Clinical Journal of Plastic and Reconstructive Surgery
An official Journal of Plastic Surgery Education Foundation

ORIGINAL ARTICLE

Medial Crura Footplate Reduction and its Effects on Nasal Measurement

Mohammad Aleisa,Ramy Shafik, Reji Mathew*

Keywords:
Rhinoplasty, Nasal Deformity, Nasal cartilages, Nasal surgical procedure

ABSTRACT

Background: The impact of medial crura footplate reduction on nasal measurements

Methodology: An external incision exposes the alar cartilages and nasal dorsum. Equal lengths are cut from both footplates after exposure. New domes were created by medialisation of the lower lateral cartilage. The medical crura was attached to the distal septum using tongue-in-groove technique with a superior position suture along the vertical axis of the septum which resulted in increase in projection and rotation.

Results: The mean preoperative Dorsal Length (DL) was 5.87 and the mean immediate post-operative DL was 4.5. The mean one-month post-operative DL was 4.380. The pre and immediate post-operative DL and the immediate post-operative and one-month follow up DL gave a *p-value* of 0.000 which was statistically significant (Table 4)

Conclusion: Excessive Nasal tip projection beyond the facial line is typically related to excessively long alar cartilages. These elongated cartilages become compressed longitudinally leading to bending and distortion. By medialising the alar cartilages and by shortening the footplates combined with tongue-in-groove sutures the stability was preserved and the natural curvature of the arch was maintained improving the nasal rotation and the projection effectively in our study

Clinical Journal of Plastic and Reconstructive Surgery, 2024; 2(1).

INTRODUCTION

Rhinoplasty is a complex surgical procedure used to reshape the nose for cosmetic or functional reasons. One of the key aspects of rhinoplasty is modifying the nasal structure to achieve the desired aesthetic image with Strong nasal tip support.[1] Projection and rotation are the key elements in defining the shape and appearance of the nasal tip. Different surgical techniques and grafts can be used to achieve this goal like septocollumellar suture, tongue in groove suture, columellar strut graft, tip onlay grafts, floating grafts, septal extension grafts and Medial crura Tuck up technique,[2-5] each with its unique effects on the nasal measurements.

Department of ENT and Head and Neck Surgery, Al Salam Al Assima Hospital, Kuwait

***Correspondence:** *Mohammad Aleissa (mdaleisa@gmail.com)*

Conflicts of interest: *None declared.*

Funding: *None declared.*

How to cite: *Aleisa M, Shafik R, Mathew R, Medial Crura Footplate Reduction and its Effects on Nasal Measurement. Clinical Journal of Plastic and Reconstructive Surgery. 2024;2(1):18–22*

Medial crura footplate reduction is not a commonly practiced surgical technique in rhinoplasty to reshape the nasal tip and increase the nasal rotation. This procedure involves modifying the medial crura of the lower lateral cartilage of the nose to adjust its position and shape, which can have significant effects on the nasal projection. The purpose of this study is to review the existing literature and to provide a comprehensive overview of this surgical technique and its potential benefits and limitations on the overall outcome of rhinoplasty.

MATERIALS AND METHODS

The study was conducted in Al Salam Al Assima Hospital, Kuwait after obtaining approval and consent from the patients. A total of 15 patients underwent primary rhinoplasty and these patients underwent surgery performed by the same surgeon at the same centre.

A Detailed Nasal examination was performed on all 15 patients. Profile view photographs were taken preoperatively according to standardized

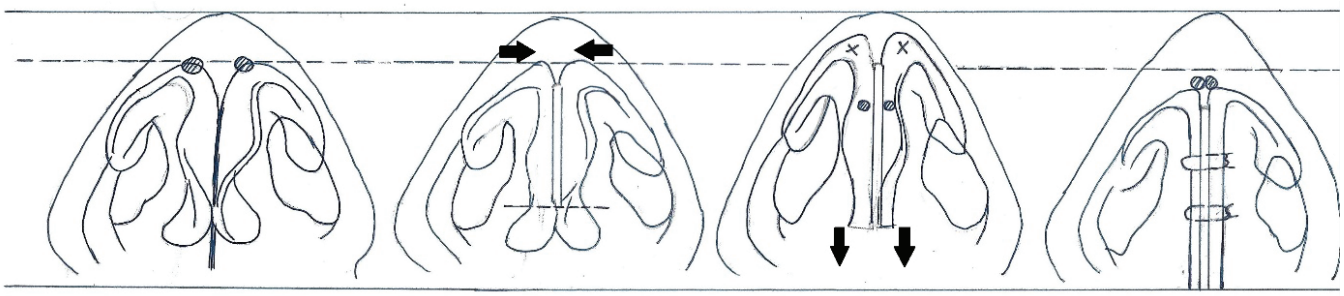

Figure 1: Diagram illustrating medial rotation of alar cartilage.

clinical photography. We collected the data Preoperatively, directly Postoperatively and one month postoperatively. The parameters assessed during the study were Nasolabial angle (NLA), Nasal Height (NH) and Basal length (BL) and this was documented on a premade proforma.

The NLA is the angle between the line from the subnasale to the nasal tip and the line from the subnasale to the vermillion. The BL was measured from the subnasale to the nasal tip and the NH was measured from the nasal root to the nasal tip.

The data was analysed by SPSS Software program. The mean and standard deviation were calculated, and the difference between them was evaluated using a paired t-test. A *p-value* of less than 0.05 was considered statistically significant

Inclusion Criteria

- All patients who presented to the clinic with projected and de-rotated nose between October 2023 to May 2023.

Exclusion Criteria

- Revision Septo-rhinoplasty cases.
- Patients with craniomaxillofacial syndrome and jaw deformity.

Operation Technique

An external incision is used to expose the alar cartilages and nasal dorsum. The alar cartilages are then exposed in the midline. After exposing the lower lateral cartilages, Osteotomies are performed after rasping the hump. The new domes are marked. Infiltration using 2% adrenaline with 1:1000 adrenaline is done on the medial and intermediate crura to help in hydro dissection. Vestibular skin is then separated from the anterior portion of the incised medial crus with sharp scissors to the under surface of the dome. Once the footplate is exposed equal lengths are cut from both the footplate. New domes are created by medialisation of the lower lateral cartilage. Cephalic trimming of the lower lateral cartilage is done. The medical crura is attached to the distal septum using tongue in groove technique with a more superior position suture along the vertical axis of the septum which increases

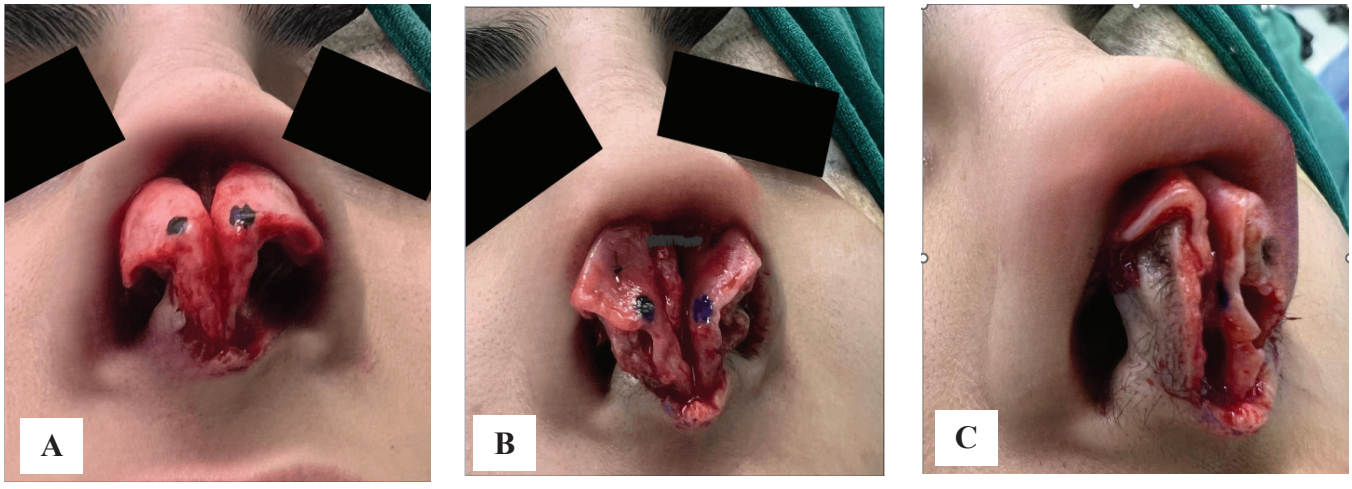

Figure 2: **(A)** Marking the old domes. **(B)** Creating the new domes after shortening the footplates and medialising the alar cartilages. **(C)** Tongue in groove suture and final appearance of the new domes.

projection and rotation.[6] Finally, the excessive vestibular skin is trimmed and re-sutured.

RESULTS

The study was designed to assess the effect of Medial crura foot plate steal with tongue in grove sutures on the nasolabial angle and the dorsal length. A total of 15 patients were taken for the study. The mean age group of the subjects was 23.866.

The mean preoperative NLA for the study group was 87.800 and the immediate post-operative NLA measured 106.267. The mean one-month post-operative NLA was 101.733

The results were analysed statistically using the paired t-test to determine significance among the three groups. A comparison between the pre-operative and immediate post-operative NLA showed a statistically significant difference, with a *p-value* of 0.000. Similarly, the comparison between the immediate post-operative NLA and the one-month follow-up NLA also revealed a statistically significant difference, with a *p-value* of 0.000 (Tables 1 and 2).

The mean preoperative DL was 5.87 and the mean immediate post-operative DL was 4.5. The mean one-month post-operative DL was 4.380 (Table 3). The pre and immediate post-operative DL and the immediate post-operative and one month follow up DL gave a *p-value* of 0.000 which was statistically significant (Table 4)

The pre- and immediate post-operative BL and one month follow up BL also yielded a *p-value* of 0.000 which was statistically significant (Tables 5 & 6).

Table 1: Descriptive analysis- NLA.

	N	Minimum	Maximum	Mean	Std. Deviation
Pre NLA	15	75.0	95.0	87.800	5.4143
Post NLA	15	98.0	115.0	106.267	4.4315
One Month NLA	15	95	108.0	101.733	3.8631

Table 2: Paired sample test –NLA.

	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig (2- tailed)
				Lower	Upper			
Pre NLA – Post NLA	18.4667	5.2897	1.3658	21.3960	15.5373	13.521	14	.000
Pre NLA – One NLA	-13.9333	5.2026	1.3433	-16.8144	-11.0522	-10.372	14	.000

Table 3: Descriptive Analysis – DL.

	N	Minimum	Maximum	Mean	Std. deviation
Pre-DL	15	4.8	5.9	5.387	0.3137
Post-DL	15	4.1	5.1	4.5	0.3634
One Month DL	15	4.0	5.0	4.380	0.3726

Table 4: Paired sample test –DL.

	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig (2-tailed)
				Lower	Upper			
Pre-DL- Post DL	0.8133	0.2875	0.0742	0.6541	0.9726	10.956	14	0.000
Post-DL- One DL	0.1933	0.1280	0.330	0.1225	0.2642	5.850	14	0.000

Table 5: Descriptive analysis –BL.

	N	Minimum	Maximum	Mean	Std. deviation
Pre BL	15	3.4	4.2	3.7	0.2268
Post BL	15	3.1	3.5	3.320	0.1424
One BL	15	2.8	3.5	3.067	0.1839

Table 6: Paired sample test –BL.

	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		.	.	.
				Lower	Upper			
Pre BL -Post BL	0.3800	0.1971	.0509	0.2708	0.4892	7.466	14	0.000
Post BL- One Month BL	0.6333	0.2610	0.0674	0.4888	0.7778	9.400	14	0.000

DISCUSSION

Optimizing the degree of nasal tip rotation is one of the most challenging and crucial aspects of rhinoplasty, as it significantly impacts upon the nose's final aesthetics. The nasal tip position is determined by both static and dynamic anatomical structures, which must be thoroughly understood by the facial plastic surgeon to achieve precise correction and ensure a successful outcome.[7]

The TIG technique offers several key advantages, with its primary benefit being the ability to achieve predictable, long-term aesthetic and functional outcomes. Postoperative patient satisfaction studies further support these findings.[8] Another significant advantage is that the surgeon receives immediate visual feedback on tip projection and rotation, encapsulated in the phrase, "What you see is what you get." Additionally, by bringing together the three layers of cartilage, the technique enhances nasal base support, thereby reducing the risk of structural failure.

A study conducted by Fatemah et al showed the tongue-in-groove technique yielded the nasolabial angle within the normal range thus giving the desired nasal rotation.[6]

However, the main disadvantage of TIG is a rigid nasal tip with the static appearance of the nose during facial expressions.

When we combined the tongue-in-groove suture along with medial crura foot plate resection, we found out that initially when tongue-in-groove was done the rotation was improved but the projection increased which was due to the medial rotation of the alar cartilages that caused the new domes to be positioned higher than the old domes leading to the medial crura to bow anteriorly. Shortening of an equal portion of the footplates reduced the anterior bowing and decreased the nasal projection which was similar to a study conducted by Bernd *et al.*[9]

The advantage of the medial rotation of the alar cartilages is that the entire excess cartilage is directed to the medial footplates which can be shortened, and this does not change the integrity of the cartilage arches or their lateral attachments

Excising the footplates alters the columellar base anatomy and they must be shortened as described by Guyuron.[10]

A study done by Yazeed *et al.*[11] in which a columellar strut graft was used to increase the nasal rotation showed that there was a considerate decrease in the mean NLA, from 108.84 to 97.2 in the 3 months follow up period thus decreasing the nasal rotation which was not the case in our study where the mean postoperative NLA was 106.27 and the mean follow-up NLA was 101.73

In our study, we found out that by this technique the dorsal length reduced postoperatively. The mean preoperative DL was 5.387 which was reduced to 4.380 one month postoperative which was statistically significant and gave a shorter appearance to the nose

By this technique, we found a significant improvement in the NLA and the DL giving the desired nasal rotation and projection. The Basal length measured during the study showed a significant decrease with a mean of 3.70 preoperatively to 3.067 in one-month postoperative period which improved the increased nasal projection.

We did not encounter any patients with nose drooping in the follow-up period.

CONCLUSION

Excessive Nasal tip projection beyond the facial line is typically related to excessively long alar cartilages. These elongated cartilages become compressed longitudinally leading to bending and distortion. By medialising the alar cartilages and by shortening the footplates combined with tongue-in-groove sutures the stability was preserved and the natural curvature of the arch was maintained improving the nasal rotation and the projection effectively in our study.

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