

Dorsal Osteo-Cartilaginous Hump Graft in Correction of the Crooked Nose

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ABSTRACT

Background: Correction of the crooked nose remains to be a challenging problem in rhinoplasty. Anatomic repair provides optimal contour at the risk of weakening skeletal support. Camouflage techniques preserves maximal structural support but may require some esthetic compromise.

Objective: The objective of this article is to present the results of the use of the resected nasal osteo-cartilaginous hump in correction of the crooked nose deformity.

Material: Sixteen patients (10 males and 6 females) with traumatic nasal deviations were included. All patients underwent repair using the hump graft technique performed by the authors at Cairo University Hospitals during the period from Jan 2005 to December 2007, with a mean follow-up period of 16 months.

Results: Excellent results were obtained in 11 patients (68.8%). Mild residual deviations were noted in 4 patients (25%). Noticeable deviation was noted only in one patient (6.3%). Complications included dorsal irregularities felt in 6 patients (37.5%) and seen in 1 patient (6.3%) and caudal displacement of the graft with supra-tip fullness in 2 patients (12.5%).

Conclusion: The external nasal deviation can be resected and the nasal roof augmented by the nasal hump graft after refashioning with promising results.

INTRODUCTION

Because fracturing one's nose is so simple, it eludes many patients why straightening a crooked nose should be so difficult. The literature and the experience of most surgeons, however, indicate that it is. Correction of the twisted nose forms the watershed of esthetic and reconstructive rhinoplasty combining and requiring elements of each [1].

Accomplished surgeons tend to be divided on the best surgical approach. An anatomic reconstruction provides optimal contour and nasal dimensions at the risk of weakening the supporting bony and cartilaginous skeleton with potential collapse [2,3,4]. Alternatively, the "camouflage" techniques preserve

maximum structural support but may require aesthetic compromise with a dorsum that is overly prominent [1,5,6]. Both groups are characterized by aggravating recurrences and revision rates.

Resection of the external deviation can be accomplished by hump removal. Replacement of the deviated hump by a straight graft can camouflage the underlying deviation of the dorsal septal strut without interfering with the supportive mechanisms. Only grafts used for this purpose are usually obtained from the septal cartilage [1,4,7].

This series describes the use of the removed deviated hump as a free graft that can be refashioned into a straight piece then replaced to restore the resected dorsal roof. This principle leans towards the more conservative "camouflage" techniques in correction of the crooked nose with the advantage of minimizing its esthetic compromise.

MATERIAL AND METHODS

Sixteen patients with traumatic nasal deviations were included. All patients underwent correction of the deformity using the "dorsal osteo-cartilaginous hump graft" technique. Procedures were done by the authors at Cairo University Hospitals over three years, during the period from Jan 2005 to December 2007. Ten patients were males, while six were females. Age ranged from 18 to 31 years with a mean of 21 years.

All included cases had history of nasal trauma in the past. The mean time lapse between the onset of trauma and presentation was 2.5 years. Assessment of the deformity included the external deviation, the septal condition and any other esthetic problems. Clinical examination together with pre-operative front-view photographs were used to classify the type of deviation. Oblique and side views were also used to determine the height of

the dorsum and the tip projection. The condition of the nasal septum was systematically assessed. The dorsal edge, caudal edge and body of septum were assessed by external examination, anterior rhinoscopy and nasal endoscopy respectively.

Procedures were performed under general anesthesia through a closed endo-nasal approach. After infiltration of the incision sites with epinephrine 1:200000 and local anesthetic, exposure of the nasal dorsum was done through bilateral intercartilaginous and left hemitransfixion incisions. After adequate exposure, the osteo-cartilaginous hump was resected as one piece using the knife for the cartilaginous part and a guarded hump osteotome for the bone. The osteotome was placed in an oblique fashion to include more of the longer nasal bone (opposite to the side of deviation). The resected hump was then re-fashioned using electric drill, knife and rasp to render it straight and reduce its height as needed (Fig. 1). Completion medial and lateral osteotomies were then performed and the bony pyramid was reduced to the midline. The medial edges of the upper lateral cartilages were then trimmed. The re-fashioned hump graft was then placed over the open roof and secured in place using multiple 5.0 prolene sutures.

After obtaining a straight dorsum, attention was then directed to the septum. The septal deviation was corrected through the hemitransfixion incision. Ancillary tip procedures including hump reduction and tip augmentation were performed as needed. Hump reduction was achieved by reducing the height of the graft. Increasing tip projection was performed using shield grafts obtained from septal cartilage, placed in a skin pocket created over the intermediate crura of the alar cartilages. The incisions were then closed using vicryl 5.0 sutures. Nasal packing, taping and splinting were then performed. The nasal splint was kept in place for 7-10 days.

Assessment of the final outcome was done after a minimal period of one year. This was done subjectively by asking the patient about the percentage of satisfaction. Objective assessment was done using both clinical examination and post operative front views. Objective results were then classified as excellent (complete correction), good (mild, barely noticeable residual deviation) and poor (obvious residual deviation). Finally, the results of ancillary procedures (hump reduction and tip augmentation) were documented as "appreciated" or "not appreciated". The follow-up period ranged from 4 to 36 months with a mean of 16 months.

RESULTS

Two types of deviations were noted in this series. Nine patients had C-shaped deviation, while 7 patients had total nasal deviation (I-shaped). Regarding the nasal septum, it was found to be deviated with functional impairment in all cases. Septal deviations included combination of forms regarding its caudal edge and the axis of deviation. The caudal edge was dislocated in 12 cases (75%). The septum was found to show deflections in a cranio-caudal manner in 15 patients (93.8%) and in a ventral-dorsal manner in 5 patients (31.2%). Other esthetic problems included under-projected nasal tip in 10 patients (62.5%) and mild nasal hump noted in 8 patients (50%).

Objective esthetic outcome revealed complete correction with no residual deviation in 11 patients (68.8%) (Figs. 1,2), mild residual deviation in 4 patients (25%) and noticeable residual deviation in 1 patient (6.3%). Ancillary procedures performed were appreciated in 8 patients who underwent tip augmentation (80%) and 6 patients who underwent hump reduction (75%).

Subjective outcome revealed more than 90% satisfaction in 10 patients (62.5%). Five patients (31.3%) had satisfaction rate between 70 and 90%. Therefore, 15 patients (93.8%) had a satisfaction rate above 70%. Reduction of satisfaction was secondary to mild residual deviation (n=4) and visible irregularity (n=1). Only one patient (6.3%) had unsatisfactory results due to persistent deviation that was slightly less than the initial deformity yet was quite noticeable (Table 1). Regarding the functional outcome of septal surgery, residual nasal obstruction was noted in 5 patients (31.3%).

Complications included dorsal irregularity and caudal graft displacement. Dorsal irregularity was felt in 6 patients (37.5%) among whom only one had visible irregularity (6.3%). Slight caudal displacement was noted in 2 patients (12.5%) causing supra-tip fullness (Table 2).

Table (1): Objective assessment of the esthetic outcome.

| Outcome | Number | Percentage |
|----------------------|--------|------------|
| Complete Correction | 10 | 62.5 |
| Residual Deviation | 4 | 25 |
| Noticeable Deviation | 1 | 6.3 |

Table (2): Complications.

| Complication | Number | Percentage |
|-----------------------|--------|------------|
| Palpable Irregularity | 6 | 37.5 |
| Visible Irregularity | 1 | 6.3 |
| Caudal Displacement | 2 | 12.5 |



Fig. (1): The dorsal hump removed (left) and fashioned (right) before replacement. The fashioned graft is smaller in size but straight in orientation. Reduction of the height can also be achieved in case hump reduction is needed as an ancillary procedure.



Fig. (2): Total nasal deviation. Preoperative front view (above, left) and 12 months postoperative photos (right). Preoperative side view (below, left), Postoperative side view (below, right). Note that minimal hump reduction was done. The patient was satisfied by the esthetic outcome however the slight hump reduction was not appreciated.



Fig. (3): C-shaped deviation. Preoperative front (left, above) and side (left, below) views and 6 months postoperative front (right, above) and side (right, below) views. Note that hump reduction and tip augmentation were performed in addition, in order to achieve a better esthetic balance. These ancillary procedures were appreciated by the patient and added to her satisfaction by the final outcome.

DISCUSSION

Correction of the deviated nose remains to be a challenging problem that implies both functional and esthetic aspects. The nasal septum plays an integral role in the pathogenesis of the problem and in its surgical correction. Tip and middle vault support are based on the caudal and dorsal edges of the nasal septum respectively. These two edges together represent a strong L-shaped strut responsible for support. Beyond this L-strut lies the main body of the cartilaginous septum with its functional impact.

In the deviated nose, the septum is almost always deviated [1,2,3]. All patients included in this series suffered from septal deviations with secondary functional problems. The most common form was deviation in a cranio-caudal manner. While deviation of the main body of the cartilaginous septum accounts for the functional aspect of the problem, deviation of the dorsal edge strongly shares in its esthetic aspect. Correction of the deviated septal body can be accomplished by either

submucous resection preserving a dorsal-caudal L-strut for support, or by more conservative septoplasty procedures. Both submucous resection and septoplasty address the functional aspect of the deformity and maintain the supportive L-strut [4,5]. It is the deviated dorsal edge that constitutes a challenging problem in repair.

One approach to the problem of the deviated dorsal edge is anatomical repair. This implies breaking down the septum-upper lateral cartilage assembly, correction of the deviation then reconstruction of the whole system in a straight manner. Correction can be performed in a direct way, indirect way or a combination of both. Direct correction includes cutting, scoring and suturing of the L-strut [4]. Minimizing cutting and scoring was then proposed to reduce the risk of weakening support [2,7]. The use of spreader grafts is becoming popular as an indirect way of straightening the dorsal edge [3]. Strong grafts are needed to obtain symmetry. Even bone grafts were recommended to achieve predictable results [8]. Anatomical repair, therefore, approaches the problem in a radical manner with the risk of weak support. It is the strength of the reconstruction that will compensate for weakness imposed by dissection. Anatomical repair is best done through an open rhinoplasty approach [2,3,4,5,9] that will also enable the surgeon to deal with the functional aspect of the problem.

Another approach to the challenging problem of the deviated dorsal edge is resection of the deviated portion and replacing it with a straight graft. This saves extensive dissection and maintains the integrity of the supportive L-strut [1]. Moreover, the whole dorsum including bone and cartilage can be addressed. Using this more conservative approach, the functional problem caused by deviation of the septal body can be dealt with individually either by septoplasty or resection preserving strong caudal/dorsal L-strut. Onlay grafts used to replace the deviated dorsal edge can be obtained from the septal cartilage which proved rich in supplying all kinds of grafts needed in rhinoplasty [1,5,6]. In this series, the nasal hump with its bony and cartilaginous components was used as a free graft to augment the underlying open roof skeleton.

The nasal hump has been used with success as a free graft after reshaping to modify the needs [10]. Its use in rhinoplasty was introduced by Skoog in 1966 who re-inserted the hump after reduction to obtain a smooth dorsum [11]. Since then, it was frequently used by rhinoplasty surgeons to avoid dorsal irregularities or to produce a normal-looking

nose [12-15]. Its use in the surgical correction of crooked nose has been infrequently reported. Emsen made use of the strong nasal bone in fabricating a spreader graft capable of achieving symmetry [8]. Orak et al., used the hump, after reversing it, as an onlay graft with successful outcome. Reversal of the dorsum had a camouflage effect on the original deviation, however, the orientation of the graft was changed since the bony part rested on the cartilaginous dorsum [16]. In this series, the nasal hump was resected, re-fashioned and replaced over the open roof dorsum. Re-fashioning of the graft was done to fulfill the objective of obtaining a straight piece that can camouflage the underlying deviated dorsal edge (Fig. 1). It was replaced in an anatomical orientation such that its bony part overlies the nasal bones while the cartilaginous part overlies its counterpart. Fixation of the cartilaginous part accounted for its stability.

The desired goal after surgical correction of a crooked nose is to obtain complete correction with no residual deviations and consequently high patient satisfaction. With different principles and methods in approaching the problem, satisfactory rates are in the range of 66-85% [4,9]. In this series, complete correction was obtained in 68.8% and thus falls within the range reported in literature. However, mild residual deviations did not interfere much with patient satisfaction that approached 94% (Fig. 2). Appreciation of ancillary procedures performed including hump reduction and tip augmentation positively affected the final subjective outcome (Fig. 3). Paying attention to the final esthetic touches to achieve balance was advocated as a cardinal step in the correction process [1,7]. The use of the nasal dorsal graft carried the chance of esthetic compromise due to large size. Regnault and Alfaro reported 11% unsatisfactory results with the nasal bone graft in reduction rhinoplasty due to the large size of the graft, 2% of whom needed secondary corrections [15]. Orak et al., reported caudal displacement of the graft in 3 among 27 patients with reversed hump graft for correction of crooked nose [16]. In this series, this problem was encountered in two patients who showed evidence of mild supratip fullness that was not enough to dictate revision surgery.

In conclusion, the conservative way of approaching the problem of the deviated nose is based on preserving the supportive mechanism. Resection of the external deviation followed by augmentation by a straight graft is an attractive method of correction. The nasal hump with its bony and cartilaginous parts can be used as a free graft to augment

the open roof after resection. Results of this technique are promising; however, larger number of patients and long-term follow-up are needed to confirm its effectiveness.

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