International Journal of Otorhinolaryngology and Head and Neck Surgery
Tiwari M et al. Int J Otorhinolaryngol Head Neck Surg. 2018 May;4(3):748-753
http://www.ijorl.com
pISSN 2454-5929 | eISSN 2454-5937

Original Research Article

DOI: http://dx.doi.org/10.18203/issn.2454-5929.ijohns20181865

Our experience with spreader graft in septorhinoplasty by open approach

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Received: 05 February 2018
Revised: 09 March 2018
Accepted: 10 March 2018

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ABSTRACT

Background: Spreader graft being one of the best method for volumetric expansion of internal nasal angle to address the nasal valve pathologies, popularised by Sheen.
Methods: To evaluate its functional effect on relieving nasal obstruction secondary to nasal valve pathologies, our study was conducted in 40 patients (35 male and 5 female; mean age 28 years) having both external nasal deformity and nasal obstruction. NOSE scale was used to assess functional improvement.
Results: Out of total 40 patients (22 patients with saddle nose deformity, 10 crooked nose and 8 nasal dorsum deformity), 35 patients (87.5%) were fully satisfied with functional outcome as assessed by NOSE score.
Conclusions: Spreader graft is good way to handle nasal obstruction secondary to narrow internal nasal angle.

Keywords: Spreader graft, Septorhinoplasty, NOSE scale, Internal nasal angle

INTRODUCTION

The importance of spreader graft has been demonstrated in various studies as they play a crucial role in managing internal nasal valve collapse, nasal dorsum aesthetics and correcting nasal septal deformities. In 1980s, Sheen was first to popularize the spreader graft as a way to handle internal nasal valve pathologies and reconstructing the nasal dorsum.[1] His technique has been widely accepted for various functional and cosmetic indications like correction of internal nasal valve collapse; correcting lack of dorsal support of the lateral nasal walls; widening the middle third of the nose; straightening or stabilization of a high dorsally deviated septum; bridging a long and narrow middle vault in patients with short nasal bones; creating straight dorsal aesthetic lines and lengthening a short nose as a caudal extension graft. Internal nasal valve is formed superiorly by caudal end of upper lateral cartilage and adjacent part of septal cartilage and inferiorly by floor of nasal cavity and anterior end of inferior turbinate.[2] Technically, use of spreader graft is a method of volumetric expansion of internal nasal angle which is formed by caudal part of upper lateral cartilage and adjacent septal cartilage. This angle is usually 9-15^0 but has a great variation in Caucasians, American, Asians and Africans.[3] In recent years, cosmetic surgery on the face including rhinoplasties are gaining popularity. It not only provides good looks but also good self-esteem and self-confidence. Many a times, while correcting the nasal dorsum deformities, nasal angle gets compromised which leads to poor functional outcome despite of good aesthetic results. This problem can be dealt with the help of spreader graft. The present study evaluated the importance of spreader graft in primary and revision rhinoplasties for both functional and aesthetic outcome.

METHODS

Our study was conducted in 40 patients (35 male and 5 female; age ranging from 17 to 45 years; mean age 28 years), visiting ENT OPD from January 2012 to December 2016. The chief complaints of all the patients selected for the study were both nasal obstruction and external nasal deformity. Patients who complained of only nasal obstruction and nasal deformity as chief complaint were excluded from the study. Diagnostic nasal endoscopy was done in all the patients. Pathology of internal nasal valve was confirmed by modified Cottle's test by using metallic probe to lift upper lateral cartilage for widening the internal nasal angle to see the improvement in nasal obstruction. Only those patients who showed improvement in nasal obstruction with modified Cottle's test were included and patients with other causes of nasal obstruction like nasal polyp, turbinate hypertrophy, chronic rhinosinusitis and tumours were excluded from the study. Out of 40 patients, 22 had saddle nose, 10 crooked nose deformity and 8 dorsal hump deformity. 26 patients had tip depression and one had alar deformity. All the patients underwent septorhinoplasty by open approach under general anaesthesia. Autologous septal cartilage used as graft material in all patients but in 8 case when cartilage amount was less, then conchal or tragal cartilage was harvested for grafting. Every patient was given injection Amoxclav 1.2 gram intravenously half an hour before the surgery which was continued 8 hourly for next 48 hours after which patients were discharged on capsule Amoxclav 625 milligrams t.i.d for next 3 days. All the patients were given NOSE questionnaire to assess functional improvement in nasal obstruction after one month of surgery. Patients were followed up for 1 year.

Surgical technique

All the patients were operated by external approach rhinoplasty. Inverted "V" shaped incision was given over columella and extended to the rim of alae as marginal incision (Figure 1). After elevating skin flap from upper and lower lateral cartilages septal corrections done as a standard technique by elevating mucoperichondrial and mucoperiosteal flaps both the sides. After septal corrections, skin flap was retracted with auphritch retractor. Most commonly, grafts were harvested from autologous septal cartilage, tragus, concha cavum and from rib cartilage in cases of revision rhinoplasty. Harvested spreader grafts were approximately 1.5-2.5 cm in length, 2-3 mm in width and 1.5-2.5 mm thick. Then a tunnel was created in between the upper lateral cartilage and the nasal septum without injuring the nasal mucosa (as shown in Figure 2) and then graft was put in the tunnel and secured with 4-0 polydiaxonone (PDX) suture (Figure 2). PDX takes approximately 3 months to get resolved and it provides good stability to the graft. Rest of the corrections were as per the defect and deformity. Finally the skin flap was reposited back and sutured over collumella with 4-0 prolene. Bilateral anterior nasal packing was done and all the patients were given plaster of Paris (P.O.P) cast over dorsum which helped in stability and didn't allow the blood to get accumulated beneath the skin flaps.

Figure 1: Showing incision used for open rhinoplasty.

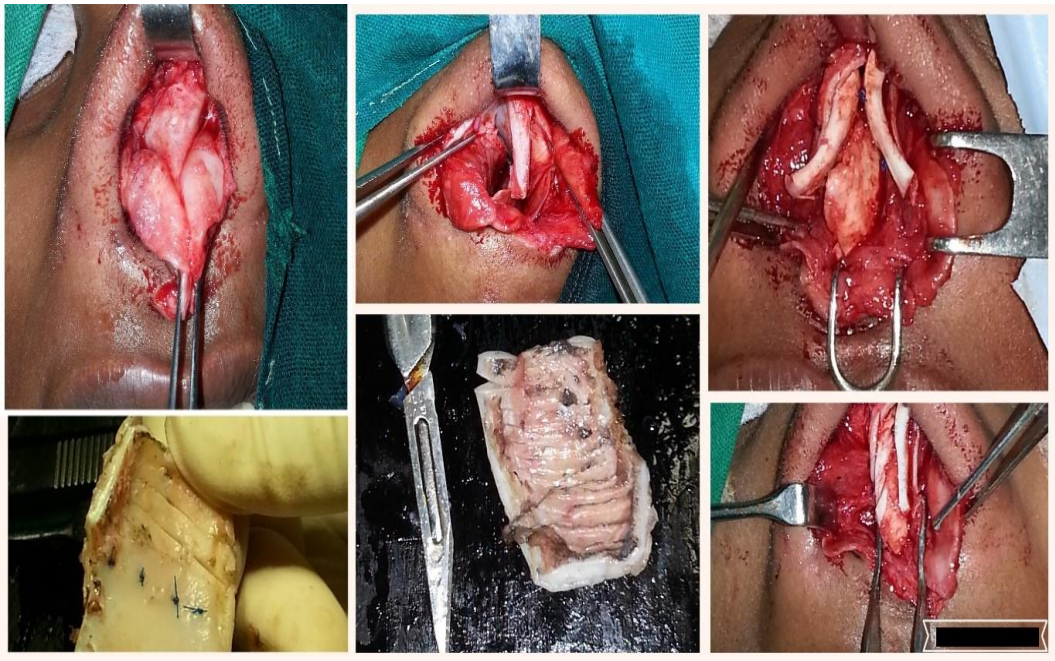

Figure 2: Showing of technique of putting spreader graft.

RESULTS

Out of total 40 patients**,** 22 patients were with saddle nose deformity, 10 crooked nose and 8 nasal dorsum deformity. Among 22 patients with saddle nose deformity, 20 were satisfied with functional and aesthetic outcome while 2 patients were not satisfied. In 10 patients with crooked nose deformity, 9 were satisfied with functional outcome while 1 patient was not satisfied. But with respect to aesthetic outcome, 8 were satisfied and 2 were not satisfied. In 8 patients with dorsum hump deformity, 6 were satisfied with functional outcome while only 5 were satisfied with aesthetic outcome. The details of aesthetic and functional outcome is shown in Table 1.

Table 1: Showing patients satisfied and not satisfied with functional and aesthetic outcome.

S. No.	Diagnosis	Total number of patients	Satisfied with functional outcome (%)	Not satisfied with functional outcome (%)	Satisfied with aesthetic outcome (%)	Not Satisfied with aesthetic outcome (%)
1.	Saddle nose deformity	22	20 (90.9)	2 (9.1)	20 (90.9)	2 (9.1)
2.	Crooked nose	10	9 (90)	1 (10)	8 (80)	2 (20)
3.	Nasal dorsum deformity	8	6 (75)	2 (25)	5 (62.5)	3 (37.5)

DISCUSSION

The spreader graft has main role in widening effect of nasal angle. Spreader graft are linear strips of cartilage which may be harvested from autologous septal cartilage, tragus, concha cavum and rib cartilage.[4] The other materials that can be used as spreader graft are hyaluronic acid, high density porus polyethylene, calcium hydroxyl apatite and polymer of polylactic and polyglycolic acid.[5-9] There is still controversy regarding the unilateral or bilateral placement of spreader graft. Many authors support the view of putting graft unilaterally, mainly on concave side for correcting high septal deviation.[10,11] But we preferred putting graft on both the sides for better functional outcome. Both endonasal and external approach have been advocated for putting spreader graft. Pontius and William, Donald and Albert used the endonasal approach for putting spreader graft.[12,13] It looks technically more difficult for proper alignment of the graft along the upper lateral cartilage endonasally. In our experience open approach remains technically easy and best for functional outcome.

Total 22 patients with saddle nose deformity, 10 crooked nose and 8 nasal dorsum deformity were operated. Out of 22 patients with saddle nose deformity, the main aetiology of saddling was developmental deformity in 18 patients, trauma in 3 patients and infection in 1 patient. In these patients, augmentation was done with autologous multiple crushed septal cartilages pieces. The spreader graft were put on both the sides. All the patients needed medial, lateral and intermediate osteotomies as per requirement without displacing the periosteum. Out of 22 patients, 20 were fully satisfied aesthetically and functionally. Only two patients complained of improper aesthetic outcome but they were satisfied for functional

outcome as per NOSE criteria. Figure 3 and 4 shows patients with saddle nose deformity pre-operative and post-operative images. In one patient with alar deformity, intradomal suture were taken for correction as shown in Figure 5. Only one patients had previous history of operated cleft lip and palate in which columellar shortening was present leading tip depression (Figure 6). Columellar strut was used for tip projection in this case. Interdomal and intradomal sutures were also used in most of the cases for tip projection.

In 10 patients with crooked nose deformity, the main aetiology was trauma in all 10 patients. All the patients required medial, lateral and intermediate osteotomies for dorsal nasal vault corrections. Spreader graft was used bilaterally for nasal angle widening. Post operatively, 8 out 10 patients were fully satisfied with their external appearance while 9 out of 10 were happy with their functional outcome as per NOSE score.

In patients with dorsal hump deformity, rasping was the preferred method for reduction of hump. All the 8 patients required rasping. All three osteotomies were required in all the patients. Spreader graft were used bilaterally. Aesthetic outcome was not upto the expectations in 3 out of 8 patients. But functionally 6 out of 8 were satisfied as per NOSE scale. The main reason was high septal deformity and slippage of the spreader graft from the mucoperichondrial pocket post-operatively.

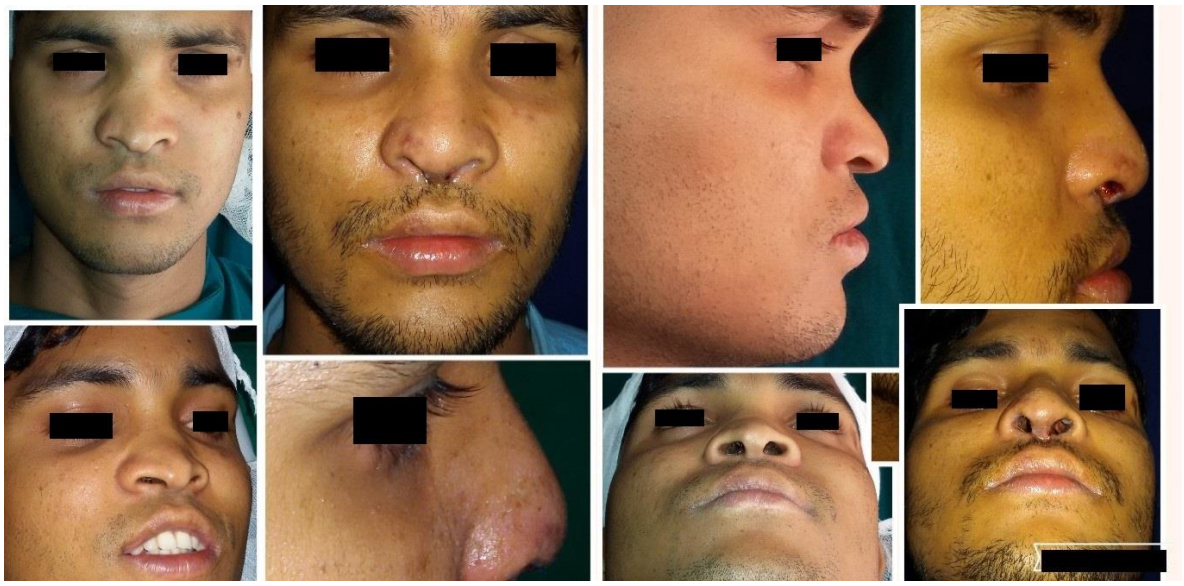

Figure 3: Shows patient with saddle nose deformity (preoperative and postoperative images).

Figure 4: Showing the preop and postop images of patient with saddle nose deformity.

Figure 5: Showing preop and postop images of patient with right alar deformity.

Figure 6: Patient with columellar shortening. Tip projection was done with columellar strut. Preoperative and postoperative images.

There are some limitations also of spreader graft. Some authors explain the inability of proper lateralization of lateral wall of the nose.[14,15] But in our study out of total 40 patients, 35 patients were satisfied with the functional outcome on assessment by NOSE scale after 6 months of surgery. Only 5 patients were not satisfied due to slippage of the graft into the mucoperichondrial pocket. This problem was overcome by putting two slices of cartilage parallel to each other on one side and secured with 4-0 PDX suture along with upper lateral cartilage and adjacent septal cartilage. It helped in more lateralization of lateral nasal wall. Another limitation is requirement of long strips of the cartilage for proper nasal angle widening which seems to be true in our experience also. Sometimes septal cartilage is not enough for proper grafting specially in revision cases. But this problem can be overcome by taking graft from other sites like concha, tragus and rib cartilage. In some cases, an alternative technique of autospreader graft is also advocated by some authors.[16-18] In this technique, the upper lateral cartilage is rolled in itself and used as spreader graft after separating the mucoperichondrium from adjacent septum and the upper lateral cartilage. This technique is limited to some selective cases of dorsal deviation.

Some other techniques of putting spreader graft like rail spreader graft technique, double layered stepped graft technique and batten graft technique are also explained by some authors.[19-21]

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Tiwari M, Kumar S, Goel HC, de sa C. Our experience with spreader graft in septorhinoplasty by open approach. Int J Otorhinolaryngol Head Neck Surg 2018;4:748-53.