي إلى نتائج أكثر دقة على المدى الطويل حيث يتم التحكم فيها عن طريق التغيير في شدة الربط.

ويوجد الكثير من أنواع الغرز التي يمكن إستخدامها في التغيير في شكل مقدمة الأنف. وعندما يوجد فقد في الغضاريف في مقدمة الأنف يمكن استخدام أجزاء أخرى لتعديل هذا الفقد.

وفي هذه الدراسة تم إستخدام الطرق الغير متلفة للأنف في تعديل شكل مقدمة الأنف ووصلت نسبة الارضاء للمريض حوالى ٩٦٪.

ولقد استنتجنا من هذه الدراسة أن إستخدام الطرق الجراحية الغير متلفة تعطى نتائج أفضل من استخدام الطرق القديمة المتلفة لتجميل مقدمة الأنف.