

Placement technique of extended spreader grafts

Uzatılmış spreader greftlerin yerleştirilme tekniği

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Objectives: This study aims to show the placement of extended spreader grafts in reductive septorhinoplasty operations to support the nasal bony vault as well as the middle cartilaginous structures.

Patients and Methods: Thirty-eight patients (16 males, 22 females; mean age 26.4 years; range 18 to 55 years) who underwent septorhinoplasty under general anesthesia via open approach between January 2008 and December 2010 were included in this study. Two separate cartilage grafts were placed end-to-end and secured to the septum on both sides after removing the cartilage and bony hump. These grafts not only transverse the full length of the middle one-third of the nose, also run approximately 1 cm under the nasal bones cephalically and the anterior septal angle caudally on both sides. The obtained data were evaluated retrospectively. Patients were followed up postoperatively for 7 to 24 months with a mean follow-up of 14 months.

Results: There was no significant bony vault collapse or irregularity, inverted-V deformity or middle-vault narrowing observed during the postoperative period. All of the patients were satisfied with the cosmetic and functional results.

Conclusion: We think that extended spreader grafts are more beneficial not only in reconstructing the middle one-third of the nose but also in supporting the collapsed and/or disrupted nasal bony vault in reductive septorhinoplasty.

Key Words: Nasal vault; rhinoplasty; spreader grafts.

Amaç: Bu çalışmada redüksiyon septorinoplasti ameliyatlarında, orta kıkırdak yapı ile birlikte kemik çatıya da destekleyen spreader greftlerin yerleştirme tekniğinin gösterilmesi amaçlandı.

Hastalar ve Yöntemler: Bu çalışmaya, Ocak 2008 - Aralık 2010 tarihleri arasında genel anestezi altında açık teknik ile septorinoplasti uygulanmış olan 38 hasta (16 erkek, 22 kadın; ort yaş 26.4 yıl; dağılım 18-55 yıl) dahil edildi. İki ayrı kıkırdak greft uç uca yerleştirildi ve kıkırdak ve kemik 'hump' çıkarıldıktan sonra septumun her iki tarafına tespit edildi. Bu greftler sadece burun orta üçte birinin tam uzunluğunu karşıdan karşıya geçmez, sefalik olarak burun kemiklerinin yaklaşık 1 cm altından geçer ve kaudalde her iki tarafta anterior septal açıya kadar uzanır. Elde edilen veriler retrospektif olarak değerlendirildi. Hastalar ameliyat sonrası 7 ila 24 ay boyunca, ortalama 14 ay takip edildi.

Bulgular: Ameliyat sonrası dönemde gözlenen belirgin kemik çatı düzensizliği veya çökmesi, ters-V deformitesi ya da orta çatı daralması yoktu. Bütün hastalar kozmetik ve fonksiyonel sonuçlardan memnundu.

Sonuç: Redüksiyon rinoplastide, uzatılmış spreader greftlerin sadece burun orta üçte birinin rekonstrüksiyonunda değil aynı zamanda çökmüş veya bozulmuş kemik çatının desteklenmesinde de daha faydalı olduğunu düşünmekteyiz.

Anahtar Sözcükler: Nazal çatı; rinoplasti; spreader greft.

The framework of the middle third of the nose is composed of the underlying dorsal septal cartilage and the smoothly attached upper lateral cartilages. Middle vault collapse, loss of structural integrity or support of the upper lateral cartilages, narrows the internal nasal valve, decreases resistance against the negative pressure produced during inhalation, and impairs air flow through the nose.^[1] In addition to being the most resistive segment in the nasal airway, its constituent structures contribute to the contour of the middle nasal vault and nasal dorsal appearance.^[2,3] Several surgical techniques have been developed to widen the nasal valve angle to prevent narrowing during inspiration and to shape the middle vault deformity.^[3-16] The most commonly used surgical technique is placing spreader grafts subperichondrally between the cartilage septum and the upper lateral cartilage as described by Sheen in 1984.^[3]

Dorsal hump reduction is a common maneuver used in reduction rhinoplasty. This typically requires transection of the dorsal septal cartilage and the medial margin of the upper lateral cartilage to reduce bridge height. Disruption of this T-shaped configuration can predispose to potential collapse of the middle vault and internal valve dysfunction.^[3,4] Dorsal hump reduction also generally disrupts the bony structures of the nose. When combined with bony hump reduction, osteotomies may result in nasal bony vault collapse and irregularity if careful controlled osteotomies were not done. Narrowing of the bony vault and irregularities may be a constant problem. Hence, supporting the disrupted bony framework is also as important as middle vault reconstruction for a functional and aesthetic nose.

The spreader graft and its variants have been used in reduction septorhinoplasty to support the middle vault of the nose. This article aims to show and expand the usage of extended spreader grafts to support the nasal bony vault as well as the middle cartilaginous structures in reduction septorhinoplasty.

PATIENTS AND METHODS

The study group comprised 38 patients (16 males, 22 females; mean age 26.4 years; range 18 to 55 years) with various nasal deformities who underwent consecutive septorhinoplasty with extended spreader grafts between January 2008 and December 2010 in two different hospitals. The study protocol was approved by the local ethical

committee and informed consent was obtained from all of the patients. None of the patients previously had a septorhinoplasty procedure. Pre- and postoperative facial photography using frontal, lateral, and basal views were documented. All the patients were questioned about the cosmetic and functional results subjectively with a one-question survey on the phone. Their pre- and postoperative photographs were reviewed attentively.

Surgical technique

All patients were operated on under general anesthesia. An open approach with a transcolumellar inverted-V shape incision was connected to a bilateral marginal incision in all patients. The skin was elevated at the subchondral and subperiosteal plane and the osseocartilaginous dorsal skeleton was exposed. The hump of the cartilage septum was removed with a scalpel and the bony hump was also removed with an osteotome and/or rasp. A cartilage graft was harvested leaving at least 1 cm at the dorsum and caudal portion in all patients. Standard techniques were completed in the remaining body of the septum to create an adequate airway. Then high to low to high osteotomies and median oblique osteotomies were done.

Two pairs of spreader grafts were prepared for both sides from the harvested septal cartilage. Usually the length of the quadrangular cartilage is not enough to prepare such long grafts. Therefore, two separate cartilage grafts should be placed end-to-end and secured to the septum with 5-0 propylene sutures on both sides. These end-to-end grafts placed together not only traverse the full length of the middle third of the nose but also run approximately 1 cm under the nasal bones cephalically and the anterior septal angle caudally on both sides. These grafts lie down not only along the nasal dorsal cartilage but also lay down along the reduced nasal bone. The dorsal edge of the grafts is placed at the same level with the dorsal cartilage. The grafts are never more than 4 mm in height. Placing grafts as described above enables to support both cartilage and bony segment of the nasal vault (Figure 1).

After addressing the other aspects of the patient's pathologies according to the preoperative analysis, the internal and external incisions were sealed to end the surgery. Finally, routine nasal splinting and external packing were performed.



Figure 1. Two separate cartilage grafts were placed end-to-end and secured to the septum with 5-0 propylene suture on both side.

RESULTS

We performed this grafting technique on all 38 patients. Patient outcomes were retrospectively evaluated. Patients were followed up postoperatively for 7 to 24 months. Results were documented by facial photography using frontal, lateral, and basal views. In 38 patients extended spreader grafts which were harvested from septal cartilage were used. We obtained cosmetic improvement in all the patients. The bony and cartilage vault of the nose became significantly straighter in all patients. There was no bony vault collapse or irregularity, inverted-V deformity and middle-vault narrowing observed during the postoperative period. Nasal breathing was improved subjectively in all patients. All the patients were pleased with their cosmetic and functional results (Figure 2, 3), and had no complaints about their grafts. There were no complications such as infections and nasal

vault asymmetry. None of the patients underwent revision surgery.

DISCUSSION

In the absence of any history of prior nasal surgery or age-related relaxation of tissues, naturally weak or flaccid upper lateral cartilages with visible collapse of the lateral nasal walls both lead to a narrow nose and internal nasal valve insufficiency that may require insertion of spreader grafts. Spreader grafts may also be indicated to straighten the nose and correct the dorsal septal deflection due to a crooked-nose deformity. More commonly, patients who have a history of prior rhinoplasty surgery that has contributed in some manner to internal valve dysfunction, aesthetic abnormality, or both, require spreader grafts.^[3-6,8-11]

In 1984, Sheen^[3] first described spreader grafts as a method of reconstructing the internal nasal



Figure 2. Preoperative view of a patient.



Figure 3. Postoperative view of a patient.

valve and/or recontouring the aesthetic appearance of the nasal dorsum in primary and secondary rhinoplasties. Spreader grafts are cartilaginous grafts used to reposition the upper lateral cartilages and maintain middle nasal vault width. Septal cartilage is most often used to prepare these grafts. In order to increase the valve angle and provide more width along the roof, these grafts were intended to act as volumetric expanders in moving the upper lateral cartilage away from the dorsal septum. These submucosally placed grafts are generally 2 to 3 mm wide and constructed to the length of the upper lateral cartilage.

Recently, preserving the upper lateral cartilage to act as a spreader graft in a primary rhinoplasty surgery reinterpreted the concept described by Sheen.^[3] Among the first techniques to use the upper lateral cartilage was described by Oneal and Berkowitz,^[4] and Berkowitz^[15] who named it a "spreader flap," described a spreader graft in 1992 by Wood^[16] and subsequently. Many variations of this technique have been described in recent studies.^[2,4,9,13,17-19] These authors have suggested that the use of the upper lateral cartilages as volumetric expanders minimizes the need for harvesting additional cartilage and prevents possible complications (ie. internal valve dysfunction, inverted-V deformity) by increasing the internal nasal valve angle and the width of the middle third of the nose. However, the length and the thickness of the upper lateral cartilage usually fail to be an adequate volumetric expander, especially when the middle third of the nose is too narrow, or when pathology has extended to nasal bones. Also, because the disruption of bony structures is likely to occur after hump reduction,

the upper lateral cartilage spreader graft cannot efficiently support the bony nasal vault.

To date, both spreader grafts and spreader flaps have been used for nasal vault reconstruction in most patients. We believe that spreader grafts can be more useful for reconstructing the middle nasal vault compared to spreader flaps. But placing spreader grafts are not sufficient to support the nasal bony vault as well. Therefore, the length of the spreader graft should be enough to reach under the nasal bones from the anterior septal angle. In this study, we described a series of 38 patients in whom we utilized extended spreader grafts that extended underneath the bony vault to prevent bony collapse as well as middle vault collapse. The length of the spreader graft prepared from harvested septal cartilage cannot always be long enough to support both cartilage and bony vault. In order to achieve the needed length, we placed two pieces of cartilage graft back to back to obtain an extended spreader graft as described in this article.

Potential disadvantages to spreader grafts of this type include the need to harvest extensive amounts of septal cartilage, the need to extend the dissection proximally to allow placement of the spreader grafts (which could disrupt bony cartilaginous soft tissue attachments), potential widening and potential for palpable graft if suturing is not perfect. Because invasive surgeries like reduction septorhinoplasty usually affect both osseous and cartilaginous parts of the nose, we suggest that extended spreader grafts are more beneficial not only to reconstruct the middle third of the nose but also support the collapsed and/or disrupted nasal bony vault.

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