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The Stabilization of Lower Lateral Cartilage in Rhinoplasty: A New Control Suture Technique

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1. Abstract

Objective: Reposition of malpositioned lateral crura to normal position in rhinoplasty is important both functionally and aesthetically. The aim of this study is to describe a lateral cruras reposition suture technique for supplying tip symmetry and avoiding crural displacement.

Patient and Methods: Sixteen primary rhinoplasty cases with malpositioned lateral crura underwent lateral crural control suture (LCCS) were reported. In this technique dissected and released lateral crura were fixed to cheek skin with a suture. Those cases were assessed with FACE-Q rhinology module both aesthetically and functionally.

Results: Intraoperative or postoperative lateral crural displacement can be prevented and nasal tip symmetry can be supplied easily with LCCS. Results were satisfactory both functionally and aesthetically.

Conclusion: LCCS is a good alternative to correct lateral crural malposition and obtain a tip symmetry.

2. Keywords: Alar cartilage; Rhinoplasty; Cruroplasty; Alar malposition; Alar collapse; Inferior crura

3. Introduction

The lateral crus play a significant role in aesthetic appearance and breathing function of the nose. Lateral crural insufficiencies can be congenital, developmental or iatrogenic [1-7]. In addition, con-genital crural agenesis or partial absence can be seen [8,9]. Reposition of malpositioned lateral crura to normal position in rhinoplasty is important both functionally and aesthetically [1-7,10-18].

There are various surgical techniques to correct alar cartilage malposition in rhinoplasty. These techniques on lateral targets to treat both functional and aesthetic deformities. Lateral crural strut grafts [10], lower lateral crural turnover flap [13], crural reverse plasty [16], alar batten grafts [18] and alar contour grafts [19] have been used to obtain an aesthetic tip complex and alar contour. The lateral crural strut developed by Gunter and Friedman uses a cartilage graft sutured to the under surface of the cephalic end of the existing lateral crus. It is the most widely used and successful procedure in correction of alar retraction [10].

In this study, a lateral cru repositions suture technique to supply tip symmetry and avoid displacement of crura is presented.

4. Methods

Patients

Sixteen (7 male and 9 female) cases underwent lateral crural correction suture (LCCS) during rhino-plasty were reported. The mean patient age was 29 years

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(range, 19 to 53 years). The most frequent complaint of cases were nasal obstruction and aesthetic deformity.

All the operations were per-formed between January 2018 and May 2019 by the author. All cases were having lateral crural deformities needing release and reposition.

Seven cases had cephalic crural malposition causing alar retraction (3 mm - 7 mm, mean 4.57 mm) and 9 cases were having inverted lateral crura causing nasal valve obstruction.

Mean follow-up time was 15 months (range 12 to 20 months). Preoperative and postoperative functional and aesthetical status of patients were assessed by FACE-Q rhinoplasty module consisted of two questionnaires; Satisfaction with nose questionnaire ranging from 1 (very dissatisfied) to 4 (very satisfied) and adverse effect questionnaire ranging from 1 (not at all) to 4 (extremely) (Table 1 and 2). All cases were asked to fill in the surveys preoperative and postoperatively (was done before the operation and at the 6th postoperative month). Survey scores were analysed with.

Operation technique

All cases were operated under general anesthesia with open technique. Lateral crural corrections were done after routine open technique rhinoplasty procedures (osteoplasty in 11 cases, spreader graft in 13 cases, etc.) and before tipplasty. After sharp dissection and release of lateral crura, crural strut graft harvested from septal cartilage were used in all cases.

Pyriform aperture was exposed after blunt dissection bilaterally and a 4/0 rapid vicryl suture stitched to tip of crus and the needle was forwarded to lateral cantus and passed through the skin at the point of pyriform aperture. The free end of the suture was attached to the cheek skin with a steri-strip (SS; 3M, St Paul, Minnnesota, USA) (Figure 1-7). After tipplasty procedures (alar cephalic resection in 11 cases, columellar strut graft in 14 cases, dome bending suture in 7 cases, dome binding suture in 16 cases, cap graft in 12 cases, septomaxillary suture in 6 cases and crashed cartilage onlay tip graft in 12 cases, alar base plasty in 5 cases) were done. All cases were controlled after septorhinoplasty surgery one week later. At this time external splints, nasal packs, LCCS and columellar sutures were removed.

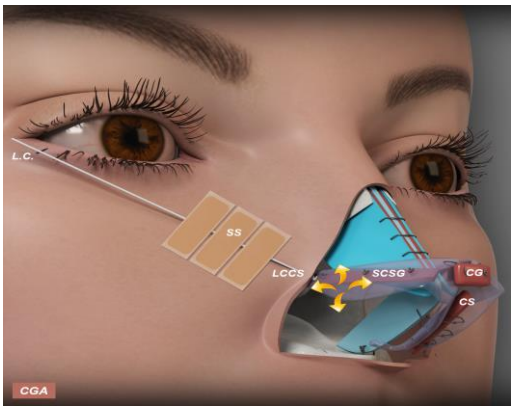

Figure 1: Graphic drawing of LCCS.

Figure 2: Preoperative nasal base view.

Figure 3: Dissected alar cartilages.

Figure 4: Crural strut graft frontal view.

Figure 5: Crural strut graft side view.

Figure 6: LCCS.

Figure 7: Postoperative nasal base view.

Statistical analysis

SPSS 15.0 for Windows program was used for statistical analysis. Descriptive statistics is given as number and percentage for categorical variables. Comparisons of numerical variables those differences did not meet the normal distribution condition in dependent groups were compared with Paired t Test and the ordinal variables and numerical variables that did not meet the normal distribution condition with Wilcoxon Test. Statistical alpha significance level was accepted as $p < 0.05$.

5. Results

Number of cases coded 1 and 2 were decreased where number of cases coded 3 and 4 increased postoperatively (Table 1 and 2).

Table 1: FACE-Q Rhinoplasty Module Satisfaction with Nose (number of cases).

To What Degree Are You Satisfied With	Very Dissatisfied (1) n (%)		Somewhat Dissatisfied (2) n (%)		Somewhat Satisfied (3) n (%)		Very Satisfied (4) n (%)	
	Preoperatively	Postoperatively	Preoperatively	Postoperatively	Preoperatively	Postoperatively	Preoperatively	Postoperatively
The overall size of your nose?	5 (31.2)	0 (0.0)	9 (56.2)	2 (12.5)	2 (12.5)	9 (56.2)	0 (0.0)	5 (31.2)
How straight your nose looked?	1 (6.2)	0 (0.0)	3 (18.7)	0 (0.0)	6 (37.5)	5 (31.2)	6 (37.5)	11 (68.7)
How well your nose suited your face?	6 (37.5)	0 (0.0)	10 (62.5)	0 (0.0)	0 (0.0)	8 (50.0)	0 (0.0)	8 (50.0)
The length of your nose?	0 (0.0)	0 (0.0)	5 (31.2)	1 (6.2)	8 (50.0)	8 (50.0)	3 (18.7)	8 (50.0)

The width of your nose at the bottom (from nostril to nostril)?	2 (12.5)	0 (0.0)	5 (31.2)	1 (6.2)	8 (50.0)	9 (56.2)	1 (6.2)	6 (37.5)
How the bridge of your nose looked (where glasses sit)?	1 (6.2)	0 (0.0)	7 (43.7)	0 (0.0)	6 (37.5)	4 (25.0)	2 (12.5)	12 (75.0)
How the tip of your nose looked?	5 (31.2)	0 (0.0)	9 (56.2)	1 (6.2)	2 (12.5)	6 (37.5)	0 (0.0)	9 (56.2)
The shape of your nose in profile (side view)?	3 (18.7)	0 (0.0)	9 (56.2)	0 (0.0)	4 (25.0)	8 (50.0)	0 (0.0)	8 (50.0)
How your nose looked in photos?	5 (31.2)	0 (0.0)	10 (62.5)	0 (0.0)	1 (6.2)	9 (56.2)	0 (0.0)	7 (43.7)
How your nose looked from every angle?	6 (37.5)	0 (0.0)	8 (50.0)	1 (6.2)	2 (12.5)	9 (56.2)	0 (0.0)	6 (37.5)

Table 2: FACE-Q Rhinoplasty Module Adverse Effects on the Nose (number of cases).

How much have you been bothered	**Not at All (1) n (%)**		**A Little (2) n (%)**		**Moderately (3) n (%)**		**Extremely (4) n (%)**	
	Preoperatively	**Postoperatively**	**Preoperatively**	**Postoperatively**	**Preoperatively**	**Postoperatively**	**Preoperatively**	**Postoperatively**
Difficulty breathing through your nose?	6 (37.5)	0 (0.0)	5 (31.2)	0 (0.0)	5 (31.2)	4 (25.0)	0 (0.0)	12 (75.0)
Tenderness (e.g. when wearing sunglasses)?	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	3 (18.7)	3 (18.7)	13 (81.2)	13 (81.2)
The skin of your nose looking thick or swollen?	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	2 (12.5)	1 (6.2)	14 (87.5)	15 (93.7)
Unnatural appearing bumps or hollows on your nose?	0 (0.0)	0 (0.0)	3 (18.7)	0 (0.0)	8 (50.0)	4 (25.0)	5 (31.2)	12 (75.0)

Preoperative and postoperative score changes are given in the Table 3 for every single question. Increase in scores were statistically significant ($p<0,05$) accept tenderness ($p=1.00$) and thick swollen nose skin ($p=0.317$).

Table 3: Preoperative and postoperative score changes.

	FACE-Q Scores			
	Decrease n (%)	**Constant n (%)**	**Increase n (%)**	**p**
The overall size of your nose?	0 (0.0)	2 (12.5)	14 (87.5)	0.001
How straight your nose looked?	1 (6.3)	6 (37.5)	9 (56.3)	0.013
How well your nose suited your face?	0 (0.0)	0 (0.0)	16 (100)	<0.001
The length of your nose?	0 (0.0)	7 (43.8)	9 (56.3)	0.004

The width of your nose at the bottom	0 (0.0)	6 (37.5)	10 (62.5)	0.004
How the bridge of your nose looked	0 (0.0)	4 (25.0)	12 (75.0)	0.002
How the tip of your nose looked?	0 (0.0)	1 (6.3)	15 (93.8)	<0.001
The shape of your nose in profile (side view)?	0 (0.0)	2 (12.5)	14 (87.5)	0.001
How your nose looked in photos?	0 (0.0)	0 (0.0)	16 (100)	<0.001
How your nose looked from every angle?	0 (0.0)	0 (0.0)	16 (100)	<0.001
Difficulty breathing through your nose?	0 (0.0)	1 (6.3)	15 (93.8)	0.001
Tenderness (e.g. when wearing sunglasses)	2 (12.5)	12 (75.0)	2 (12.5)	1000
The skin of your nose looking thick or swollen	0 (0.0)	15 (93.8)	1 (6.3)	0.317
Unnatural appearing bumps or hollows on your nose?	1 (6.3)	6 (37.5)	9 (56.2)	0.013

Preoperative and postoperative mean scores in total were 32.8 and 50.1, in satisfaction with nose were 21.8 and 34 and in adverse effects on the nose were 12.8 and 15.3 respectively. Increase in FACE-Q scores in total or in subgroups were statistically significant ($p<0.001$) (Table 4).

Table 4: Preoperative and postoperative mean score changes.

		FACE-Q		
		±MeanSD	**Minimum-Maximum**	**p**
Satisfaction with nose	Preoperative	21.8±3.3	15-27	<0.001
	Postoperative	34.8±3.1	42278	
Adverse Effects on the Nose	Preoperative	12.8±1.5	27-37	<0.001
	Postoperative	15.3±0.9	30-39	
Total	Preoperative	32.8±3.1	13-16	<0.001
	Postoperative	50.1±3.5	45-55	

6. Discussion

Correction of lateral crural malposition's are discussed widely in the current literature. Lateral crural deformities are boxy nasal tip, malpositioned lateral crura, alar rim retraction, alar rim collapse and concave lateral crura.

In this study we included the cases with lateral crural collapse with breathing difficulty, alar rim retraction, cephalic malposition of lateral crura.

Excessive concavity of the lower lateral crura prevents the creation of the ideal nasal tip and alar arch shape. Lower lateral crural concavities can lead to external nasal valve collapse, alar retraction and/or a pinched nasal tip [17-20].

Toriumi [18], Rohrich [19] and Tardy [20] have described techniques to correct lower lateral crural malposition by using lateral crural strut graft and batten graft.

McCollough has described lower lateral crural turnover flap to support and shape the alar rim and soft triangle [21].

We recommend this new technique in cases where the lateral crus are completely released during rhinoplasty. Repositioning the lateral crus by using LCCS prevents mobilisation during surgery and facilitates tip symmetry procedures.

In all cases fixation suture removal one week later was enough to stabilize the lateral crus.

7. Conclusion

Lower lateral crus control suture is a useful technique in open rhinoplasty. Further controlled studies with larger groups are warranted in order to further evaluate this method.

8. Informed Consent: Written informed consent was obtained from the patients who participated in this study.

9. Author Contributions: All C.G.A.

10. Main Points

This is the first study explaining the lateral crus stabilization to cheek skin technique with a suture.

Tipplasty can be done easily and tip symmetry can be obtained with less complication like crural dislocation.

LCCS is a safe and reliable technique in rhinoplasty.

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