

ORIGINAL ARTICLE

Functional and Aesthetic Outcomes Following Spreader Graft Placement in Deviated Noses: A 5 Year ExperienceZAMEER ABBAS MIR¹, HAMID HUSSAIN ANSARI², HUSSAN BIRKHEZ SHAMI³, SAADIA NOSHEEN JAN⁴, FARID AHMED KHAN⁵¹Dept of Plastic & Reconstructive Surgery, Shiekh Zayed Hospital Lahore.^{2,4}Dept of Plastic & Reconstructive Surgery & Burn Unit, King Edward Medical University / Mayo hospital Lahore.³PGR Plastic Surgery, King Edward Medical University / Mayo hospital Lahore.⁴Chairman and Dean Shiekh Zayed Hospital, Head of Plastic And Reconstructive Surgery Department, Shiekh Zayed Hospital Lahore.Correspondence to Dr. Zameer Abbas Mir, Email: zameerdoc@yahoo.com, Cell No. 03134326208.**ABSTRACT****Aim:** To describe the functional and aesthetic outcome following rhinoplasty using spreader grafts in post traumatic deviated noses.**Design:** Retrospective cohort study**Place and duration of study:** July 2017 to August 2022**Methods** A retrospective data analysis of patients was done who had undergone Rhinoplasty for post traumatic deviated noses using spreader grafts from July 2017 to August 2022. Patients undergoing revision rhinoplasty, incomplete description of preoperative deformities and per operative maneuvers to correct the deformities, and incomplete photographic record were excluded. The study population consisted of 11 female patients and 19 male patients. Mean (Standard Deviation) age of the patients was 30 (8) years (range 16-48 years). The follow up post-operatively was from 12 - 26 months (mean, 15±3 months). Postoperative aesthetic outcome was assessed by the patient him/her self and 2 independent surgeons using pre and postoperative photographs. Functional outcomes and complications were also evaluated.**Results:** Study by two plastic surgeons found that out of the total 30 patients 22 had no post operative residual deformity, 7 had residual deformity not requiring revision and only 1 patient had a residual deformity that would require revision surgery. The patient outcome showed that out of the total 30 patients 20 were satisfied with their postoperative result, 9 thought that their postoperative nose was better than their preoperative nose and 1 patient was dissatisfied with the postoperative result. Over all the obstructive symptoms improved after surgery and only two patients complained of unilateral partial nasal obstruction at one year follow up. No complication occurred in any patient.

Practical implication

Conclusion: We conclude that the use of spreader graft as we have achieved good functional as well as precise aesthetic results, without recurrence of the problem. This will open new gateways in world of aesthetics and reconstruction .**Keywords:** Spreader grafts, nasal valve collapse, deviated nasal septum, post operative assessment.**INTRODUCTION**

Correction of a deviated nose is an ordeal for the surgeon as he strives to satisfy the patient by improving both form and function¹. Correction should be approached in a systematic manner to ensure a satisfied patient and surgeon². There are different causes and factors responsible for the deviation with post traumatic deviation being the commonest³ submucosal placement of strips of cartilage along the anterior border of the septum--the spreader graft--has proved to be an effective method for reconstructing the roof of the middle vault.

The challenge for the modern rhinoplasty surgeon is to create a nose that appears natural and balances with the individual's face and ethnicity⁵. Rohrich et al, classified the deviated noses into 3 types⁶. Type I includes caudal septal deviation, type II includes concave dorsal deformity and type III includes concave/convex dorsal deformity. He further classified type I into 3 subtypes i.e., straight septal tilt, concave deformity and S shaped deformity; and type II into 2 subtypes i.e., C shaped and reverse C shaped deformity. This is a simple classification system which can be applied to any deviated nose and leads to an ease in the management of such noses.

Sheen in 1984⁷, popularized the spreader grafts which are being extensively used in the management of deviated noses. Spreader grafts are usually 25 to 30mm in length and 3mm in width⁸. They can be positioned lower ("invisible") for straightening, strengthening and lengthening of nasal septum, and internal valve stenting⁹. They can also be positioned more anteriorly ("visible") along the septum to recreate stronger dorsal aesthetic lines and lengthen the nose¹⁰.

In this case series we have presented our long term experience with spreader grafts use for correction of deviated noses.

Received on 09-09-2022

Accepted on 29-11-2022

PATIENTS AND METHODS

This study was a retrospective study with stratified sampling with 30 patients. The study population consisted of 11 female patients and 19 male patients. Mean (Standard Deviation) age of patients was 30 (8) years (range 16-48 years). The post-operative follow-up period span ranged from 12 to 26 months (mean, 15 ± 3 months). This study was held at the Department Of Plastic and Reconstructive Surgery KEMU, Mayo hospital Lahore. The institutional review board approved the study protocol .We retrospectively analyzed data of patients who underwent rhinoplasty for post traumatic deviated noses using spreader grafts from July 2017 to August 2022. Patients undergoing revision rhinoplasty, incomplete description of preoperative deformities and per operative maneuvers to correct the deformities, and incomplete photographic record were excluded.

Surgery: All the patients were operated by the senior author. All operations were performed under general anesthesia. Open approach was used in 27 patients while closed in 3 patients. A nasal musculocutaneous flap was raised and the nasal septum was exposed in subperichondrial and subperiosteal planes. The nasal septal cartilage was harvested, leaving behind a 1cm wide dorsal-caudal L-shaped septal strut. After the septal harvest, it was re-evaluated for any residual deviation. Septal scoring was done as per need in each specific case. Two pieces of spreader graft about 3cm long, 5mm wide and approximately 2mm thick were carved before placing. The graft was harvested from the septum (n=21), concha (n=5) and costal cartilage (n=4). The spreader graft was placed keeping most deviated part of the septum at the centre of graft and secured with 24 gauge hypodermic needle and then secured with two mattress sutures of prolene 4-0. In most cases, more than one graft was used to achieve better alignment of the septum. In all cases, transdomal and interdomal sutures for tip and lateral osteotomies were performed for correction of deviated bony pyramid. At the end of

the operation, internal nasal splints were secured bilaterally with a single 2-0 monofilament suture for 7 days along with nasal packing which was removed after 24 hours. All patients were given external nasal splint after the application of steri-strips which were changed on weekly basis for three weeks as the edema of the nose settled. Then malleable aluminum splint was applied for four weeks at nights. All patients received broad spectrum penicillin antibiotic therapy for 7 days, starting at the time of anesthesia induction.

Postoperative assessment: Two plastic surgeons not involved in the procedures assessed the aesthetic outcomes by comparing the preoperative photograph with the postoperative photograph taken at minimum one year follow-up. Outcomes were classified as no residual deformity, Residual deformity not requiring revision or Residual deformity requiring revision. Patients self assessed the aesthetic outcome, and the outcomes were classified as satisfied, better than preoperative condition, or dissatisfied. Functional outcome was also assessed by asking for improvement in airway symptoms and were classified as one sided reduced nasal airway patency, bilateral reduced nasal airways patency, one sided blocked nasal airway and bilateral blocked nasal airways. Postoperative records were reviewed to assess surgical morbidity, including graft resorption, postoperative infection, visible graft contour and warping.

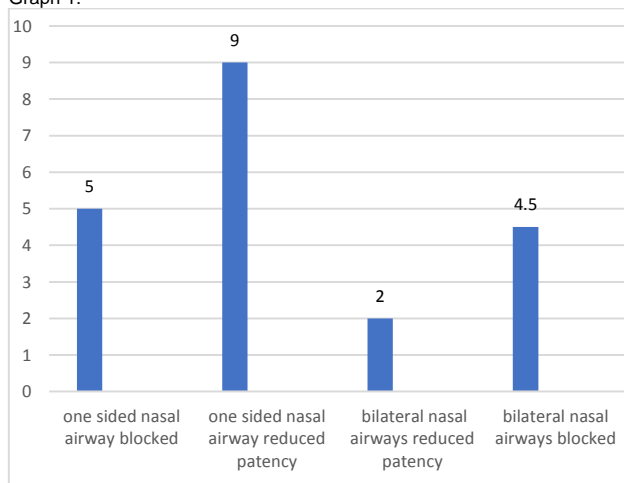
RESULT

The noses were classified according to the classification given by Rohrich and the deformities fell in type II a (n=7), II b (n=9) and III (n=14). Patient concerns were broadly classified as only aesthetic (n=14), only functional (n=6) and both aesthetic and functional (n=10) (Table 1). Functional concerns were categorized into one sided nasal airway blocked (n=5), one sided nasal airway reduced patency (n=9), bilateral nasal airways reduced patency (n=2) and bilateral nasal airways blocked (n=0)(Graph 1)

Table 1

Aesthetic concern	14
Functional concern	6
Aesthetic and functional concern	10
Total	30

Graph 1:



The assessment by two plastic surgeons found that out of the total 30 patients 22 had no postoperative residual deformity, 7 had residual deformity not requiring revision and only 1 patient had a residual deformity that would require revision surgery. The patient outcome showed that out of the total 30 patients 20 were satisfied with their postoperative result, 9 thought that their postoperative nose was better than their preoperative nose and 1 patient was dissatisfied with the postoperative result. Reason for dissatisfaction

was postoperative unilateral partial nasal obstruction in one patient who previously had bilateral partial nasal obstruction. Over all the obstructive symptoms had improved after surgery and only two patients complained of unilateral partial nasal obstruction at one year follow up. No complication occurred in any patient.

Figure 1: (a and c) preoperative pictures, (b and d) postoperative pictures



Figure 2: Intraoperative picture; placement of spreader graft



DISCUSSION

This article has displayed our results of using the spreader graft in 30 patients. Spreader grafts have worked very well in our hands in achieving functional and aesthetic improvement.

The usefulness of spreader grafts in treatment of deviated noses includes straightening, lengthening and strengthening of deviated nasal septum, improvement in nasal valve function and better aesthetic outcome. The improvement in nasal patency has been attributed to the widening effect in the valve area, as well as the increased resistance against inspiratory pressure caused by the grafts, which avoids nasal valve collapse⁹. The extent of lateralization of the upper lateral cartilage from the septum by the spreader graft is usually influenced by the graft thickness and the visible wideness of the nose. Hence the spreader graft's ability to adequately support and lateralize the lateral nasal wall is limited by visible wideness of nose. This compromise the functional outcome achieved with spreader graft. Khosh et al¹⁰ used spreader graft in 42 patients and found it to be extremely effective in improving nasal obstructive symptoms although it caused widening of the middle third of the nose in some patients. Obstructive symptoms were also improved in majority of our patients but none of our patients complained of widening of middle third of nose.

The most suitable donor site for spreader graft is the nasal septal cartilage because it is harvested from the same operative site having a straighter contour, can provide required sufficient length, width and thickness. However in cases of secondary rhinoplasty or after septoplasty, it is difficult to obtain adequately long and straight cartilage grafts from the septum. In these cases, alternatives include conchal and costal cartilages as graft material but the drawback of cartilage taken from these sites is that graft

need to be carved¹¹. Two of our patients in the study suffered postoperative partial nasal obstruction as grafts were taken from the conchal cartilage. Both had preoperative bilateral nasal reduced patency. Both patients had an overall improvement in their nasal airway symptoms but some residual reduced patency on one side of nose persisted postoperatively. The residual reduced patency in our view was due to improper nasal valve reconstruction resulting from insufficient thickness of the graft.

Another alternative technique using the upper lateral cartilage for spreader grafts has been describe. This auto-spreader flap is a technique in which the mucoperichondrium of the underside of the upper lateral cartilage is elevated and then released from its cartilaginous and bony attachments in a vertical fashion. The upper lateral cartilage is thereafter rolled on itself to form a spreader flap while reducing the profile of the dorsum. This technique avoids harvesting and carving cartilage for grafting from other locations. However this technique is limited in cases of deviated dorsal septum and asymmetric dorsal aesthetic lines¹¹.

Many people have used the closed rhinoplasty approach and have produced good results¹². But we mostly use the open approach as it gives us better idea and understanding of the underlying problem. The advantages of the external approach in the use of septal spreader grafts includes ease of harvest, accurate contouring, precise placement and suture stabilization to minimize postoperative graft displacement¹³. In our patients, both prolene and polydioxanone suture (PDS) have been used to stabilize the spreader grafts and we have found no difference in outcome between the two.

CONCLUSION

With the use of spreader graft, we have achieved functional as well as precise aesthetic results, without recurrence of the problem. It is a safe, secure, effective, and long-lasting method for the deviated nose. This versatile technique can be used in conjunction with other techniques i.e. hump reduction and is helpful in restoring dorsal esthetic lines, nasal patency, nose length. It provides an increased strength against forces of scar and contracture thus preventing recurrence

Funding: It is self funded research.

Conflict of interest: None

REFERENCES

1. Antunes MB, Goldstein SA. Surgical approach to nasal valves and the midvault in patients with a crooked nose. *Facial Plast Surg.* 2011 Oct;27(5):422-36.
2. Potter JK. Correction of the crooked nose. *Oral Maxillofac Surg Clin North Am.* 2012 Feb;24(1):95-107.
3. Rehman A, Hamid S, Ahmad M, Rashid A. A prospective study of nasal septal deformities in kashmiri population attending a tertiary care hospital. *Intl J Otolaryngology and Head & Neck Surg.* 2012 Nov;1(3):77-84.
4. Rohrich RJ, Gunter JP, Deuber MA, Adams WP Jr. The deviated nose: optimizing results using a simplified classification and algorithmic approach. *Plast Reconstr Surg.* 2002 Nov;110(6):1509-23
5. Use of Spreader Grafts in the External Approach to Rhinoplasty Author links open overlay panel Rod J. Rohrich MD, FACS Larry H. Hollier MD 17 June 2020, Version of Record 17 June 2020.
6. Sheen JH. Spreader graft: a method of reconstructing the roof of the middle nasal vault following rhinoplasty. *Plast Reconstr Surg.* 1984 Feb;73(2):230-9.
7. Janis JE, Ahmed J, Rohrich RJ. Rhinoplasty. In: Thorne CH, Chung KC, Gosain AK, Gurtner GC, Mehrara BJ, Rubin JP, Spear SL, editors. *Grabb and Smith's Plastic Surgery.* 7th ed. Philadelphia: Lippincott Williams & Wilkins; 2014.
8. Wagner W, Schraven SP. Spreader grafts in der Septorhinoplastik [Spreader grafts in septorhinoplasty]. *Laryngorhinootologie.* 2011 May;90(5):264-74. German.
9. Rohrich RJ, Hollier LH. Use of spreader grafts in the external approach to rhinoplasty. *Clin Plast Surg.* 1996 Apr;23(2):255-62.
10. Ingels KJ, Orhan KS, van Heerbeek N. The effect of spreader grafts on nasal dorsal width in patients with nasal valve insufficiency. *Arch Facial Plast Surg.* 2008 Sep-Oct;10(5):354-6.
11. Khosh MM, Jen A, Honrado C, Pearlman SJ. Nasal valve reconstruction: experience in 53 consecutive patients. *Arch Facial Plast Surg.* 2004 May-Jun;6(3):167-71.
12. Teymoortash A, Fasanla JA, Sazgar AA. The value of spreader grafts in rhinoplasty: a critical review. *Eur Arch Otorhinolaryngol.* 2012 May;269(5):1411-6.
13. Yoo DB, Jen A. Endonasal placement of spreader grafts: experience in 41 consecutive patients. *Arch Facial Plast Surg.* 2012 Sep-Oct;14(5):318-22.
14. Boccieri A. Il naso torto [The crooked nose]. *Acta Otorhinolaryngol Ital.* 2013 Jun;33(3):163-8. Italian.