

Conchal cartilage graft versus dermal graft in dorsal nasal augmentation (Comparative Study)

Mohamed Abdelwadood Salah¹, Mohamed Fathy Abdelmageed², Abdelnasser Mohamed Elnaggar³, Ahmed Emad Ahmed⁴

^{1,2,3,4}Plastic and Reconstructive Surgery Department, Beni Suef University, Egypt.

*Corresponding author

Mohamed Abdelwadood Salah

Plastic and Reconstructive Surgery Department, Beni Suef University, Egypt.

Email: Everist9987@gmail.com

Cite this paper as: Mohamed Abdelwadood Salah, Mohamed Fathy Abdelmageed, Abdelnasser Mohamed Elnaggar, Ahmed Emad Ahmed Ahmed Conchal cartilage graft versus dermal graft in dorsal nasal augmentation (Comparative Study) . Journal of Neonatal Surgery, 13, 2279-2286

ABSTRACT

Background: Dorsal nasal augmentation represents a major determinant for success in primary or revision rhinoplasties as well as post-traumatic and congenital nasal reconstruction.

Objective: The aim of this study is to compare between dermal grafts and conchal cartilage grafts in nasal dorsal augmentation regarding general aesthetic outcome including shape and contour, patient satisfaction, complications and functional improvement.

Methods: This prospective study included 20 patients who underwent rhinoplasty with dermal and conchal grafts .They were divided into two groups: first group (A), ten patients will be managed by dermal graft. Second group (B), ten patients will be managed by conchal cartilage graft.

Results: Our results reflected the statistically insignificant difference between two techniques. Additionally, the two techniques had similar results, regarding the aesthetic outcome; there was a considerable patient satisfaction in both groups. Regarding post-operative complications, dermal grafts had a slightly insignificant lower complication rate than conchal cartilage grafts.

Conclusion: Both techniques could be used safely and effectively in surgical treatment of mild and moderate dorsal nasal defects. Both are proved to be effective and can be considered as a first line option in treatment of class I and II saddle nose deformities

Keywords: dorsal nasal augmentation; dermal graft; conchal cartilage graft; saddle nose deformity; rhinoplasty..

INTRODUCTION

Saddle nose is one of the most severe morphofunctional abnormalities of the nose that need correction, as it requires not just camouflaging by graft but also anatomical rebuilding of all relevant tissues. Congenital conditions, injuries to the nasal septum and pyramid, infections, or prior rhinoplasties can all be the cause. (1)

The lower two-thirds of the nose lose structural integrity in the saddle nose deformity, which impairs both function and appearance. This deformity's main characteristic is the disruption of the septum, upper lateral cartilage, and nasal bone-septal cartilage complex, along with the loss of septal support. (2)

The autologous, homologous, and allogeneic tissues that are used as grafts are used to prevent and correct dorsal nasal irregularities, especially in patients with thin skin. (3)

Autogenous cartilage is widely used as a grafting material for reconstruction because it balances rigidity and flexibility, causes a little reaction at the recipient site, can resist the traction forces of the wound healing and is widely available. (4)

Septal and conchal cartilaginous grafts have been shown to be successful in treating class I and the II saddle nose deformities with little loss of dorsal support, nostril rounding, or columellar retraction. (5)

Conchal cartilage grafts have benefits comparable to those of septal grafts. Conchal grafts exhibit sufficient elasticity and support. Because of its natural curve, it is perfect for repairing contour irregularities. (6)

There was no instance of rejection, and resorption is usually very small. A conchal cartilage graft's primary drawback is the need for an extra incision and dissection. (7)

Regarding dermal grafts; they vascularize more quickly, can be used to correct contour deformities following primary rhinoplasty. Because the graft fits into the recipient tunnel correctly and interacts with the surrounding tissues rapidly, it is unlikely to be displaced. The three main drawbacks of dermal grafts were infection, resorption risk, and the need for repeated augmentation. (8)

For patients who do not want to have an artificial implant placed in their noses or who require secondary rhinoplasty due to excessive skin thinning, the folded dermal graft is a very practical and safe surgical option for nasal augmentation. (9)

The aim of this study is to compare dermal grafts and conchal cartilage grafts in dorsal nasal augmentation regarding general aesthetic outcome, including shape and contour, patient satisfaction, and complications

PATIENTS AND METHODS

This prospective comparative randomized clinical study was performed in plastic surgery Department, Beni-Suef University during the period between January 2021 to March 2023. It was conducted on 20 patients sorted in 2 groups according to block randomization, first group (A), ten patients were managed by dermal graft and were chosen as patients no (1-3-5-... 19). Second group (B), ten patients were managed by conchal cartilage graft and were chosen as patients no (2-4-6-.....20). Patients were selected as surgical candidates for nasal augmentation. The included patients presented with mild and moderate degrees of saddle nose deformities. They reported concern of nasal dorsal defects, either congenital, following trauma or previous rhinoplasty procedures, at the initial examination. An informed written consent about surgery, possible outcomes and complications was obtained from all patients before the surgical procedure. Faculty of Medicine, Beni-Suef University, Egypt. Ethics Committee approved the study protocol.

All study patients were assessed pre-operative through obtaining proper medical history review and examining the patient's conditions generally and locally. Examination of the donor site for any scars, inflammation or infection was also done. A full clinical assessment was conducted, including facial analysis using photographic documentation in the standard photographic views. All findings were recorded on the patient's preoperative form. CT paranasal sinuses to assess bony and cartilaginous nasal parts was done. Patients were evaluated postoperatively weekly for first month and after 3, 6 months for overall aesthetic and functional outcome and complications.

SURGICAL TECHNIQUE

A dorsal nasal pocket is formed by an inverted V-shaped transcollumellar incision made across the columella's narrowest section. The size of the nasal pocket formed matched the size of the graft that was harvested. The left lower iliac region was used to harvest the dermal graft. Using a sharp number 15 blade, the epidermis was fully separated from the dermis before the graft was harvested. An actual pure dermal graft was created by removing the extra subcutaneous fat. Following minimal dissection and skin edge undermining, the donor site was mainly closed by direct approximation of the wound edges. To harvest conchal cartilage graft, Dissection began with a 3- to 4-centimeter incision made in the postauricular sulcus from a retroauricular incision. All of the conchal cartilage was exposed. Using an elevator or tenotomy scissors, conchal cartilage of the appropriate size and shape was raised and resected. To prevent the ear from flattening, about 6 mm of concha is preserved. The skin incision is closed with interrupted 6-0 nylon suture. To avoid hematoma formation, the three peanut gauzes are positioned in the cavity from which the cartilage has been harvested.



FIG 1: DERMAL GRAFT HARVESTING AND SCULPTING



FIG 2: CONCHAL GRAFT HARVESTING AND SCULPTING

The harvested dermal graft was molded into the shape of a fishing boat. It was inserted into the nasal pocket and secured in place with 5-0 Vicryl sutures. The harvested conchal cartilage was divided to create pieces of cartilage as smooth and flat as possible. 6-0 PDS sutures were used to secure the cartilage segments to one another. Following graft insertion in the nasal pocket, 6-0 PDS sutures were used to secure the graft to the nasal septum, upper lateral cartilage, and surrounding soft tissue.



FIG3: APPLICATION OF DERMAL GRAFT



FIG 4: APPLICATION OF CONCHAL GRAFT

After appropriate hemostasis, 6-0 Prolene simple interrupted sutures are used to close the nasal incision. At the end of the procedure, the nose is packed and splinted with a nasal splint (thermoplast).

RESULTS

Clinical evaluation of patients was done subjectively and objectively. Patient's subjective for aesthetic satisfaction was assessed through analysis of responses to a postsurgical patient satisfaction questionnaire that included items on nasal function (smelling and nasal obstruction symptom evaluation scale;

1 = worse, 2 = no change, 3 = improved, and 4 = much improved) and self-evaluation of postoperative nasal appearance (1

= dissatisfied, 2 = no change, 3 = satisfied, and 4 = very satisfied). The questionnaire was independently completed by each subject at least 6 months after surgery. To evaluate resorption, the patient was evaluated objectively by inspection, palpation, and photographic documentation. Postoperative histories were reviewed to assess complications, including graft infection, extrusion, irregularity and postoperative deformity.

Patients were 14 females(70%) and 6 males(30%), with age ranging from 18-42 years .The mean for patients in group A was 27.7 ± 6.4 , and for group B) was 27.8 ± 6.7 . No significant differences between the dermal graft and Conchal graft regarding age and sex (p-value .973, 1.000 respectively).

TABLE (1): SOCIO-DEMOGRAPHIC CHARACTERISTICS OF THE PARTICIPANTS

Characteristics	Total (n=20)	Dermal graft (n=10)	Conchal graft (n=10)	p-value
Age (years)				
Mean $\pm$ SD	27.8 ± 6.4	27.7 ± 6.4	27.8 ± 6.7	
Median (range)	27.5 (18-42)	28 (19-38)	27 (18-42)	0.973
Sex				
Female	14 (70%)	7 (70%)	7 (70%)	
Male	6 (30%)	3 (30%)	3 (30%)	1.000

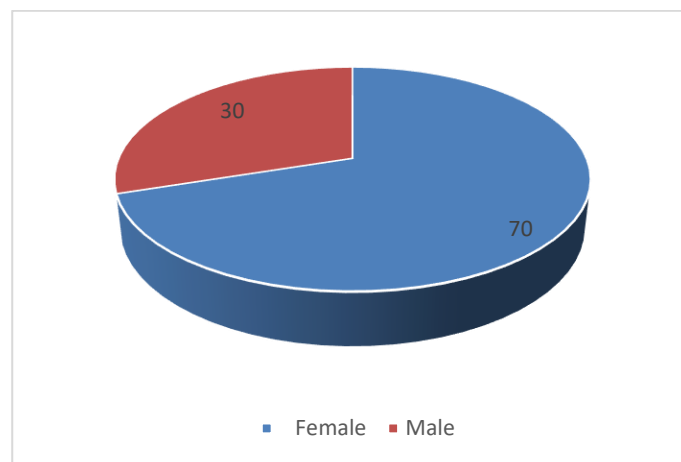


FIG 5: GENDER DISTRIBUTION AMONG THE STUDIED GROUP

The most frequent cause was Post-traumatic in 8 cases (40%) followed by post-surgical in 7 cases from previous rhinoplasties (35%) and congenital in 5 cases (25%).

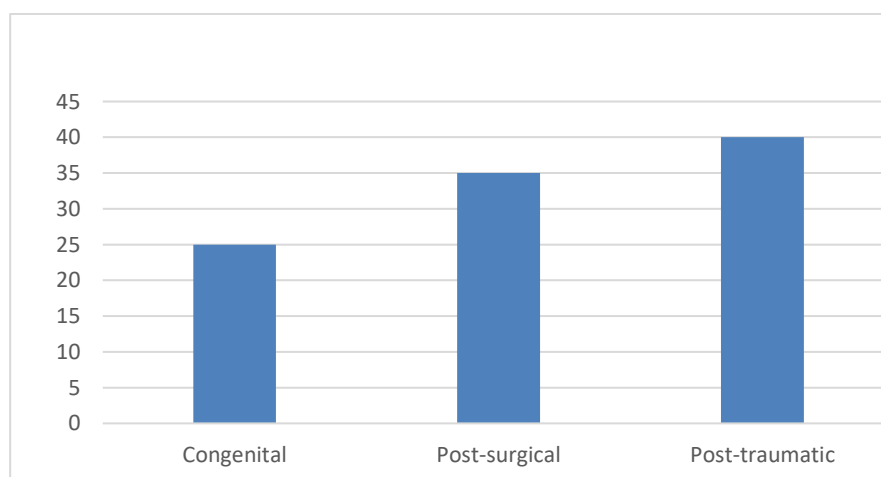


FIG 6: THE AETIOLOGY AMONG THE STUDIED GROUP

Table (2) shows the deformity details among the participants. The average deformity size was 2.5 ± 6 . 65% (13 cases) the deformity is located at Proximal 2/3 while in 35% (7 cases) the deformity is located at distal 1/3. There was no statistically

significant difference between the two groups (p-value= 0.754 and 0.057 respectively).

TABLE (2): DEFORMITY DETAILS AMONG THE PARTICIPANTS

Characteristics	Total (n=20)	Dermal graft (n=10)	Conchal graft (n=10)	p-value
Size				
Mean $\pm$ SD	2.5 $\pm$.6	2.5 $\pm$.7	2.4 $\pm$.6	
Median (range)	3 (1-3)	3 (1-3)	2.5 (1-3)	0.754
Location				
Distal 1/3	7 (35%)	1 (10%)	6 (60%)	
Proximal 2/3	13 (65%)	9 (90%)	4 (40%)	0.057

Nasal complications occurred were anosmia in 3 cases (15%) (1 dermal and 2 conchal) which persist for only 3 weeks, and epistaxis in 1 conchal graft case (5%) which occurred 2 days postoperatively and stopped by compression and head elevation. Mild to moderate erythema occurred in 4 cases (20%) with dermal grafts which resolved in 2-3 weeks post operatively. There was 1 case with nose infection (5%) (deraml graft). Mild resorption noticed in 2 cases (10%) operated by conchal grafts at 4 and 6 months post operatively. Although, the 2 patients still satisfied with their aesthetic results. There also were no cases with major graft resorption, wrapping, graft displacement, distortion or visibility.so, revision surgery was not required.

Donor site complications occurred in 6 cases (30%); 1 case of post auricular hematoma which treated by evacuation and 2 cases of hypertrophic scars in dermal graft donor area (lt lower iliac). Mild to moderate ecchymosis occurred at the donor sites in 3 patients (15%) (conchal graft cases)which resolved after 1 week. There were no cases with seroma or infection (at the donor site or recipient site).

TABLE (3): NASAL AND DONOR SITE COMPLICATIONS AMONG THE PARTICIPANTS

Characteristics	Total (n=20)	Dermal graft (n=10)	Conchal graft (n=10)
Nasal complications			
Anosmia	3 (15%)	1 (10%)	2 (20%)
Epistaxis	1 (5%)	0 (0%)	1 (10%)
Infection	1 (5%)	1 (10%)	0 (0%)
Erythema	4 (20%)	4 (40%)	0 (0%)
Hematoma	0 (0%)	0 (0%)	0 (0%)
Mild resorption	2 (10%)	0 (0%)	2 (20%)
Wrapping,Distortion,Visibility	0 (0%)	0 (0%)	0 (0%)
Donor site morbidity			
Infection	0 (0%)	0 (0%)	0 (0%)
Ecchymosis	3 (15%)	0 (0%)	3 (30%)
Hematoma	1 (5%)	0 (0%)	1 (10%)
Hypertrophic scars	2 (10%)	2 (20%)	0 (0%)

Table (4) shows the functional improvement and satisfaction regarding aesthetic outcome among the studied group. In the subjective rating of appearance and the score given by patients through the questionnaire, the majority of the patients reported improved dorsal contour with relief of saddling. Most patients stated stable postoperative appearance of the nose throughout the follow up period. They stated that once the swelling improved, the appearance of the nose was more defined.

More than half of the participants; 11 patients(55%) noticed functional improvement(7 cases with dermal grafts and 4 cases with conchal grafts).The improvement were in nasal airway obstruction and smell. **7 cases(35%)** noticed improvement of nasal airway obstruction, **4 cases(20%)** noticed improvement in smell with no significant statistical differences between groups regarding function(p-value =0.158).

In addition, more than two third of the participants (65%) **13 patients** :(7 cases with dermal grafts and 6 cases with conchal grafts) reported they were very satisfied with the operation regarding aesthetic outcome, while (35%) **7 patients** were satisfied (3 dermal grafts and 4 conchal grafts) with no significant statistical differences between groups regarding satisfaction. (P-value =1.000)

TABLE (4): FUNCTIONAL IMPROVEMENT AND SATISFACTION AMONG THE STUDIED GROUP

Characteristics	Total (n=20)	Dermal graft (n=10)	Conchal graft (n=10)	p-value
Functional improvement				
No	9 (45%)	3(30%)	6 (60%)	
Yes	11 (55%)	7 (70%)	4 (40%)	0.158
Satisfaction				
Satisfied	7 (35%)	3 (30%)	4 (40%)	
Very satisfied	13 (65%)	7 (70%)	6 (60%)	1.000

(Case 1)(Group A)

24 years old female patient, presented with depressed nasal dorsum with history of cleft lip repair at 6 months of age, complained of aesthetic look. Augmentation rhinoplasty was done using dermal graft with 6 months postoperative results

PRE OPERATIVE POST OPERATIVE



(Case 2)(Group B)

40 years old female patient, presented with depressed nasal dorsum, complained of aesthetic look. Augmentation rhinoplasty was done using conchal cartilage graft with 6 months postoperative results

PRE OPERATIVE POST OPERATIVE





DISCUSSION

This study was conducted at Beni-Suef University Hospital, Egypt. In our study we used dermal and conchal grafts to augment mild and moderate dorsal nasal deformities, assess their aesthetic and functional outcomes, patient's satisfaction and post-operative complications after a 6-month period postoperative.

Gruber study included 25 patients treated with conchal grafts. They concluded that conchal cartilage is ideal for correcting contour irregularities due to its inherent curves. (6)

In our study, 4 cases presented with donor site morbidity (1 case of hematoma, 3 cases of ecchymosis). 2 cases presented with minor graft resorption. No cases required any revision surgery. No graft wrapping or graft malposition

Johnny Mao et al retrospective study included 20 patients underwent dorsal nasal augmentation by conchal grafts of saddle nose deformity secondary to trauma. Four patients were satisfied with appearance, one dissatisfied and one indifferent. There were no major complications as infection or donor site morbidity. (7)

In our study, six patients were very satisfied with appearance, four patients were satisfied. Two cases improved in smell sensation and two cases improved about nasal obstruction. Other minor complications included erythema and anosmia.

Payam et al study included 14 patients treated by conchal cartilage graft with retroauricular fascia. In 3 patients, slight graft resorption was noted. The aesthetic results were not compromised in these patients, and revision surgery was not performed. (9)

In our study, two cases presented with minor graft resorption, three cases with ecchymosis and one case of post auricular hematoma

Pietro et al study included 26 patients treated with conchal cartilage graft for dorsal nasal augmentation. Good cosmetic results were obtained in 90%, with excellent functional results in almost all of the cases, with the resolution of the nasal obstruction. (10)

In our study, there were no cases of graft dislocation or graft exposure. No infection or cutaneous necrosis. All of our patients were satisfied with cosmetic results.

S GANE study included 10 patients treated with rolled conchal cartilage graft for dorsal nasal augmentation. They concluded that using rolled conchal cartilage for dorsal augmentation gives greater dorsal height. It is most appropriate in the minimally or moderately saddled nose in patients with thick skin. (11)

Erdogran et al study was done between 1994 and 2002 included ninety patients. No hematoma or collections were observed in any patient. They stated that dermal grafts can be used for correcting contour deformities after primary rhinoplasty because of its quicker vascularization. The main disadvantages of dermal grafts are the risk of resorption, requirement of repeated augmentation or infection. (8)

In our study, ten patients were operated with dermal grafts (3 males and 7 females), their age ranging from 19-38 years, the dermal graft were taken from lt lower iliac region. In follow up period, no cases needed further surgery, one case presented with infection, four cases presented with erythema and two cases with hypertrophic scar in the donor area. No graft resorption, no hematoma or any collection observed. Minor complications included anosmia which resolved within three weeks.

Heung KK et al study included 68 patients treated with dermal graft for augmentation rhinoplasty between 2008 and 2012. Among the 68 patients, 6 patients (8.8%) showed over-absorption of the dermal graft. Two patients developed a small dorsal hump on the bony cartilaginous junction as a result of secondary contraction of the dermis. (12)

Sheng HL et al study included 37 patients operated with a combined alloplastic implant and autologous dermal graft for dorsal and tip augmentation rhinoplasty. Patients presented with saddle nose deformities that were congenital or resulted from trauma or unsuccessful rhinoplasty. No implant extrusion at the tip or any other complications were observed during 24 months of follow-up evaluation. (13)

Conclusion

Our study concluded that derma grafts and conchal cartilage grafts are safe and reliable in surgical treatment of mild and

moderate dorsal nasal defects. Both are proved to be effective and can be considered as a first line option in treatment of class I and II saddle nose deformities with minimal and moderate loss of dorsal hight, support and projection. Both techniques have least possible donor site morbidities and satisfactory aesthetic outcome with considerable patient satisfaction. Both dermal grafts and conchal grafts had satisfactory aesthetic outcome and considerable patient satisfaction. In addition, both techniques had comparable post-operative outcome regarding complication rate and donor site morbidity. Nevertheless, dermal grafts had slightly insignificant lower complication rate.

REFERENCES

1. Marianetti Tito Matteo Saddle Nose: A Systematic Approach From the Edited Volume Contemporary Rhinoplasty chapter 4 ,2018
2. 2-Kim DW, Toriumi DM. Management of posttraumatic nasal deformities: the crooked nose and the saddle nose. *Facial Plast Surg Clin North Am.* 2004;12:111-132
3. 3- Lin G, Lawson W. Complications using grafts and implants in rhinoplasty. *Operative Techniques in Otolaryngology.* 2007;18(4):315–23
4. 4- Tardy ME Jr, Schwartz M, Parras G. Saddle nose deformity: autogenous graft repair. *Facial Plast Surg: FPS.* 1989;6:121-134.
5. 5- Daniel RK, Brenner KA. Saddle nose deformity: a new classification and treatment. *Facial Plast Surg Clin North Am.* 2006;14:301-312.
6. 6- Gruber R, Pardun J, Wall S. Grafting the nasal dorsum with tandem ear cartilage. *Plast Reconstr Surg* 2003;112:1110
7. 7- Johnny Mao, MD; Michael Carron, MD; Senja Tomovic, BS; Kailash Narasimhan, MD; Shannon Allen, MD; Robert H. Mathog, MD Cartilage Grafts in Dorsal Nasal Augmentation of Traumatic Saddle Nose Deformity: A Long-Term Follow-Up. *Laryngoscope*, 119:2111–2117, 2009
8. 8- Erdogan B, Tuncel A, Adanali G, et al. Augmentation rhinoplasty with dermal graft and review of the literature. *Plast Reconstr Surg* 2003;111:2060-2068
9. 9- Payam Varedi and Behnam Bohluli. Dorsal Nasal Augmentation: Is the Composite Graft Consisting of Conchal Cartilage and Retroauricular Fascia an Effective Option?. *J Oral Maxillofac Surg* 2015; 73:1842.e1-1842.e13
10. 10-Pietro Gentile, and Valerio Cervelli., Nasal Dorsum Reconstruction with 11th Rib Cartilage and Auricular Cartilage Grafts. *Ann Plast Surg* 2009;62: 63–66
11. 11- S.Gane et al. Rolled auricular cartilage grafts for dorsal augmentation rhinoplasty. *The Journal of Laryngology & Otology* (2007), 121, 387–389.
12. 12- Heung KK and Seung SR. Augmentation Rhinoplasty Using a Folded “Pure” Dermal Graft. *J Craniofac Surg* 2013;24: 1758-1762
13. 13-Sheng-Hong Li, et al. Combined Alloplastic Implant and Autologous Dermis Graft for Nasal Augmentation Rhinoplasty in Asians. *International Society of Aesthetic Plastic Surgery* 2014