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ORIGINAL ARTICLE

Controlling Nasal Length with Extended Spreader Grafts: A Reliable Technique in Primary Rhinoplasty

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Abstract
Background: The short nose characterized by a reduced distance from the nasal radix to the tip represents a challenging deformity in facial plastic surgery. Several techniques have been described in the literature for augmentation of the short nose, but none emphasizes the surgical maneuvers necessary to preserve nasal length in primary rhinoplasty and to avoid the development of a short nose deformity.
Methods: The authors present a surgical technique for avoiding postoperative nasal shortness and for controlling nasal length in primary rhinoplasty. The procedure uses caudally extended bilateral spreader grafts, which prevent postoperative cephalic tip rotation and allow control of tip rotation. The grafts should be placed electively in noses that have the potential to become overshortened postoperatively. By doing so, surgeons can perform any of the common surgical maneuvers in rhinoplasty without risking short nose deformity. The study included 41 patients with a mean age of 27 years who were considered to be at high risk for the development of postoperative short nose deformity. All the patients were treated with bilateral extended spreader grafts via the open nasal approach. The follow-up period was up to 12 months, with regular evaluation of the surgical outcome comprising measurement of the nasal length and photographic analysis.
Results: All the patients showed preserved nasal length after surgery with well-proportioned facial features. There was no evidence of postoperative nasal shortening after 12 months of follow-up evaluation. No operative or postoperative complications were detected. All the patients were pleased with the surgical results achieved.
Conclusion: The use of extended spreader grafts during primary rhinoplasty for selected patients represents a valuable tool for preventing short nose deformity after primary rhinoplasty.

Key words Extended spreader grafts · Nasal length · Primary rhinoplasty · Short nose deformity

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Introduction

Many patients who request rhinoplasty require a considerable reduction of the nasal framework to achieve optimal surgical results. When nasal resection is necessary, we have to anticipate that scar contraction forces may considerably vary the final surgical outcome, resulting in a short nose deformity, which is not evident during the immediate postoperative period.

Recognition of patients with a high risk for the development of postoperative short nose deformity is the major key to preventing this unpleasant outcome. Usually, these high-risk patients present with very distinct anatomic features that should be evaluated and taken into account before surgery (Table 1).

Surgical maneuvers used in primary rhinoplasty to correct the nasal appearance often are associated with a significant reduction in nasal length. Such surgical steps usually involve broad cephalic trim of the lateral crura and domus, anterior shortening of the caudal septum, wide resection of the dorsal septum, mucous resection of the membranous septum, and extensive defatting of the soft

Table 1 Anatomic risk factors for short nose deformity

Borderline nasal extension
High nasal dorsum with large dorsal hump
High or excessively convex lateral crura
Wide nasolabial angle
Large compliance of soft tissues
Low radix
Deviated caudal septum

tissue envelope [1, 2]. Byrd et al. [3] described the use of extension grafts to control tip projection and tip shape.

To control nasal length after primary rhinoplasty, we present a method of using extended spreader grafts as batten grafts. These grafts are positioned as conventional spreader grafts on the dorsal septum. The caudal end is advanced distally beyond the septal angle. This avoids any excessive cephalic rotation of the tip during the postsurgical healing process. It also controls the nasal length in a reliable and predictable way.

Materials and Methods

During a 5-year period (August 1998 to August 2003), 41 primary rhinoplasty patients (9 men and 32 women) with a mean age of 27 years (range, 19–45 years) were identified as being at high risk for the development of short nose deformity after surgery. All these patients underwent extended spreader graft placement through the open approach to preserve nasal length. The minimum postoperative follow-up period was 6 months. After this period, a thorough physical analysis, including nasal measurements, was performed using the nasal radix and tip defining points to assess nasal length.

All spreader grafts were composed of septal cartilage. In some patients, the cartilaginous septum was insufficient to achieve the desired nasal length. Thus, the application of septal bone in continuity with septal cartilage became necessary.

Patients were scheduled for postoperative visits on a regular basis, allowing frequent assessments during immediate and late follow-up periods. Photographs were taken 3, 6, and 12 months after surgery.

Surgical Technique

The procedure begins via an open approach with extensive undermining of the soft tissue [4] The cephalic margins of the lower lateral cartilages are resected. This maneuver is responsible for the cephalic rotation on the nasal tip. The septum is dissected in a subperichondrial plane followed by partial resection of its caudal edge. Careful reduction of the dorsal hump is performed through rasping and trimming of the upper lateral cartilages.

At this point, we assess nasal length by redraping the skin flap over the osteocartilaginous framework. If the length has been excessively shortened or if we consider any possible risk for the development of postoperative short nose deformity, we routinely place cartilage extended spreader grafts to preserve nasal length. The grafts are harvested from the nasal septum and tailored to a smooth round contour caudally. The average size of each extended spreader graft is 3.5×1 cm.

Grafts are always positioned bilaterally and sutured with three stitches to the dorsal septal cartilage in the same manner as conventional spreader grafts [5]. The caudal end of the graft is extended beyond the septal angle resting on the posterior surface of the medial crura. The amount of graft extension beyond the septal angle varies and ranges from 3 to 10 mm depending on the final nasal length desired. This allows for maintenance of the preoperative nasal length and for controlled nasal lengthening if necessary.

Finally, the tip lobule is modified as much as necessary using suturing techniques or tip grafts before closure of the transcolumellar incision. Percutaneous osteotomies are performed to correct wide bony vaults or open roof defects when required. At the end of the procedure, the nose is packed, and a nasal splint is placed.

Results

All 41 patients preserved adequate nasal length after surgery with well-proportioned facial features. There was no evidence of postoperative nasal shortening after 12 months of follow-up evaluation. Some patients experienced a slight increase in nasal length after surgery. No complications such as graft extrusion or displacement were detected. All patients were pleased with the surgical results.

Case 1

A 19-year-old girl, who complained that she detested her large dorsal hump, poorly defined and projected tip, and small chin presented to our service. She requested an aesthetically pleasing nose and improved facial proportions.

Clinical assessment demonstrated a relatively small nose with a prominent dorsal hump and a poorly defined tip. The position of the girl's radix was adequate, although she had a slightly reduced nasolabial angle. Other findings included a boxy tip deformity attributable to an excessive middle crura divergence angle and inadequate chin projection.

Fig. 1 *Left:* Preoperative view showing a prominent dorsal hump and an undefined tip in a 19-year-old girl. *Right:* Clinical views 1 year postoperatively demonstrating preservation of nasal length after nasal reduction with placement of extended spreader grafts

The surgical plan comprised an open approach, extensive undermining, cephalic trim of the lateral crura, mucoperichondrial dissection with moderate resection of the osteocartilaginous dorsum, septal graft harvesting, placement of extended spreader grafts and a columella strut to maintain nasal length and augment nasal projection respectively, suture techniques to correct the box tip deformity, percutaneous lateral osteotomies, and chin augmentation (Figs. 1 and 2).

Case 2

A 28-year-old woman presented with the complaint that she disliked her large nose and prominent dorsal hump. She requested nose reduction and upper lip enhancement.

During presurgical evaluation, we noted a large dorsal hump and a small retracted upper lip attributable to excessive protrusion of the nasal spine. Despite this, the woman's nasolabial angle was normal, as well as the height of her radix positioned at the supratarsal fold level. Other findings included an acute lobullocolumellar angle and an undefined bulbous tip.

The surgical plan included an open approach, moderate skin envelope undermining attributable to the woman's thin skin, cephalic trim of the lateral crura, large resection of the osteocartilaginous dorsum after mucoperichondrial septum dissection, septal graft harvesting, nasal spine resection, placement of extended spreader grafts to prevent postoperative nasal shortening and nasal valve collapse, suture techniques to define the tip, and percutaneous lateral osteotomies (Fig. 3).

Case 3

A 25-year-old man presented with the complaint that he did not like his large dorsal hump and nose deviation. Clinical evaluation showed a large and high dorsal hump with nasal deviation.

The surgical plan consisted of an open approach, extensive undermining of the skin envelope, conservative cephalic trim of the lateral crura, mucoperichondrial dissection with large resection of the osteocartilaginous dorsum, septoplasty to correct the deviated septum and septal graft harvesting, placement of extended spreader grafts and a columella strut to maintain nasal length and augment nasal projection respectively, suture techniques to define the tip, and percutaneous lateral osteotomies (Fig. 4).

Discussion

Short nose deformity remains a challenge for the rhinoplasty surgeon, frequently resulting in poor and frustrating surgical outcomes. Most often, this type of deformity is the result of inadequately performed rhinoplasty [6, 7].

Several surgical techniques to correct short nose deformities have been described in the literature, but none

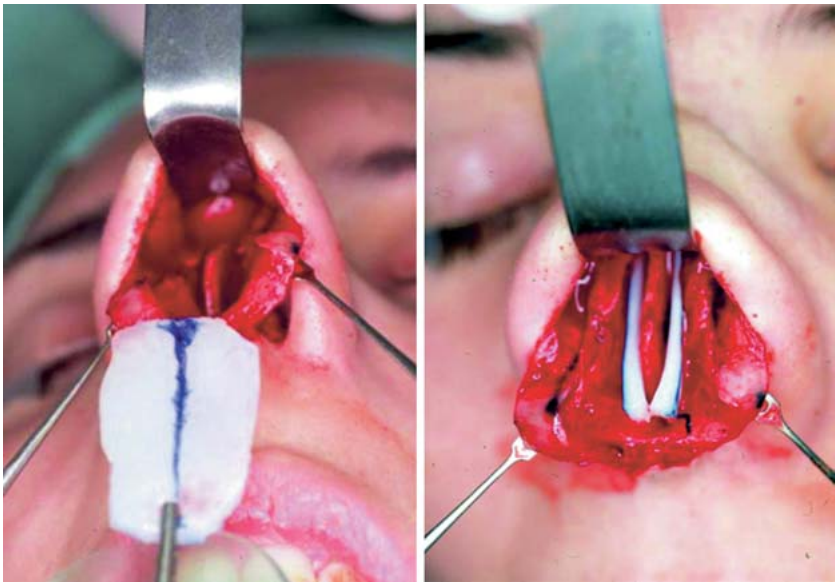

Fig. 2 Open approach view. *Left:* The harvested cartilage from the septum is prepared for graft carving. *Right:* The extended spreader grafts are shown in their final position before suturing

emphasize the surgical maneuvers necessary to preserve nasal length and to avoid postoperative nasal shortening [8–18]. A thorough preoperative nasal assessment with physical examination is crucial in identifying the patients at the risk for the development of this type of deformity after nasal reduction.

We present a technique that is simple, effective, and safe for the control of nasal length and tip rotation by the use of extended spreader grafts. This technique also can be performed by less experienced surgeons in the event that overresection of the osteocartilaginous framework is evident intraoperatively. Although originally described as a technique used in secondary rhinoplasty to reconstruct the roof of the middle vault [19], spreader grafts currently represent a common tool in primary rhinoplasty with multiple goals including prevention of middle vault collapse and internal valve dysfunction, aesthetic recreation of the nasal dorsum, and correction of nasal deviation [20].

The use of extended septal grafts in primary rhinoplasty has been described previously [3]. However, their application has been advocated as an alternative to the columella strut to control tip projection and shape, and not to control and preserve nasal length in patients at increased risk for nasal shortening after primary rhinoplasty. In secondary rhinoplasty, extended septal grafts have been described for the correction of short noses and the prevention of recurrences [8–18].

In contrast to previous reports, our technique emphasizes the use of bilateral extended spreader grafts to control nasal length in primary rhinoplasty (Fig. 4). Besides the desired effect of controlling nasal length, careful positioning of these grafts is important to avoid certain potential problems. If the grafts are not positioned slightly posterior to the septal angle or if they are too thick, displacement of the upper lateral cartilages may occur, causing considerable nose widening. If the grafts are extended caudally too far, two problems may occur: (1) excessive reduction of the nasolabial angle or the rotation angle leading to deformed nostrils or (2) an imbalance of the columella and tip lobule inducing a hanging columella. These problems can be avoided by careful preoperative evaluation together with operative planning, and by a detailed intraoperative assessment [21].

All patients included in this study were considered to have an increased risk for the development of short nose deformity after conventional primary rhinoplasty. The potential for postoperative short nose deformity was evaluated by consideration of both the nasal anatomy and the surgical procedures necessary to achieve the desired final aesthetic result. The regular use of extended bilateral spreader grafts in our patients controlled nasal length as well as tip rotation and avoided postoperative short nose deformities.

Conclusion

Before performing the described technique, we encountered in our clinic several cases of shortened noses after primary rhinoplasty. These cases were difficult and challenging to correct due to scar contraction of both the inner lining and the skin envelope. The best way to avoid severe problems is, of course, to avert them with prevention. By applying extended spreader grafts in patients with an

Fig. 3 *Left:* Preoperative view showing a prominent dorsal hump and an undefined bulbous tip in a 28-year-old woman. *Right:* Clinical views 1 year postoperatively demonstrating preservation of nasal length after nasal reduction with placement of extended spreader grafts

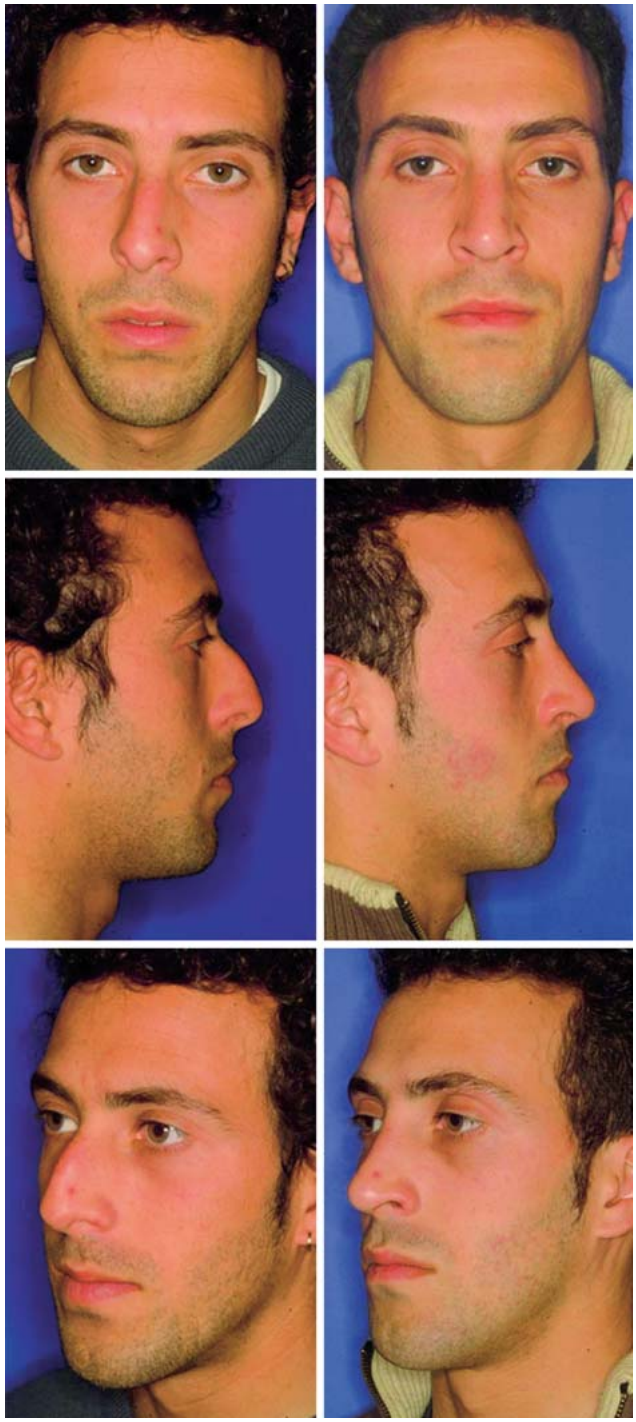

Fig. 4 *Left:* Preoperative view showing a large dorsal hump with nasal deviation in a 25-year-old man. *Right:* View 1 year postoperatively showing preservation of nasal length after reduction rhinoplasty with placement of extended spreader grafts

increased risk of nose shortening after rhinoplasty, we have been able to obtain consistent and predictable results regarding nasal length without any nasal deformity. We believe that this surgical technique represents a safe, effective, and reliable surgical procedure for controlling nasal length and preventing short nose deformity after primary rhinoplasty.

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