

Combined Anatomical Reconstruction and Camouflaging Techniques for Management of the Crooked Nose

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ABSTRACT

Introduction: One of the most difficult maneuvers encountered by the facial plastic surgeon in rhinoplasty is achieving a straight dorsum in the patient with a crooked nose.

Aim of the Work: To evaluate combined anatomical reconstruction and camouflaging technique in management of the crooked nose.

Patients and Methods: Combined anatomical reconstruction and camouflaging technique were used for management of the crooked nose in forty patients.

Conclusion: The results were satisfactory and the combined technique could be considered the technique of choice for such deformity.

INTRODUCTION

The crooked nose is a generic term used to define all deformities which involve the nasal pyramid deviation in relation to the facial medio-sagittal plane [1]. The crooked nose is the result of complex deformities which may involve the bony nasal pyramid, the upper and lower lateral cartilages and, especially, the nasal septum, leading to cosmetic and functional complaints [2]. The crooked nose's major component is the extremely deviated nasal septum [3]. Therefore, in order to correct the crooked nose, the nasal septum must be the treatment's target. Even in the absence of obstructive complaints, small septum deviations may impact proper nasal alignment [4]. Therefore, it is important to have a broad knowledge of the nasal anatomy and the external and internal forces which act on these structures so as to employ the many existing surgical techniques [3].

In general, crooked nose are classified into three types: Straight line, C-shape, and S-shape. Often this deformity is a result of trauma even minor trauma in early life can lead to marked deformation with continued chondrocyte growth. The middle vault of the nose may exhibit deformi-

ties that are due to atrophy, deviations, and skewing in relationship to the other regions of the nose [5].

To give the nose an appearance of being straight, the existing architecture is realigned or grafts are used to provide a symmetric and straight appearance. Most often, both strategies are used to achieve a straight and symmetric nose. Overall, autogenous cartilage is the material most commonly used to restructure the nose and provides material to strengthen, augment, camouflage, and reposition the deviated dorsum. Sources of autogenous cartilage are the nasal septum, auricular conchal cartilage, and costal cartilage [6].

The forces of scar contracture coupled with long-standing natural force existing in the cartilaginous structures and soft tissue (shortened muscles and connective tissue on the crooked side) make the crooked nose resistant to rhinoplasty and makes it difficult to achieve an excellent result. Another factor which may cause the nose to return to its crooked shape is the incomplete correction of the deviated nasal septum, so one must be skilled with both complex septal surgery and multiple techniques for modifying the osseocartilaginous vault [7,8].

We report a series of 40 cases of significantly crooked noses to assess the combined anatomical reconstruction and camouflaging technique which we used for management of this deformity.

PATIENTS AND METHODS

We operated 40 consecutive patients submitted to rhinoplasty to correct a crooked nose, with the combined anatomical reconstruction and camouflaging technique. The surgeries were carried out in Plastic Surgery Unit in Zagazig University Hospital between December of 2009 and January of 2011.

We included all the patients submitted to rhinoplasty in order to correct a crooked nose, with 1 to 2 years of postoperative follow-up. Patients' ages ranged from 17 years to 42 years with a mean of 28 years. We excluded those patients with fascial asymmetry. Preoperative computed tomography and pre- and post-operative photos were done for all patients.

Analysis of the nose:

A vertical line was drawn from the exact mid-point between the medial canthi. Nasal analysis began with noting the deviation of the nose from the midline of the face. Beginning with the upper third of the nose, the width of the bony pyramid was assessed as well as the length of the nasal bones. The length of each nasal bone was assessed individually. Analysis continued with evaluation of symmetry of the middle third of the nose.

We attempted to determine the relationship of the upper lateral cartilage with the nasal bones, particularly if there was any narrowing or step-off deformity.

The lower third of the nose included the medial and lateral crura of the lower lateral cartilages. The lower lateral cartilages may have intrinsic deformities that lead to asymmetry. The septum was analyzed for deviations, particularly those with deflections that were high dorsal or caudal. Of high importance in this region was the area of the internal nasal valve, which is formed by the caudal free edge of the upper lateral cartilage, the septum, and the nasal floor.

Technique:

All patients were marked for nasion, rhinion, meridian of the nose, nasal bones and cartilages, lines of osteotomies and columellar incision. All patients were done under hypotensive general endotracheal anaesthesia with injection of 70:100cc of 1/200000 epinephrine solution infiltration subcutaneous and submucous. All patients approached externally through columellar and marginal incisions and degloving were done under the SMAS. We removed cartilaginous hump if present by scalpel. We made asymmetrical medial osteotomies to remove bone more from the opposite side of deviation either bony hump were present or not. Lateral osteotomy began at the pyriform crista, just above the level of the inferior turbinate, and following a high-low-high direction (curved line) till the level of the intercanthal line in all patients. Periosteal elevations were done along osteotomy lines to maximize nasal bone mobility. The upper lateral cartilages were freed from the anterior dorsal

border of the nasal septum to allow these structures to reorient themselves in the midline (if reorientation of the lower two thirds of the nose is not performed the nose may shift back toward the preoperative orientation because of the memory of the deviated cartilaginous structures).

We accessed the septum by dissecting between the two lower lateral cartilages in 16 patients with severe caudal septal deviations. In the other 24 patients we accessed the septum via the middle vault by dissecting between the upper lateral cartilages and septum to preserve the tip support. We harvested the septal cartilage graft preserving 1cm L-strut for dorsum and tip support. Septoplasty was done in all patients in form of removal of the cartilaginous septum preserving L-strut, scoring in the concave side of the remaining septum in cases with c-shaped and s-shaped noses or removal of part of the septum and resuturing by 3/0 vicryl. We put unilateral spreader grafts and on-lay grafts as camouflage creating the illusion of a straight nose and providing patent airway in all patients. Columellar strut were done in 16 patients who underwent accessing the septum by dissecting between the two lower lateral cartilages. Suturing the upper lateral cartilages to the septum and suturing the 2 lateral crurae were done by 5/0 vicryl. Closure of the wounds were done by 5/0 vicryl. The noses were packed for one day, the patients put a nasal splint for one week and patients lay down in a head elevated position and ice packs were administered for 24h. Stitches were removed on 5th day postoperative. Antibiotics were given for 5 days.

RESULTS

Forty patients with crooked nose were included in this study. Thirty patients were males and ten were female, with their ages ranged between 17 to 41 years. Thirty-six patients had history of trauma. All patients showed that the meridian of the nose (the line passes through nasion and rhinion) is deviated off sagittal plane. These deviations were symmetrical (straight nose) in 9 patients and asymmetrical either c-shaped nose in 23 patients or s-shaped nose in 8 patients. Thirty-three patients had humps and ten patients had lateral depressions. Ten patients had air way obstruction. No patient had narrow nose or low radixes (saddle nose).

There was no mortality in this study. Most of morbidity came from lateral osteotomy in the form of excessive narrowing of the nose, asymmetry of nasal bones, prolonged oedema, haematoma and ecchymosis and step like deformity. Residual nasal

deviation occurred in 3 patients. Residual functional obstruction occurred in 2 patients. Inverted V deformity occurred in 2 patients. Late cartilage graft resorption occurred in one patient resulted in slight lateral depression (Pseudo-deviated nose). Four patients asked for revision.

The data acquired from the study of complications are reinforced by the patient's satisfaction at

the 12th months postoperative. We assess the aesthetic outcome by nine objective and subjective responses (equal, symmetrical, normal shaped and strong well projected cartilaginous and bony skeleton and patient's satisfaction from aesthetic view). Also, we assess functional outcome by 3 objective and subjective responses (assessment of nasal valve, improvement of breathing and absence of headache) (Table 4).

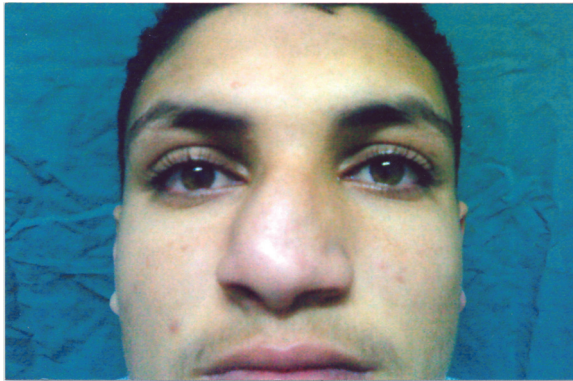


Fig. (1): Pre-operative frontal view.



Fig. (2): Post-operative frontal view of the same patient.

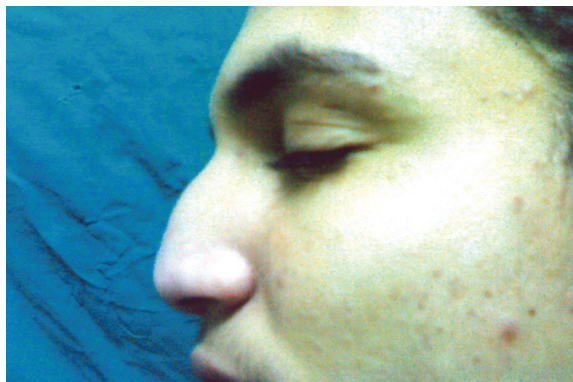


Fig. (3): Pre-operative lateral view of the same patient.

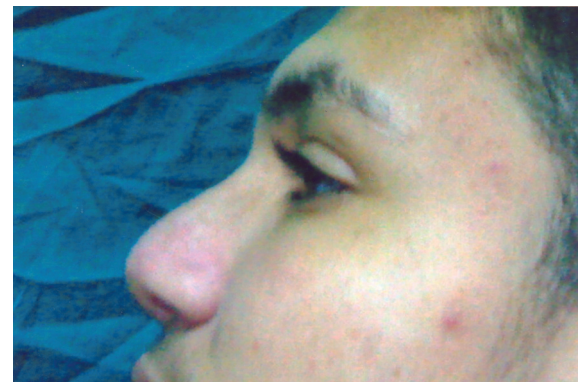


Fig. (4): Post-operative lateral view of the same patient.



Fig. (5): Pre-operative frontal view.

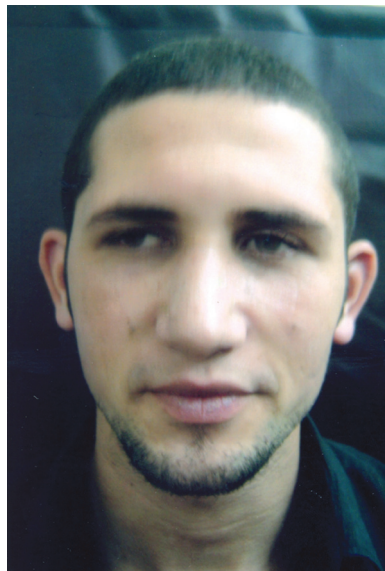


Fig. (6): Post-operative frontal view of the same patient.



Fig. (7): Pre-operative lateral view of the same patient.



Fig. (8): Post-operative lateral view of the same patient.



Fig. (9): Pre-operative frontal view.

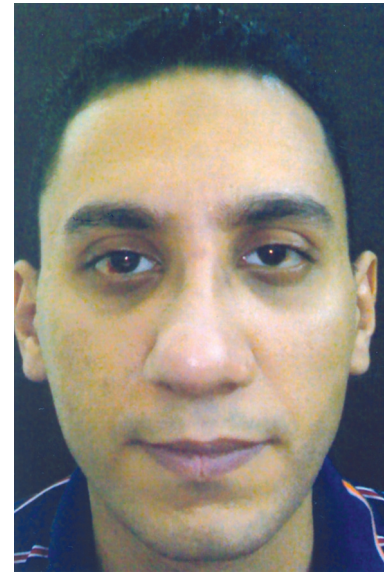


Fig. (10): Post-operative frontal view of the same patient.



Fig. (11): Pre-operative frontal view.



Fig. (12): Post-operative frontal view of the same patient.



Fig. (13): Intra-operative view for septum exposure.

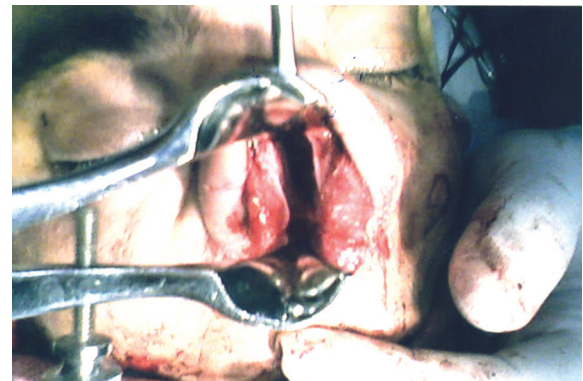


Fig. (14): Intraoperative view of septum exposure in other patient.

Table (1): Data of the patients.

Item	No. of patients	Percentage (%)
<i>Sex:</i>		
Male	30	75
Female	10	25
<i>Type of crooked nose:</i>		
Straight	9	22.5
C-Shaped	23	57.5
S-Shaped	8	20
<i>Associated pathology:</i>		
Hump	33	82.5
Lateral depression	10	25
Airway obstruction	10	25
Saddle nose/Narrow nose	0	0

Table (2): Operative data.

Item	No. of patients	Percentage (%)
<i>Approach:</i>		
Open	40	100
Endonasal	0	0
Mobilization of the nasal bones and upper lateral cartilage	40	100
Septal cartilage harvesting and Septoplasty	40	100
<i>Camouflaging:</i>		
Spreader graft	40	100
On-lay graft	40	100
Columellar strut	16	40

Table (3): Complications in 40 patients.

Complication	No. of patients
Prolonged edema (>3 months)	20 (50%)
Haematoma and ecchymosis	32 (80%)
Excessive narrowing of the nose	2 (5%)
Asymmetry of nasal bones	2 (5%)
Step like deformity	4 (10%)
Residual functional obstruction	2 (5%)
Residual nasal deviation	3 (7.5%)
Pseudo-deviated nose	1 (2.5%)
Inverted V deformity	2 (5%)
Infection	0
Complication in the septum (perforation or hematoma)	0
Revisi Revision	4 (10%)

Table (4): Patient's satisfaction.

Results	Good (>0.66)	Fair (0.66-0.33)	Poor (<0.33)
Outcome			
Aesthetic view(a)	31 (77.5%)	5 (12.5%)	4 (10%)
Functional view(b)	25 (62.5%)	9 (22.5%)	6 (15%)
Over-all view(a+b/2)	28 (70%)	7 (17.5%)	5 (12.5%)

DISCUSSION

Generally, there are two techniques chosen by surgeons for the ideal treatment of crooked nose deformity. The first technique is the septoplasty with mobilization of the nasal bones and cartilages with internal packing and external splinting (anatomical reconstruction) [9,10]. This approach makes release of all extrinsic deforming forces on the nose as well as correction of all intrinsic deforming factors. Extrinsic forces are those forces acting on the deviated nasal pyramid, such as the forces acting through the attachments of the upper and lower lateral cartilages and forces from deviation or injury to the vomer, the perpendicular plate of the ethmoid, or the maxillary crest. Intrinsic deforming forces are due to growth and development of the injured cartilage. To correct this deformity, the extrinsic forces must be released and the intrinsic forces must be overcome by weakening the cartilage [9]. The second technique is to use dorsal on-lay grafts and/or spreader grafts (camouflage). This method is effective, but placing a dorsal on-lay graft may be inappropriate for the patient with a dorsal hump. The use of spreader grafts has been proposed by many for the collapsed lateral nasal wall, especially when the airway is compromised [11,12,13]. However, if the upper lateral cartilage is truly avulsed or the trauma has affected adjacent structures such as the lateral crura, a spreader graft may not lead to a perfectly straight nose.

Proponents of the camouflage technique hold the goals of surgery on the crooked nose to be creation of a functional nose that appears straight. Support of the nose should never be compromised for obtaining a nose that simply appears straight.

In this study, we used combination of both techniques and this was compatible with Porter and Toriumi [14] and Toriumi and Ries [15] who advocated thoroughly deconstructing the deformed nose and then reconstructing a straight nose supported by camouflaging techniques (combination of both techniques). Allison and Joseph [16] stated that "more is better" in that adding more of the techniques to resolve the asymmetries as rhinoplasty outcomes are not measured in weeks or months as forces of scarring and soft tissue contracture exert effects for many years.

In this study, Complications were similar to other authors [5-12] who performed single technique either anatomical or camouflaging techniques so combined technique did not add any significant complications. We obtained a non-satisfactory

result in 12.5% among operated patients and this was comparable to Porter and Toriumi [10] who obtained a non-satisfactory result in 11% of their patients in whom they used a combined technique and these results were lower in comparable to authors [1,17] used single technique only as they got up to 23% non-satisfactory results. The non-satisfactory results were doubled by Jang et al. [18] who carried out a study through endonasal approach and obtained a non-satisfactory result in 50% of their cases due to the difficulty in exposure so in this study we used the external or open approach for direct visualization of the anatomic structures involved in the crooked nose and this was preferred by many authors [13-16].

The patients submitted to rhinoplasty may require a revision rhinoplasty in about 2 to 5% of all cases. In cases of crooked noses, this rate may be higher [8]. In our study, this rate was 10%.

In this study septoplasty was done in 100% of the patients, a similar result to Lisandra et al. (2011) [8], McKinney and Shively, 1979 [10] and Foda, 2005, [4] studies in which 90% of the patients were submitted to septoplasty.

Conclusion:

This study revealed that the combination of anatomical reconstruction and camouflaging techniques for management of the crooked nose is safe and reliable. It gives good results as it deals with anatomical reconstruction supported with camouflage. This combination gives better results without adding any significant complications.

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