



A New Technique for Use Instead of Lateral Crural Overlay for Reduction of Nasal Tip Projection in Revision Rhinoplasty

Original Investigation

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Abstract

Objective: Correction of nasal tip projection (NTP) deformities involve techniques for the lower lateral cartilage of the nose. Previously, it would have been surgically difficult to perform the lateral crural overlay (LCO) technique for the second time in revision rhinoplasty in patients who already had undergone rhinoplasty with the LCO technique because of the length of the NTP. In this study, we evaluated the lateral crural segmental excision (LCSE) technique in patients with overprojected nasal tip in revision rhinoplasty.

Methods: We retrospectively studied the cases of 19 patients who had initially undergone rhinoplasty with the LCO technique for overprojected nasal tip, and later underwent revision rhinoplasty with the LCSE technique after insufficient NTP was observed on facial analysis between 2018 and 2022.

Results: Of the patients, 12 (63%) were male, with an average age of 29.6 years, and 7 (17%) patients were female, with an average age of 25.3 years. Using Goode's formula, NTP indexes of patients measured 79.4 ± 1.8 preoperatively and 56.0 ± 1.3 postoperatively. Statically significant difference was observed between preoperative and postoperative values. None of the patients had malnutrition at the incision margins, and all patients recovered on time and without any problems. Granulation tissue was detected in the mucosa in only one patient.

Conclusion: The LCSE technique, with a short surgical time, recovery period without complications, and satisfactory nasal respiratory function, is preferred over a second LCO application in cases of NTP.

Keywords: Rhinoplasty, surgical revision, nasal tip, lower lateral cartilage

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Introduction

Evaluation and resolution of nasal tip (NT) length, projection, and rotation have an important role in rhinoplasty operations (1). Detailed facial analysis should be performed in the preoperative period. In the recent years, most rhinoplasty operations have been performed to correct NT disorders. NT projection (NTP) is the

distance from the NT to the vertical facial plane in a posterior-anterior direction, and an essential criterion in the aesthetic appearance of the face. Corrections of NTP deformities constitute an important part of rhinoplasty operations (2). However, given the increasing number of rhinoplasties in recent years, revision rhinoplasties (RRs) have also increased as a result of unsatisfactory results from

primary rhinoplasties. To achieve excellent results in NTP surgery, the surgeon should have comprehensive knowledge of the anatomical structures that make up the NT [i.e., the septal angle, the caudal septum, the medial crus (MC) and the lateral crus (LC) of the lower lateral cartilage, the nasal dome, and the nasal spine] and the surgical techniques (3-5).

In this study, we evaluated 19 patients who had previously undergone an operation with the lateral crural overlay (LCO) technique to correct an overprojected NT, but still complained of NT overprojection which was treated with the lateral crural segmental excision (LCSE) technique in RR.

Methods

This study was done retrospectively on 19 patients who underwent RR in the Otorhinolaryngology Department of the Yeni Yüzyıl University Faculty of Medicine between January 2018 and April 2022. Approval for the study was obtained from the İstanbul Yeni Yüzyıl University's Ethics Committee for Non-Invasive Health Sciences Research (no: 2022/07-881, date: 04.07.2022). Also consent was obtained from the patients participating in the study.

All patients had previously undergone external rhinoplasty with the LCO technique to correct NT overprojection but required RR due to unsatisfactory results. Oedema that occurs after primary rhinoplasty can persist in the NT area; therefore, RR should be delayed for at least one year (6). In our patient group, this delay was 14 months on the average. Patients were followed-up for at least seven months after RR.

LCSE Surgical Technique

A columellar flap was created with the standard open rhinoplasty technique using an intercartilaginous transcolumellar reverse-V incision under general anaesthesia. Dissection was performed in the subperichondrial and subperiosteal planes up to the frontonasal junction. After revealing the bilateral LC, a 5-mm long cartilage segment from the NT to approximately 10 mm cranially was removed vertically together with the nasal vestibular mucosa (Figure 1). Cartilage ends were sutured with 5/0 round needle Trofilen (Doğsan, İstanbul, Turkey) and the nasal mucosa was sutured with 5/0 round needle egesorb Pegesorb (Doğsan, İstanbul, Turkey) (Figure 2). A new NT was created by removing the hemidomal and transdomal sutures

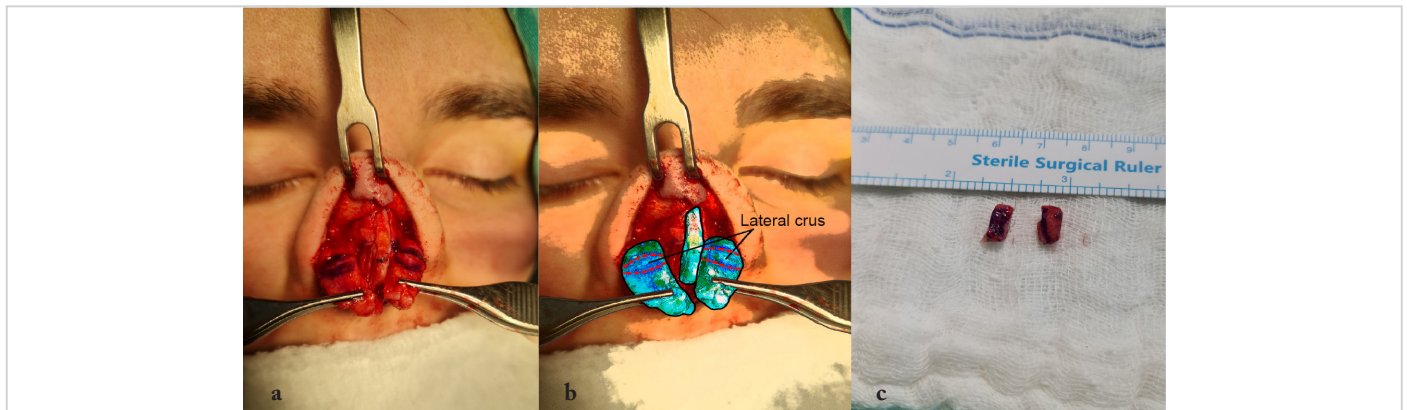


Figure 1. (a, b) Marking the segment to be resected from the LC, (c) Cartilage and mucosa segment resected from the LC
LC: Lateral crus

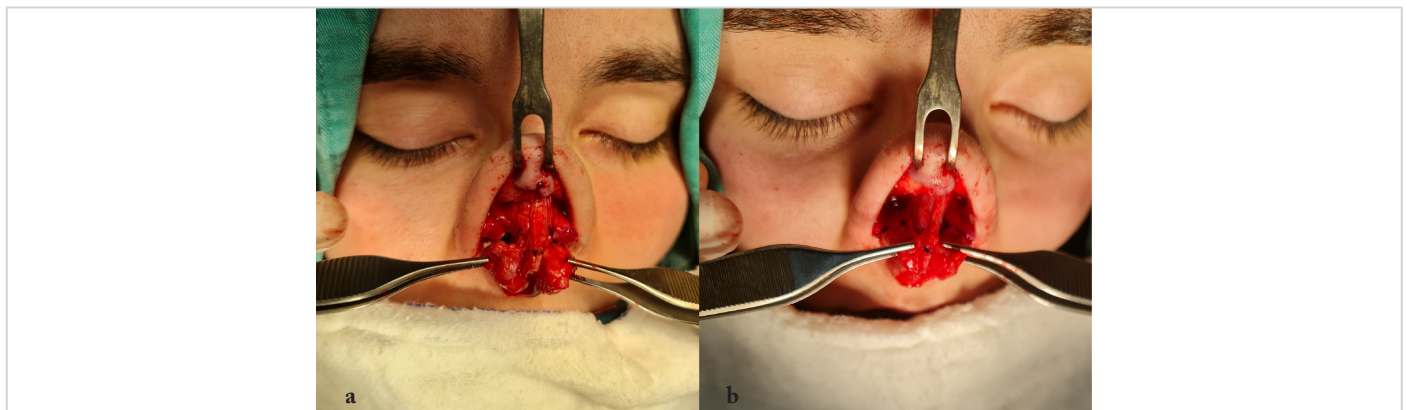


Figure 2. (a) LC with segmental resection, (b) Sutured LC
LC: Lateral crus

and sutured to the septum using the septal extension graft technique. The operation was completed by replacing the nasal flap and suturing it with 5/0 round needle pegesorb Pegesorb (Doğsan, İstanbul, Turkey) (Figure 3). The dorsum and the tip of the nose were carefully taped. A metal splint was placed on the dorsum for eight days. A mixture of epithelial and antibiotic cream (dexpanthenol/chlorhexidine hydrochloride and nitrofurazone) was applied to the nasal vestibule for 15 days.

NTP was assessed with Goode's formula by taking preoperative and postoperative facial photographs from a standard distance in the lateral planes (7). The nasal projection (TY) [distance between NT (T) and alar-facial junction (Y)] was approximately 55–60% of the nasal length [distance between nasion (N) and alar-facial junction (Y)] (Figure 4).



Figure 3. Postoperative internal LC mucosal appearance
LC: Lateral crus

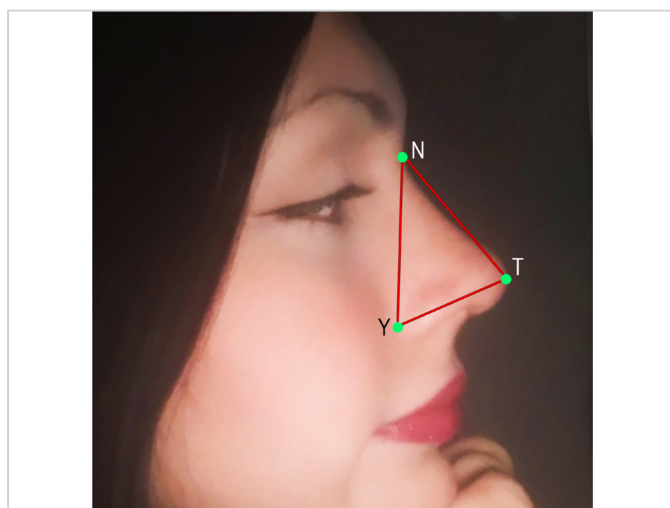


Figure 4. Facial analysis of nasal projection [Nasal tip (T), alar-facial junction (Y) and nasion (N) (YT/NTx100 ~ 55–60%)]

Statistical Analysis

Statistical analyses were done with SPSS v15.0 to compare measurements and repeated measurements. The Bonferroni method was used as a post hoc test in advanced paired comparisons. The Kolmogorov–Smirnov test was used to evaluate compliance with normal distribution. For statistical analyses, results were considered significant at $p < 0.05$.

Results

Nineteen patients with overprojected NT underwent open rhinoplasty using nasal septal caudal excision and the LCO technique; however, their results were found unsatisfactory on facial analysis done with Goode's formula. Of these patients, 12 (63%) were male, with an average age of 29.6 years, and 7 (17%) were female, with an average age of 25.3 years. LCSE was performed on all patients in RR.

A costal cartilage graft was used in five patients because of insufficient nasal septum cartilage reserve, and low NT and nasal dorsal hump were observed in four patients.

Significant difference was observed between the preoperative and postoperative nasal projection values ($p < 0.001$). Significant difference was observed between the measurements in all advanced paired comparisons ($p < 0.001$).

Preoperative and postoperative projection indexes of the patients were 79.4 ± 1.8 and 56.0 ± 1.3 , respectively. There was significant difference between preoperative and postoperative values ($p < 0.001$) (Table 1, Figure 5).

Table 1. Statistical analyses of projection index

	Pre-operative	Post-operative	p-value
Projection index	79.4 ± 1.8	56.0 ± 1.3	< 0.001



Figure 5. (a) Preoperative NTP appearance, (b) Postoperative NTP appearance

On the average, RR was performed 14 months after the primary procedure. Patients were followed-up for at least seven months after the operation and none of the patients had non-healing tissue at the incision margins, and all patients recovered promptly and without complications. Granulation was observed in the mucosa in only one patient.

Discussion

A successful rhinoplasty depends on adequate control of the overprojected NT and its supporting elements that control it. The elements that directly affect NTP are the caudal nasal septum, the LC, the MC, the nasal dome, and the nasal spine (8). In the tripod concept recently introduced by Anderson (9), the tripod structure-with one leg formed by the MCs in the middle and two legs formed by the LCs on the sides-provides nasal projection and rotation. LC and MC lengths play important roles in the overprojection of the NT. Therefore, surgical techniques for NTP reduction were designed for tripod elements (2, 10). However, there are many alternative methods for reducing NTP that are generally divided into two main groups. One of them is shortening the long lateral crura including the LCO (11), lateral crural steal (12), vertical dome division (13) and dome truncation (13) techniques. The other one is shortening the long medial crura including the septocolumellar or tongue-in-groove sutures (14), medial crural steal (15), footplate resection (2), Lipsett (2), medial crural overlay (16), vertical dome division (17), and the dome truncation (18) techniques.

The techniques that are described for NT overprojection in the literature generally are procedures for shortening the length/s of the LC and/or the MC. This technique is especially suitable for use in cases related to the LC length of the nasal over-projection.

In the LCO technique, the lateral crura are elevated from the mucosa and typically divided vertically at 10 mm lateral to the dome. Then, the medial segment is placed over the lateral segment and sutured. Although this technique is effective in shortening the length of the LC, it is difficult to achieve bilateral symmetry. As a result of the overlapping of the cartilage segments, this technique causes mucosal swelling at the nasal vestibule entrance and narrows nasal air entry (Figure 6) (11). Reduction of the nasal air passage occurs because the external nasal valve at the level of the nasal rim and the internal nasal valve at the junction of the septum upper lateral cartilage are affected. There is a risk that patients will develop nasal congestion in the postoperative period as the use of the LCO technique in the same patient group for a second time will decrease the size of the nasal vestibule, increase nasal vestibular swelling, and further decrease nasal airflow (18). However, because nasal vestibular swelling does not occur in the LCSE technique, the decrease in nasal airflow is limited.

Although the approach to NTP is difficult in primary rhinoplasty, elevation of the LC from the nasal mucosa is difficult or even impossible in RR due to fibrotic scar tissue, tissue healing complications, deterioration of anatomical structures, and synechia. Because the cartilage and the mucosa are not elevated in LCSE, fibrotic scar tissue does not represent a problem in the application of the technique (19). Moreover, the ease of the procedure allows for shorter surgery time compared to LCO.

In the LCSE technique, segmental resection was performed between the external nasal artery and the lateral nasal artery branches to preserve the nasal arterial blood supply. Therefore, deterioration of tissue vascularization was not observed in any of the patients in the postoperative period (Figures 3, 7).

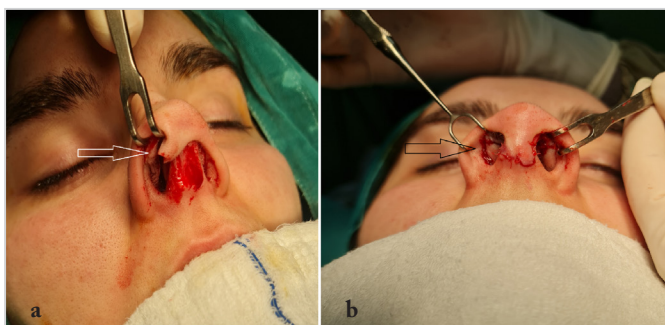


Figure 6. (a) LC cartilage mucosal swelling in preoperative LCO technique, (b) LC mucosal appearance in the postoperative LCSE technique

LC: Lateral crus, LCO: Lateral crural overlay, LCSE: Lateral crural segmental excision

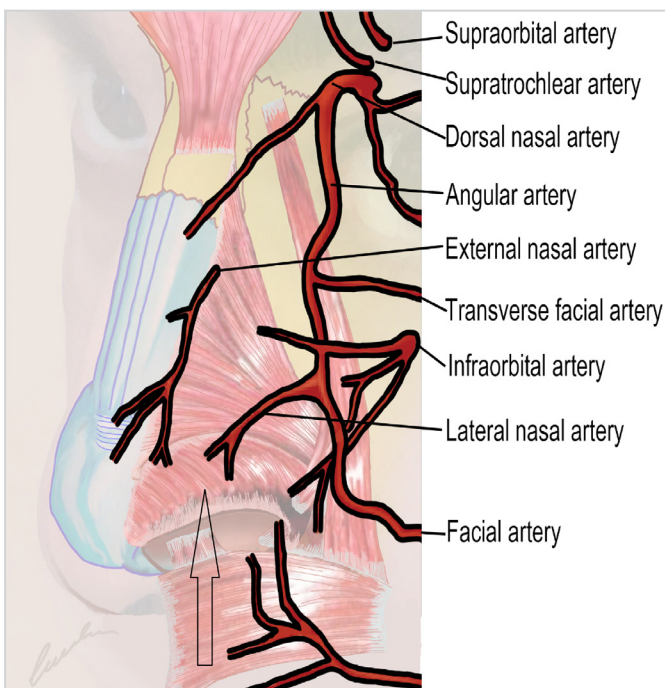


Figure 7. Nasal arterial nutrition: arrow (LC excision area)
LC: Lateral crus

Considering the possibility that our technique could weaken the resistance of the lateral crura and cause nasal alar collapse, the tension of the LCs was increased by fixing the NT to the septum using the septal extension graft technique. Our aim was to increase the stability of the tripod elements. Nasal collapse was not seen in any of the patients during the seven-month postoperative follow-up (20, 21). Granulation tissue was seen in the nasal vestibule mucosa only in one patient.

Considering that LCSE and end-to-end suturing may cause weakness and collapse in the alar region, a lateral crural strut graft can be applied. However, we did not apply an alar support graft in any of our cases. Alar collapse, asymmetry, or deformity in the nostrils was not detected in any of the patients during the postoperative follow-up. Nevertheless, the technique should be studied in larger cohorts with longer follow-up times for more rigorous evaluation.

Conclusion

Ideal NTP was achieved with the LCSE technique in patients with overprojected NT, after facial analysis showed unsatisfactory results with primary open rhinoplasty using the LCO technique. The LCSE technique offers the benefits of short surgical time, uncomplicated recovery period, and satisfactory nasal respiratory function.

Ethics Committee Approval: Approval for the study was obtained from the İstanbul Yeni Yüzyıl University's Ethics Committee for Non-Invasive Health Sciences Research (no: 2022/07-881, date: 04.07.2022).

Informed Consent: Consent was obtained from the patients participating in the study.

Peer-review: Externally and internally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: A.S.R., F.Ö., Concept: A.S.R., F.Ö., Design: A.S.R., Data Collection and/or Processing: A.S.R., Analysis and/or Interpretation: A.S.R., Literature Search: A.S.R., Writing: A.S.R.

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Main Points

- Nasal tip projection (NTP) is an important aspect of facial esthetics. The creation of proportional NTP basically involves techniques for the lower lateral cartilage of the nose.
- The most important of these is the lateral crural overlay (LCO) technique. In patients who already have had an LCO procedure, however, it is difficult to apply this technique in revision rhinoplasty (RR) because of synechia and fibrosis in the surgical area.
- For this reason, the lateral crural segmental excision (LCSE) technique was developed.
- The main advantages of the LCSE technique are that it is easy to apply in RR, shortens operation time, and provides satisfactory surgical results.

References

1. Patrocínio LG, Patrocínio TG, Maniglia JV, Patrocínio JA. Graduated approach to refinement of the nasal lobule. *Arch Facial Plast Surg* 2009; 11: 221-9. [Crossref]
2. Apaydin F. Projection and deprojection techniques in rhinoplasty. *Clin Plast Surg* 2016 ;43: 151-68. [Crossref]
3. Lee LN, Quatela O, Bhattacharyya N. The epidemiology of autologous tissue grafting in primary and revision rhinoplasty. *Laryngoscope* 2019; 129: 1549-53. [Crossref]
4. GOLDMAN IB. Surgical tips on the nasal tip. *Eye Ear Nose Throat Mon* 1954; 33: 583-6. [Crossref]
5. McCollough EG, Mangat D. Systematic approach to correction of the nasal tip in rhinoplasty. *Arch Otolaryngol* 1981; 107: 12-6. [Crossref]
6. Kridel RW, Undavia SS. Deprojection of the nasal tip in revision rhinoplasty. *Facial Plast Surg* 2012; 28: 440-6. [Crossref]
7. Goode RL. A method of tip projection measurement. Powell N, Humphreys B, editors. *Proportions of the aesthetic face*. New York: Thieme-Stratton; 1984. p. 15-39. [Crossref]
8. Rich JS, Friedman WH, Pearlman SJ. The effects of lower lateral cartilage excision on nasal tip projection. *Arch Otolaryngol Head Neck Surg* 1991; 117: 56-9. [Crossref]
9. Anderson JR. The dynamics of rhinoplasty. In: Bustamant GA, editor. *Proceedings of the Ninth International Congress of Otorhinolaryngology*. Mexico City. Amsterdam: Excerpta Medica; 1970. [Crossref]
10. Rohrich RJ, Raniere J Jr, Ha RY. The alar contour graft: correction and prevention of alar rim deformities in rhinoplasty. *Plast Reconstr Surg* 2002; 109: 2495-505. [Crossref]
11. Kridel RW, Konior RJ. Controlled nasal tip rotation via the lateral crural overlay technique. *Arch Otolaryngol Head Neck Surg* 1991; 117: 411-5. [Crossref]

12. Kridel RW, Konior RJ, Shumrick KA, Wright WK. Advances in nasal tip surgery. The lateral crural steal. Arch Otolaryngol Head Neck Surg 1989; 115: 1206-12. [Crossref]
13. Kridel RW, Konior RJ. Dome truncation for management of the overprojected nasal tip. Ann Plast Surg 1990; 24: 385-96. [Crossref]
14. Porter JP, Toriumi DM. Surgical techniques for management of the crooked nose. Aesthetic Plast Surg 2002; 26: S18. [Crossref]
15. Pedroza F. A 20-year review of the “new domes” technique for refining the drooping nasal tip. Arch Facial Plast Surg 2002; 4: 157-63. [Crossref]
16. Soliemanzadeh P, Kridel RW. Nasal tip overprojection: algorithm of surgical deprojection techniques and introduction of medial crural overlay. Arch Facial Plast Surg 2005; 7: 374-80. [Crossref]
17. GOLDMAN IB. The importance of the mesial crura in nasal-tip reconstruction. AMA Arch Otolaryngol 1957; 65: 143-7. [Crossref]
18. Bottini DJ, Gentile P, Arpino A, Dasero G, Cervelli V. Reconstruction of the nasal valve. J Craniofac Surg 2007; 18: 516-9. [Crossref]
19. Burgess LP, Everton DM, Quilligan JJ, Charles G, Lepore ML, Van Sant TE Jr, et al. Complications of the external (combination) rhinoplasty approach. Arch Otolaryngol Head Neck Surg 1986; 112: 1064-8. [Crossref]
20. Alkarzae M, Bafaqeeh SA. Turn-in flap: 10 years' experience of a single institution in Saudi Arabia. Cureus 2020; 12: e6593. [Crossref]
21. Khetpal S, Gowda AU, Parsaei Y, Mozaffari MA, Dinis J, Lopez J, et al. Rhinoplasty in the older adult. Aesthet Surg J 2021; 41: 1231-41. [Crossref]