

Graft Selection in Rhinoplasty: Indications and Limitations

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SUMMARY

The nasal profile and skin thickness in the Caucasian Indian vary from the Oriental Chinese or Malay noses. Reduction rhinoplasty is more common in the Caucasian Indian noses whereas augmentation rhinoplasty is more common in the Oriental Chinese or Malay noses. Graft selection remains the greatest challenge for surgeons performing rhinoplasty. However, the preferred choice as far as possible for nasal reconstruction would be autografts as compared to allografts due to their lower rate of infection, extrusion and they do not induce an immune response. We have evaluated 40 patients and compared our experience with the grafts available over a period of 46 months.

KEY WORDS:

Caucasian nose, Oriental nose, Rhinoplasty, Allografts, Autografts

INTRODUCTION

In the last few decades, numerous grafting techniques have been developed to sculpt the nasal framework in 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. However, the type of graft, their shape, position, and usage may vary depending on the situation and the desires of the surgeon. A total of 40 patients with either developmental or post-traumatic nasal deformities were treated surgically over a period of 46 months. These patients either underwent reduction rhinoplasty, augmentation rhinoplasty, tip plasty, external osteotomies, rasping of hump with or without corrective septal surgery and inferior turbinate reduction. A closed rhinoplasty technique was performed in 11 patients and an external rhinoplasty in 29 patients. Harvested autologous conchal or quadrangular cartilage was used for mild to moderate reconstruction namely in the form of spreader graft, dorsal cartilage graft, shield graft, plumping graft, columella strut etc. The nasal valve region needs to be addressed carefully in majority of cases of open rhinoplasty due to the repeated insults to this region.

The patients were reviewed retrospectively in view of the grafts used, complications encountered and those who required revision procedures. There were eight patients in whom allografts (Medpore) were used, eight patients were reconstructed using harvested autografts, six patients in whom combination of both were used to achieve cosmesis and 18 patients who did not require grafts. The revised data revealed that the cosmetic outcome achieved was better in the group in whom harvested autologous grafts were used

and the complication rate was much lower. At our tertiary referral hospital, we would advocate the use of harvested autografts as far as possible for nasal reconstruction as it provides satisfactory aesthetic results with no evidence of rejection.

MATERIALS AND METHODS

This is a retrospective review of forty patients with either developmental or post-traumatic nasal deformities who were treated surgically over a period of 46 months from July 2002 till May 2006 at National University Hospital. The nasal profile and the skin thickness of the individual racial groups was assessed. Following which, these patients either underwent reduction rhinoplasty, augmentation rhinoplasty, tip plasty, external osteotomies, rasping of hump with or without corrective septal surgery and inferior turbinate reduction, after a comprehensive consent was obtained. Here, the patients were counseled by the surgeon regarding the post-operative outcome whereby the aim was to achieve both an improvement in nasal function and cosmesis. These patients were then reviewed in view of types of grafts used, complications encountered, functional as well as cosmetic improvement based on a symptom score (1- 10) and whom required revision procedures.

RESULTS

There were 22 men (55%) and 18 women (45%) in this series, ranging in age from 18 to 50 years, with a mean age of 34. Twelve were Indians, eleven Chinese and seven Malays. The majority of the patients presented with post-traumatic nasal deformities (87.5%). Varied procedures were required to attain cosmesis in these patients. Ten patients underwent Septorhinoplasty which included (septoplasty, tip plasty, collumelaplasty, alar plasty and repair of open roof deformity with the use of the spreader-splay graft combination) and accompanied with inferior turbinate reduction (25%), ten patients had hump reduction, external osteotomy with turbinate reduction (25%), five others had tip plasty with external osteotomy and turbinate reduction (12.5%) and the remaining fifteen patients had external osteotomy with turbinate reduction (37.5%). (Figure 1)

There were eight patients in whom allografts (Medpore) were used (20%), eight patients were reconstructed using autografts which consisted of either conchal or quadrangular cartilages (20%), six patients in whom combination of both were used to achieve cosmesis (15%) and 18 patients who did not require grafts (45%). (Figure 2)

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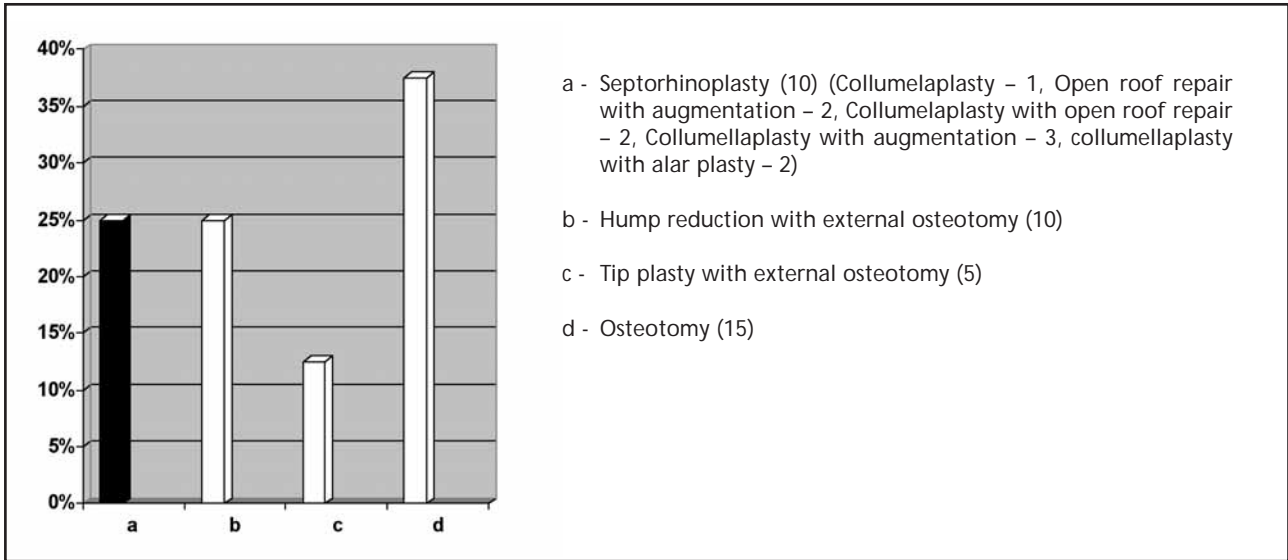


Fig. 1: The various procedures preformed in Rhinoplasty

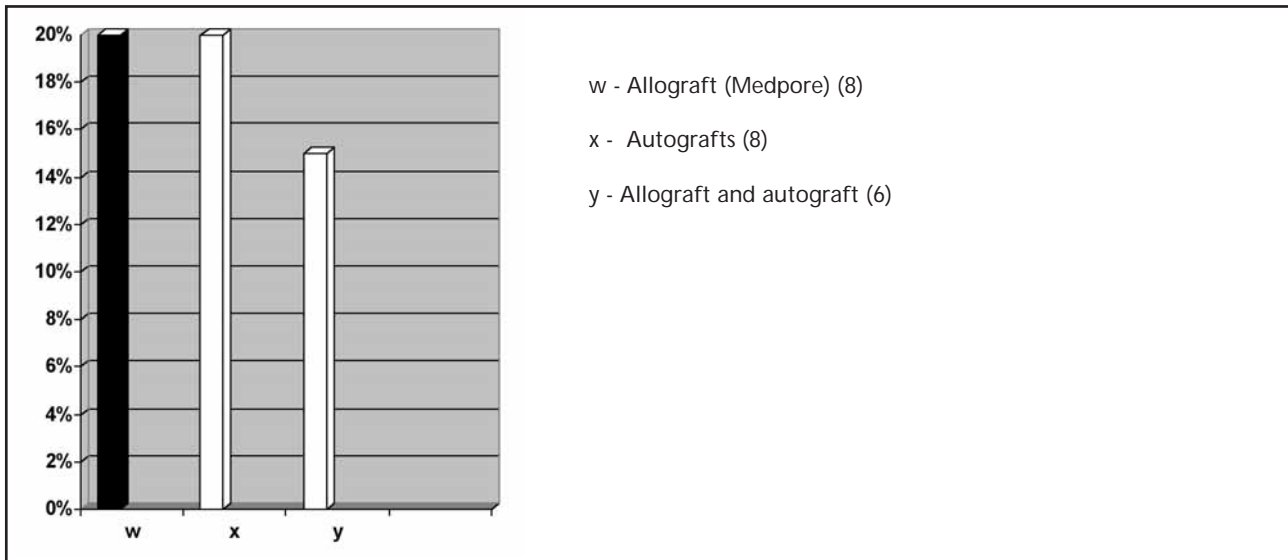


Fig. 2: The various types of grafts used in the 40 patients who underwent Rhinoplasty

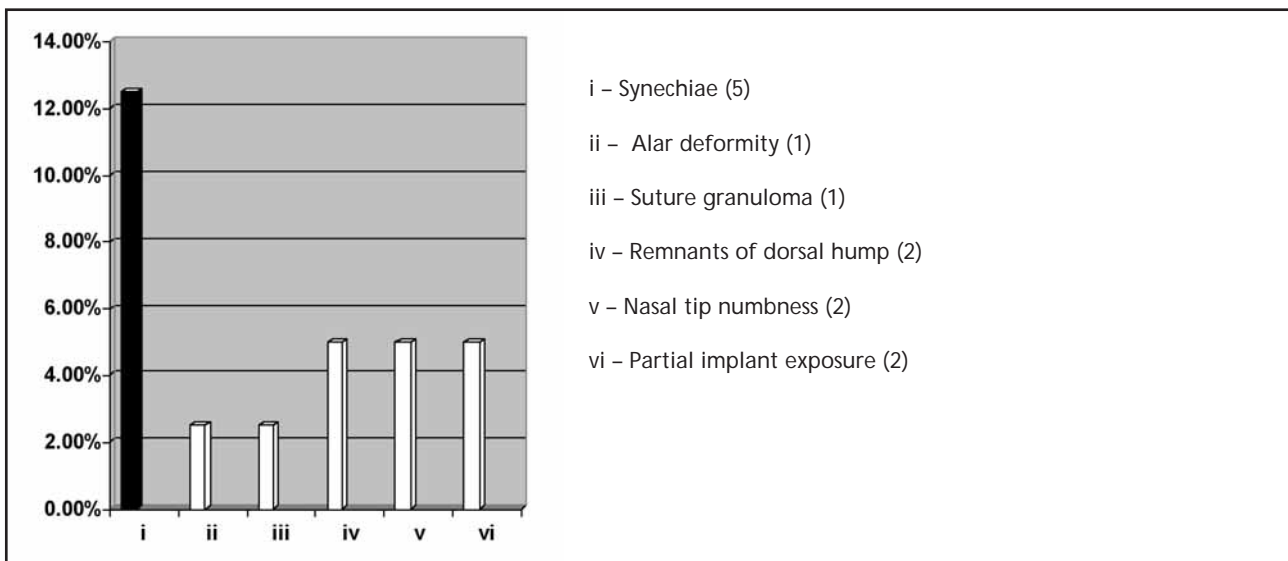


Fig. 3: The post-operative complications experienced in the 40 Rhinoplasty patients

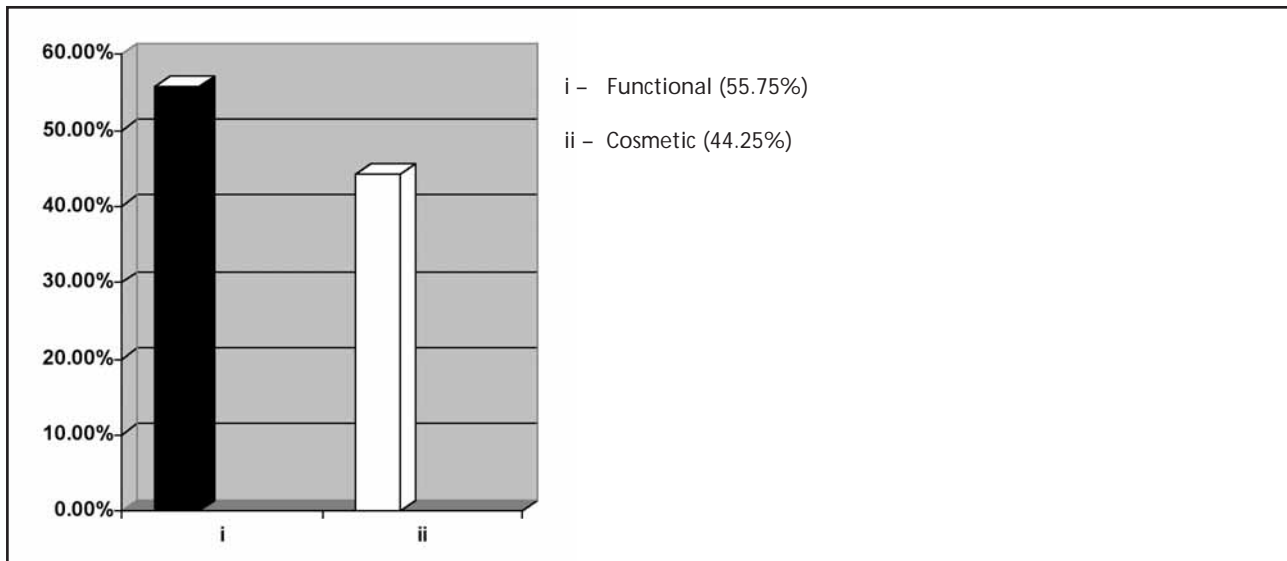


Fig. 4: Functional and Cosmetic improvement experienced by the 40 Rhinoplasty patients

Post-operatively five patients developed synechiae between the septum and the inferior turbinate (12.5%) and this was corrected by releasing the synechiae under local anesthesia. One patient was unfortunate to develop post-operative alar deformity (2.5%). An aquamid injection filler was performed at one year post-operatively to correct the alar deformity and the patient was satisfied with the outcome. Another patient developed a suture granuloma (2.5%) which was removed under local anesthesia. Two patients had remnants of dorsal hump (5%) which were revised under general anesthesia. Two patients developed numbness over the nasal tip (5%) and two others had partially exposed medpore implants (5%). (Figure 3) Post-operatively all the patients were asked to score their functional and cosmetic improvements based on a symptom score (1-10). Here, 1 will represent the lowest satisfaction and 10 representing complete satisfaction. These scores were calculated into a percentage and we noted that all the patients included in the study had a 55.75% improvement in function and 44.25% improvement in cosmesis. (Figure 4)

DISCUSSION

Autologous materials offer more advantages over allografts as seen in our post-operative rhinoplasty outcome. The main author experienced a 5% extrusion rate with medpore as well as another 22.5% of local complications ie; alar deformity and obvious nasal tip numbness. Hence, autologous cartilage grafts offers considerable advantages due to its unremarkable infection rate, tissue reaction and extrusion rate¹⁻³.

The quadrangular and bony septum is a useful supply of cartilage and bone that is easily harvested during surgery⁴. The main author had the opportunity to harvest the rostrum from the sphenoid in addition to the septal cartilage to reconstruct the nasal dorsum. Another source is from the pinna, where the conchal cartilage is pliable and easily

shaped⁵. An important consideration in harvesting conchal cartilage is to use portions of the concha that is most similar to the nasal anatomy. For example the cymba concha due to its curvature is suitable for reconstruction of the lateral crura and correction of saddle nose deformity⁶. The cavum concha which is thicker and stiffer is ideal for projection of the nasal tip^{7,8}. Costal cartilage, although has been recommended for more extensive deformities, has the disadvantage of incurring significant donor site morbidity and reported incidence of warping^{9,10}. Allografts can be considered if there is inadequate cartilage available, however first consideration should be given to autogenous material.

In one of the largest personal series to date, Tardy described 2000 cases of augmentation rhinoplasty over a follow-up period of 17 years and reported a very low rate of complications with no resorption of autologous grafts in the early years. He also describes the potential for continued growth of the cartilage if the perichondrium is preserved. The nasal profile in the Caucasian Indian nose differs from that of the Oriental noses, namely the Malays and the Chinese. The quadrangular cartilage, bony septum and sphenoid rostrum is usually sufficient and strong in a non-revised Caucasian nose compared to an Oriental nose. In the Oriental nose where previous septal surgery was performed, an allograft in addition to the available autograft may be utilized.

CONCLUSION

The nasal dorsum and tip projection in the Caucasian Indian nose is high with less prominent alar flare. In contrast the Oriental Malay and Chinese nose has a less prominent nasal dorsum and tip projection with a prominent alar flare. The nasal skin thickness in the Caucasian nose is relatively thin as compared to the Oriental nose where it is relatively thicker^{11,12}. The post-operative nasal tip edema is usually less in the Caucasian nose compared to the oriental nose.

Our preference would be harvested autologous grafts as they are abundant in the nasal cavity and can be contoured to suit the natural architecture of the nose as well as having no complications of rejection. It should be stressed that careful pre-operative assessment of the structural and functional problems presented by the patient is essential in every case of nasal reconstruction. This in turn will result in a successful aesthetic outcome^{13,14}.

REFERENCES

1. Staffel G, Shockley W. Nasal implants. *Otolaryngol Clin North Am* 1995; 28: 295-308.
2. Camarena LC, Guerra MT. Use of cartilaginous autografts in nasal surgery: 8 years of experience. *Plast Reconstr Surg* 1999; 103: 1003-14.
3. Constantian, M. B. Indications and use of composite grafts in 100 consecutive secondary and tertiary rhinoplasty patients: Introduction of the axial orientation. *Plast. Reconstr. Surg* 2002; 110: 1116.
4. Neu BR. Combined conchal cartilage-ethmoid bone grafts in nasal surgery. *Plast Reconstr Surg* 2000; 106: 160-70.
5. Gendeh BS, Vincent ST. Open septorhinoplasty: Operative technique and grafts. *Med J Malaysia* 2007; 62(1): 13-18.
6. Tardy ME, Denney J, Fritsch MH. The versatile cartilage autograft in reconstruction of the nose and face. *Laryngoscope* 1985; 95: 523-33.
7. Peck GC. The onlay graft for nasal tip projection. *Plast Reconstr Surg* 1983; 71: 27-37.
8. Sheen JH. Achieving more nasal tip projection by the use of a small autogenous vomer or septal cartilage graft. *Plast Reconstr Surg* 1975; 56: 35-40.
9. Gunter, J. P., Clark, C. P., and Friedman, R. M. Internal stabilization of autogenous rib cartilage grafts in rhinoplasty: A barrier to cartilage warping. *Plast. Reconstr. Surg* 1997; 100: 161.
10. Spencer MG. Chondroplastic graft augmentation rhinoplasty. *J Laryngol Otol* 1990; 104: 539-43.
11. Dhong, E. S., Han, S. K., Lee, C. H., Yoon, E. S., and Kim, W. K. Anthropometric study of alar cartilage in Asians. *Ann. Plast. Surg* 2002; 48: 386.
12. Ducut, Erick G, Han, Seung-Kyu, Kim, Sang-Bum M.D, Kim, Yang-Soo, Kim, Woo-Kyung. Factors Affecting Nostril Shape in Asian Noses. *Plast Reconstr Surg* 2006; 118: 1613-21.
13. Constantian MB, Clardy RB. The relative importance of septal and nasal valvular surgery in correcting airway obstruction in primary and secondary rhinoplasty. *Plast Reconstr Surg* 1997; 98: 38-54.
14. Claus W. The evolution of rhinoplasty. *J Laryngol Otol* 1988; 102: 1079-85.