Kulak Burun Boğaz ve Baş Boyun Cerrahisi Dergisi
*Journal of Ear Nose Throat and Head Neck Surgery*

SURGICAL TECHNIQUE CERRAHİ TEKNİK

DOI: 10.24179/kbbbbc.2024-103492

# Stabilization of Costal Cartilage Graft to Nasal Spine in Revision Rhinoplasty: The Rhino-graft Technique

## Revizyon Rinoplastide Kostal Kıkırdak Greftinin Nazal Spine Stabilizasyonu: Rhino-greft Tekniği

Mazahir GULIYEV[a]

[a]Ministry of Health Azerbaijan State Advanced Training Institute for Doctors named after Aziz Aliyev, Department of Otolaryngology, Baku, Azerbaijan

**ABSTRACT** The costal cartilage is used in the augmentation of the over-resected dorsum, support of the alar cartilages, and a strong L-strut reconstruction in revision rhinoplasties. From 2017 onwards, the surgeon operated on 72 (54 females, 18 males) revision rhinoplasty cases involving the use of costal cartilage. A novel caudal septum stabilization method was applied to all patients. The fixed graft to the nasal spine was called "rhino-graft" because it resembles a rhinoceros horn in appearance and durability. The follow-up period was from 12 to 36 months. There was no functional complication during the follow-up period. An acceptable aesthetic appearance was achieved in all cases. During L-strut reconstruction, proper repositioning of the caudal septal cartilage graft to the nasal spine is crucial. The rhino-graft technique described in this article appears to be a powerful stabilization method.

**Keywords:** Costal cartilage; reoperation; rhinoplasty

**ÖZET** Revizyon rinoplastide kostal kıkırdak, aşırı rezeke edilen burun sırtının yükseltilmesinde, alar kıkırdakların desteklenmesinde ve güçlü bir L-strut yapılandırılmasında kullanılır. Cerrah, 2017 yılından itibaren kosta kıkırdağının kullanıldığı 72 (54 kadın, 18 erkek) revizyon rinoplasti vakasını ameliyat etti. Tüm hastalara yeni bir kaudal septum stabilizasyon yöntemi uygulandı. Nazal spine sabitlenen grefte, görünüm ve dayanıklılık açısından gergedan boynuzuna benzediği için "rhino-graft" adı verildi. Takip süresi 12-36 ay arasındaydı. Takip süresi boyunca fonksiyonel bir komplikasyon görülmedi. Tüm vakalarda kabul edilebilir bir estetik görünüm elde edildi. L-strut rekonstrüksiyonu sırasında kaudal septal kıkırdak greftinin nazal spine uygun şekilde yeniden konumlandırılması çok önemlidir. Bu makalede açıklanan "rhino-graft" tekniği güçlü bir stabilizasyon yöntemi olarak görünmektedir.

**Anahtar Kelimeler:** Kosta kıkırdağı; cerrahi düzeltme; rinoplasti

In recent decades, rhinoplasty has emerged as the most frequently performed facial plastic surgery, attributed to the growing number of experienced surgeons and heightened awareness of personal appearance. The primary objective of rhinoplasty is the reduction of nasal volume, involving the removal of excess nasal bones, upper lateral cartilages, and septum. However, resections undertaken to achieve an aesthetically pleasing nasal appearance may, in certain instances, compromise bone and cartilaginous support.[1] Consequently, nasal dorsum collapse and L-strut support failure may preclude the attainment of desired dorsal aesthetic lines, potentially leading to breathing difficulties.[2] In such situations, revision surgery becomes imperative.

The nasal septal cartilage stands as a valuable graft source in septorhinoplasty procedures, while auricular cartilage may be considered in specific cases.[3] However, limitations are such as the restricted quantity, elasticity, and curved shape of auricular cartilage. The acquisition of costal cartilage becomes necessary in cases where prior surgeries have exten-

**TO CITE THIS ARTICLE:**
Guliyev M. Stabilization of Costal Cartilage Graft to Nasal Spine in Revision Rhinoplasty: The Rhino-graft Technique. Journal of Ear Nose Throat and Head Neck Surgery. 2024;32(3):134-8.

**Correspondence:** Mazahir GULIYEV
Ministry of Health Azerbaijan State Advanced Training Institute for Doctors named after Aziz Aliyev, Department of Otolaryngology, Baku, Azerbaijan
**E-mail:** dr.mezahirq@gmail.com

Peer review under responsibility of Journal of Ear Nose Throat and Head Neck Surgery.

***Received:*** 16 Apr 2024 ***Accepted:*** 25 Apr 2024 ***Available online:*** 09 May 2024

sively removed septal cartilage, impairing the L-strut support. Harvested costal cartilage proves useful for augmenting over-resected dorsum, supporting alar cartilages, and facilitating a stable L-strut reconstruction.

During L-strut reconstruction, proper repositioning of caudal septal cartilages to the nasal spine is crucial. In this article, a novel technique for stabilizing the caudal portion of the new L-strut to the nasal spine is elucidated.

## SURGICAL TECHNIQUE

Medical records of patients who underwent revision septorhinoplasty surgeries between January 2017 and January 2023 were retrospectively analyzed. From 2017 onwards, the surgeon operated on 72 revision cases (54 females, 18 males) involving the use of costal cartilage. A novel caudal septum stabilization method was applied to all patients and the follow-up period ranged from 12 to 36 months. The study adhered to the principles outlined in the Declaration of Helsinki, and written informed consent was obtained from all patients.

All surgeries were performed under general anesthesia. Following an appropriate skin incision and dissection through the muscle layer, cartilage was harvested from the seventh rib as described in the literature previously.[2] Grafts were prepared using the oblique split technique proposed by Tastan and Sozen.[4] One part of the sliced cartilage was shaped to form the caudal portion of the L-strut. The inferior border of the graft was thinned with a scalpel. A 3 mm notch was created in the inferior margin of the costal cartilage graft, and two holes were drilled into the inferior portion of the cartilage.

The open rhinoplasty approach was consistently utilized in all revision rhinoplasty cases. The skin flap was elevated, the medial crura of the lower lateral cartilages were dissected, and the upper lateral cartilages were separated from the septum. The remaining nasal septum was exposed, and the keystone point was secured whenever possible. A narrow V-shaped slot was created in the nasal spine using a piezosurgery device or straight nasal saw, with dimensions of 10 mm in the anterior-posterior dimension and 5 mm in depth, and holes were drilled on each side of the slot using a piezosurgery device or a 21-gauge needle (Figure 1A).

A 4/0 polydioxanone suture was passed through the hole on the right side of the spine, and a knot was tied (Figure 1B). The free end of the suture was left approximately 7 cm long. The suture needle was then passed from the cartilage graft, and the left-sided hole in the nasal spine (Figure 1C). Subsequently, the suture passed back through the cartilage graft and the hole on the right side (Figure 1D). The graft was positioned within the opened slot, and the suture was tied once more (Figure 1E). At this stage, the graft with its shaved inferior border fits exactly into the V-shaped slot in the nasal spine. The notch along the inferior margin of the cartilage was placed on the V-shaped slot to enhance graft stabilization (Figure 1F). This fixed graft was termed "rhino-graft" due to its resemblance to a rhinoceros horn in both appearance and durability (Figure 2). The dorsal portion of the new L-strut was sutured to the superior portion of the "rhino-graft."

Throughout the follow-up period, there were no functional complications, including luxation of the new caudal septum. A satisfactory aesthetic appearance was achieved in all cases (Figure 3).

## DISCUSSION

In revision septorhinoplasty procedures, L-strut reconstruction using grafts is often necessary, particularly in cases where patients have undergone previous rhinoplasty and lack sufficient nasal septum support. In such instances, costal cartilage becomes a crucial source for grafts. Fixation of the new caudal septum is an essential aspect of the surgery as harvesting of the costal cartilage. This article introduces a novel technique for preparing and stabilizing a new caudal septal graft to the nasal spine.

A stable, strong, and straight septum is crucial for the success of rhinoplasty surgeries. Apaydin highlighted the challenges associated with the caudal segment of the nasal septum, responsible for carrying the nasal type and supporting the internal nasal valve.[5] In primary rhinoplasties, simple or mattress sutures can be used to fix the inferior border of the caudal septum to the nasal spine.[5-7] If the nasal spine has a peak, creating a groove before suturing may aid in stabilizing

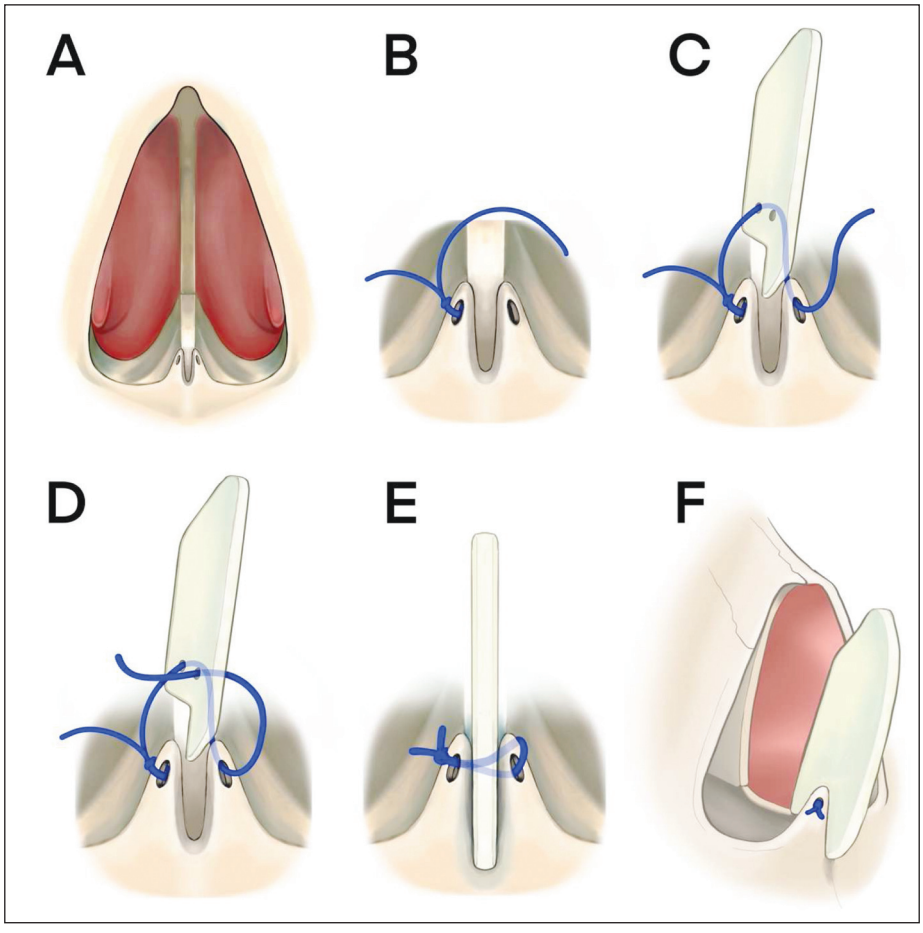


**FIGURE 1:** A narrow V-shaped slot is created in the nasal spine holes were drilled on each side of the slot **(A)**. A 4/0 Polydioxanone suture is passed through the hole on the right side of the spine, and a knot is tied **(B)**. The suture needle is passed from the cartilage graft, and the left-sided hole in the nasal spine **(C)**. The suture is passed back through the cartilage graft and the hole on the right side **(D)**. The graft is positioned within the opened slot, and the suture is tied once more **(E)**. The notch along the inferior margin of the cartilage is placed on the slot to prevent migration **(F)**.

**FIGURE 2:** The graft fixed to the nasal spine is termed "rhino-graft" due to its resemblance to a rhinoceros horn.

the caudal septum.[5] However, in revision rhinoplasty with L-strut reconstruction, more is required for strong stabilization of the caudal septum in the midline.

Surowitz et al. proposed a technique involving the use of straight osteotomes to split the nasal spine to a depth of 2 to 3 mm, allowing placement of the caudal septal graft (referred to as the anterior septal reconstruction graft) into the created groove.[8] The author asserted that additional sutures were unnecessary to stabilize the caudal portion of the L-strut. Toriumi addressed cases necessitating subtotal septal reconstruction due to severe deformities. In this technique, a notch is made in the nasal spine using an osteotome, and another notch is created through the inferior margin of the cartilage graft.[9] Sutures are placed anteriorly and posteriorly in the soft tissues around the nasal spine to secure the cartilage graft. If soft tissue is insufficient, a hole is drilled in the base of the nasal spine. This described technique bears similarities to the rhino-graft technique outlined in the present arti-

**FIGURE 3:** Preoperative and postoperative views of a patient who underwent revision rhinoplasty with rhino-graft technique.

cle. However, the rhino-graft technique exhibits certain advantages in stabilizing the prepared graft on the nasal spine, including the creation of a deep V-shaped slot in the nasal spine and the drilling of holes on each side of the slot. The rhino-graft with its shaped inferior border fits exactly into the V-shaped slot in the nasal spine. Consequently, the placed sutures provide a more secure stabilization of the graft. As noted by Toriumi, making a notch in the inferior margin of the cartilage prevents the cephalic migration of the graft.[9]

In conclusion, the reconstruction of the stable and strong caudal septum is a pivotal step in revision rhinoplasty with L-strut reconstruction. The rhino-graft technique, as described in this article, emerges as a potent stabilization method.

***Source of Finance***

*During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.*

***Conflict of Interest***

*No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.*

***Authorship Contributions***

*This study is entirely author's own work and no other author contribution.*

## REFERENCES


1. Park SS. Fundamental principles in aesthetic rhinoplasty. Clin Exp Otorhinolaryngol. 2011;4(2):55-66. [Crossref] [PubMed] [PMC]
2. Fedok FG. Costal cartilage grafts in rhinoplasty. Clin Plast Surg. 2016;43(1):201-12. [Crossref] [PubMed]
3. Dermody SM, Lindsay RW, Justicz N. Considerations for optimal grafting in rhinoplasty. Facial Plast Surg. 2023;39(6):625-9. [Crossref] [PubMed]
4. Tastan E, Sozen T. Oblique split technique in septal reconstruction. Facial Plast Surg. 2013;29(6):487-91. [Crossref] [PubMed]
5. Apaydin F. Septal surgery challenges in rhinoplasty. Facial Plast Surg. 2016;32(4):351-60. [Crossref] [PubMed]
6. Kunanandam T, Sheikh S, Hilmi OJ. Columella stabilising suture. Clin Otolaryngol. 2007;32(4):291-3. [Crossref] [PubMed]
7. Dikici O, Bayar Muluk N. mattress suture technique for caudal septum dislocations in open and endonasal septoplasty: which approach is better? J Craniofac Surg. 2019;30(8):2512-6. [Crossref] [PubMed]
8. Surowitz J, Lee MK, Most SP. Anterior septal reconstruction for treatment of severe caudal septal deviation: clinical severity and outcomes. Otolaryngol Head Neck Surg. 2015;153(1):27-33. [Crossref] [PubMed]
9. Toriumi DM. Subtotal septal reconstruction: an update. Facial Plast Surg. 2013;29(6):492-501. [Crossref] [PubMed]