Original Article

Evaluation of a Systematic Approach to Alar Rim Reduction for Overhanging Ala: A Quasi-Experimental Study in Lahore, Pakistan

Muhammad Faisal[1], Amin Yousaf[1], Kamran Khalid[1], Fahad Tasleem[1],Muhammad Bilal[1], Zain ul Abiden[2]
[1]Jinnah Burn and Reconstructive Surgery Centre, Allama Iqbal Medical College, Lahore, Pakistan, [2]Sheikh Shakhbout Medical City, Abu Dhabi, UAE
***Correspondence to*:** Muhammad Faisal, Email: doc.faisalhussain@gmail.com

ABSTRACT

Background: Overhanging ala is a common aesthetic nasal concern that can disrupt alar contour and facial harmony, often requiring surgical correction. Various techniques for alar rim reduction have been described; however, a standardized, systematic approach remains lacking. The objective of this study was to evaluate the aesthetic outcomes of an alar rim reduction technique in patients with overhanging ala.

Methods: This quasi-experimental study was conducted over five months at Jinnah Burn and Reconstructive Surgery Centre, Allama Iqbal Medical College, Lahore and Cosmoplast Plastic Surgery Centre, Lahore. A total of 60 patients aged ≥18 years with clinically diagnosed overhanging ala undergoing alar rim reduction were enrolled through consecutive sampling. Patients unfit for anesthesia, with conditions affecting wound healing, unrealistic expectations, or unwilling to follow up, were excluded. All procedures were performed using a standardized mirror-image marking technique to ensure precise and reproducible alar rim correction. Patients were followed for 3 months postoperatively. Aesthetic outcomes were assessed using both objective (independent surgeon evaluation of nasal contour parameters) and subjective (patient satisfaction) measures on a 10 cm Visual Analog Scale (VAS), categorized as poor to excellent. Data were analyzed using SPSS version 25, with $p < 0.05$ was considered as statistically significant**.**

Results: The mean age of patients was 28.9 years. The gender distribution of patients showed female predominance (65%). Mean satisfaction score for patients was 8.82 (excellent patient satisfaction: 96.7%). Mean VAS score for surgeons' satisfaction was 9.31. Among more than 95% of patients, surgeons reported excellent outcomes across all measured parameters. Patient satisfaction and surgeons satisfaction showed no significant difference between age groups and the gender of patients.

Conclusion: This technique provides a safe, precise, and effective solution for correcting overhanging ala. Through the use of standardized markings and targeted soft-tissue excision, the technique ensures an ideal alar–columellar relationship.

Keywords: Overhanging ala; Alar rim reduction; Rhinoplasty; Nasal aesthetics; Alar–columellar relationship; Nasal contouring

INTRODUCTION

Consistently high-quality results in rhinoplasty are not achieved by technical skill alone, but a combination of accuracy in surgery, aesthetic sense, and patient expectations. Even small corrections, usually in millimeters, can have a great effect on nasal harmony andthe overall balance of the face. This can be seen more specifically with regard to the alar soft tissue, where there are minor asymmetries that are easily felt and can significantly influence aesthetic results.[1]

Overhanging ala (alar hooding) is a condition where the alar rim is below the optimal alar-columellar relathionship, making the nostril margin appear drooping or bulky. This disturbs the natural shape of the nasal base and creates an unappealing look as opposed to the aesthetically preferred gull wings in flight profile. The variation in the anatomy is common to the South-Asian and Southeast-Asian populations and is often seen as a common concern in the rhinoplasty practice in these areas.[2,3]

According to Gunter's classification of alar rim and columellar deformities, with true alar deformities (retracted [notched] and hanging [hooded] ala). In objective evaluation, the place of the alar rim in relation to a reference line that extends between the apex and the nadir of the nostril in the lateral view is used. An alar rim lying within 1.5 to 2 mm of this reference line is considered ideal; anything outside this would represent either hanging ala or alar retraction, respectively.[4]

ARTICLE INFO

Article History: Received: 10 October 2025 | Accepted: 21 March 2026
Conflict of Interest: The authors declared no conflict of interest exists.
Funding: None.

Citation: Faisal M, Yousaf A, Khalid K, Tasleem F, Bilal M, Abiden Z. Evaluation of a systematic approach to alar rim reduction for overhanging ala: a quasi-experimental study in Lahore, Pakistan. J Fatima Jinnah Med Univ. 2025;19(4):195-201.
DOI: http://doi.org/10.37018/YHJT6318

Moreover, Yap expanded this system by adding contour-based grading, which graded deformities as mild (horizontal gull's wing appearance), moderate (gull's wing in a slight inferior direction lobule area) based on the extent of inferior tilt and the relationship to the columellar lobule, thereby improving clinical evaluation and decision-making[5] and severe (gull's wing in the inferior direction and ends lower than the columella.

Several surgical methods have been suggested as a way of improving the appearance of alar overhang and restoring the appearance of the nose. Modern rhinoplasty literature emphasizes the use of a variety of approaches to the problem, such as vestibular excision, cartilage manipulation, and soft-tissue sculpture, all aimed at different aspects of the structure to guarantee a consistent, predictable aesthetic outcome.[6-9]

In addition to advances in surgical techniques, various validated tools have been used to assess aesthetic outcomes and patient satisfaction in rhinoplasty. Objective methods include standardized photographic analysis and anthropometric measurements for evaluating nasal proportions and symmetry.[10] Surgeon-based scales, such as the Rhinoplasty Outcome Evaluation (ROE)[11] and functional tools such as the Nasal Obstruction Symptom Evaluation (NOSE) scale[12], are commonly employed. Subjective assessment involves patient-reported measures, including Likert scales and global aesthetic improvement scores.[13] Among these, the Visual Analog Scale (VAS) has been extensively used in aesthetic and reconstructive surgery due to its simplicity, reliability, and sensitivity in detecting subtle changes in appearance and satisfaction.[14] Previous studies have demonstrated that combining surgeon-based objective assessment with patient-reported subjective measures provides a more comprehensive and reproducible evaluation of rhinoplasty outcomes.[15]

Therefore, the purpose of the study was to assess a methodical approach to alar rim reduction using the mirror-image marking technique for overhanging ala correction. The aesthetic results were evaluated using the Visual Analog Scale (VAS) and patient- and surgeon-reported satisfaction scales, which are among the most popular tools for measuring subjective outcomes in aesthetic surgery. The research aimed to present systematic quantitative data on the validity and generalizability of this method in producing uniform aesthetic results.

PATIENTS AND METHODS

This quasi-experimental research was carried out at the Jinnah Burn and Reconstructive Surgery Centre, Allama Iqbal Medical College, Lahore, and Cosmoplast Plastic Surgery Centre, Lahore, over a span of five months between October 2025 and February 2026, following the approval of the institutional ethical review board and the College of Physicians and Surgeons of Pakistan. Written informed consent was obtained from all patients for participation in the study as well as for the use and publication of their clinical photographs in scientific publications. A total of 60 patients were enrolled using a non-probability consecutive sampling technique. OpenEpi was used to determine the sample size based on the previously reported assuming a population mean of 19.3 ± 2.05 values at 95% confidence level and a 5% margin of error.[16] Patients who met the criteria of overhanging ala clinically diagnosed and able to tolerate alar rim reduction and follow-up were included, whereas those medically ineligible to undergo surgery or those who have conditions that influence wound healing, unrealistic expectations, or lack of willingness to take part were excluded.

Written informed consent was obtained, and confidentiality was maintained. The main aim was to assess aesthetic outcomes after alar rim reduction, defined as a better alar contour, alar symmetry, proportion, and patient satisfaction. Every patient was subjected to a thorough preoperative examination, including standardized photography (frontal, lateral, and basal views). A systematic marking protocol was formulated, in which the extent of alar overhang was identified and the desired postoperative contour was planned based on ideal aesthetic proportions, maintaining the alar rim approximately 1–2 mm cephalad to the columella.

The principal investigator conducted all the procedures using a standardized technique. Alar rim reduction was done under local anesthesia or general anesthesia, depending on whether the procedure is done in isolation or with complete rhinoplasty. Using surgical skin marker the excess alar tissue is marked. The anterior extent of the overhang near the tip is marked first then the posterior extent near the alar base. An external marking was used to denote the current alar margin as the caudal line and the desired postoperative position as the cranial line, with measurements taken by calipers. External markings were reproduced on the internal vestibular surface with the mirror-image technique. The caudal line of the external marking becomes the caudal line of the internal marking. The cranial line on the internal vestibular surface is then marked according to the measurements. The anterior and posterior edges are marked and are tapered, either triangularly or as gentle ellipses. These markings were excised under control to provide a smooth contour and a tension-free closure. Correct positioning during intra-operative procedures was maintained through repetitive visual inspection, bilateral

Table 1: Surgeon-Based Aesthetic Evaluation at 3 Months (n=60)

Parameter	Poor (0–2.5)	Fair (2.6–5)	Good (5.1–7.5)	Excellent (7.6–10)	Mean ± SD
Alar overhang correction	0 (0%)	1 (1.7%)	2 (3.3%)	57 (95.0%)	9.3 ± 0.5
Vertical height correction	0 (0%)	1 (1.7%)	2 (3.3%)	57 (95.0%)	9.2 ± 0.5
Soft tissue thickness	0 (0%)	2 (3.3%)	2 (3.3%)	56 (93.4%)	9.2 ± 0.6
Alar–columellar relationship	0 (0%)	1 (1.7%)	2 (3.3%)	57 (95.0%)	9.4 ± 0.5
Symmetry (right vs left)	0 (0%)	1 (1.7%)	2 (3.3%)	57 (95.0%)	9.4 ± 0.4
Overall composite score	—	—	—	—	9.31 ± 0.49

Table 2: Patient satisfaction (VAS Score) preoperatively and at 3 months (n=60)

Time Point	Mean ± SD	Poor n (%)	Fair n (%)	Good n (%)	Excellent n (%)	p-value
Preoperative	3.12 ± 0.84	24 (40.0%)	27 (45.0%)	9 (15.0%)	0 (0%)	
3 Months Post-op	8.82 ± 0.58	0 (0%)	1 (1.6%)	1 (1.6%)	58 (96.7%)	0.001*
p-value	<0.001					

A p-value calculated using paired sample t test/*Fisher Exact test

Table 3: Stratification of Patient Satisfaction (VAS) by Age and Gender

Variable	Category	n	Good n (%)	Excellent n (%)	Mean ± SD	p-value
Age (Years)	20–30	35	1 (2.9%)	34 (97.1%)	8.90 ± 0.59	0.062
	31–40	25	1 (4%)	24 (96%)	8.71 ± 0.56	
Gender	Male	21	1 (4.8%)	20 (95.2%)	8.93 ± 0.53	0.403
	Female	39	1 (2.6%)	38 (97.4%)	8.76 ± 0.61	

symmetry, and manual replacement prior to closure. Closure was done using 6-0 Vicryl Rapide™ sutures.

Patients were followed at 1 week, 2 weeks, 1 month, and 3 months after surgery, whereby clinical assessment and standardized photography were performed. At 3 months, the final evaluation was done. The assessments of aesthetic results were conducted both objectively and subjectively. Two independent plastic surgeons conducted an objective assessment with the help of the standardized photographs and a 10-cm Visual Analogue Scale (VAS), where 0 is the worst and 10 the best result.[14] Parameters measured were alar overhang classification, vertical height correction, soft tissue thickness, overhang correction, alar-columellar relationship, and symmetry of both sides. All the scores were divided into poor (0–2.5), fair (2.6–5), good (5.1–7.5), and excellent (7.6-10) , and a composite score was produced by averaging all the parameters.[15,17] Patient satisfaction was subjectively evaluated using a 10-cm VAS with 0 representing not satisfied at all and 10 representing completely satisfied, with categorical grading in between. To reduce bias, the evaluators were blinded to patient identity and the order in which the photos were displayed. The level of inter-observer bias was minimized through the average score of two independent observers, whereas intra-observer reliability was achieved by re-assessing some of the selected images. Unified photography was observed. All procedures were carried out by the principal investigator, whereas outcome assessment was done independently to minimize bias.

Data analysis was performed using SPSS version 25. Quantitative variables were presented as mean ± standard deviation, and qualitative variables as frequencies and percentages. The Shapiro-Wilk test was used to assess normality, and inferential tests (Chi-square/Fisher exact test and Mann-Whitney U test/Paired sample t test) were applied. Statistical significance was defined as a p-value less than 0.05. Data entry and analysis was done with SPSS version 25. Quantitative variables (Age, VAS score for patients and surgeons satisfaction) were presented with mean±SD and qualitative variables were presented with frequency and percentage. Normality assessment was done for quantitative variables with the help of Shapiro Wilk test. Chi Square/ Fisher exact test was applied to see association of patients and surgeons' satisfaction with patients age and gender. Mann Whitney u test was applied to compare the surgeon and patient's satisfaction score in relation to patients age (20-30 years and 31-40 years) and gender. A p-value $\leq$0.05 was considered statistically significant.

RESULTS

A total of 60 patients were included in the study. The mean age of patients was 28.9 ± 5.99 years. The patients are aged between 20 and 40 years. The patient population was female-dominated. i.e., 35% vs. 65%.

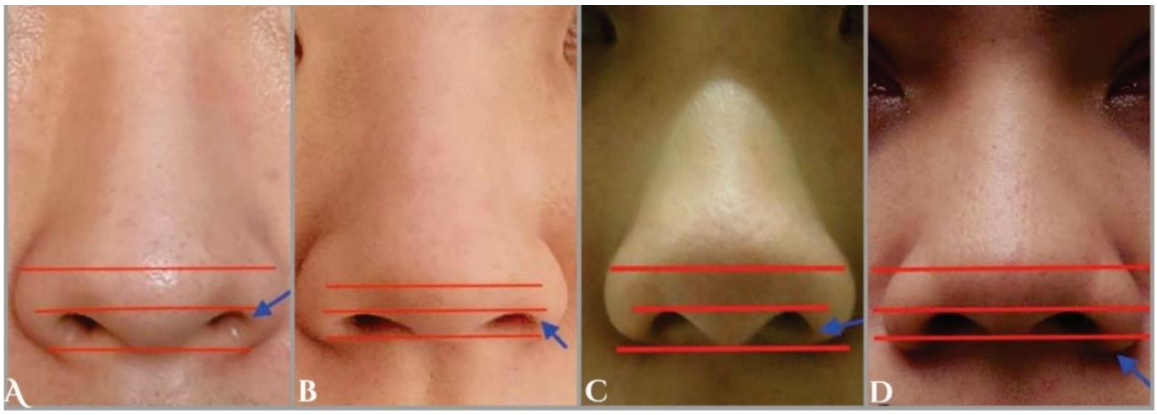

Figure 1: (A) Normal ala having a gentle gull-wing arc. (B) Mild hanging ala, horizontal wing apperance; the alar rim is above the columellar lobule. (C) Moderate hanging ala, a slight inferior tilt; the alar rim aligns with or slightly above the columellar lobule. (D) Severe hanging ala, a pronounced downward slope and alar rim extends below the columellar lobule.[5]

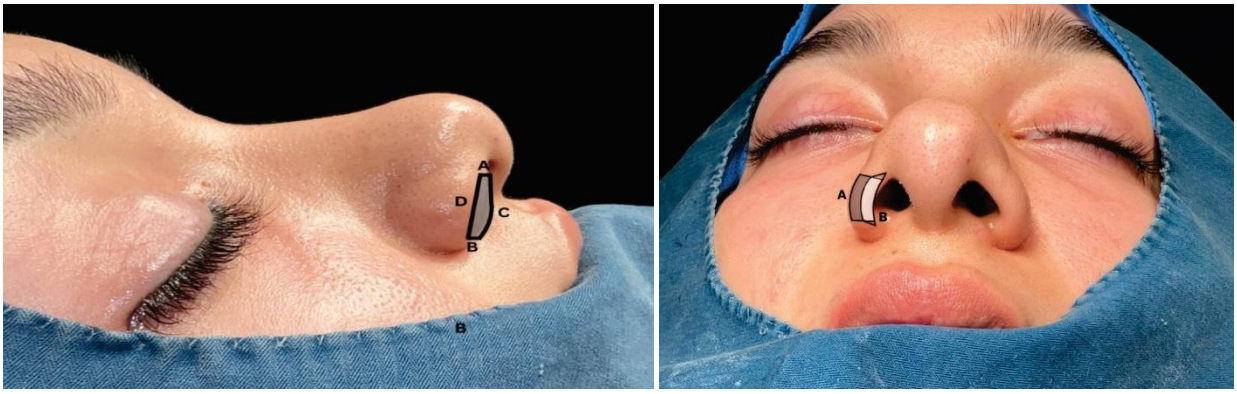

Figure 2: A) Lateral view external marking (A) Anterior extent of the overhang near the alar tip, (B) Posterior extent of overhang near the alar base, (C) Pre-exsisting Ala, (D) Desired Ala. B) Basal view marking (A) External marking, (B) Internal mirror image marking with ellipses/triangles at both ends (resection area).

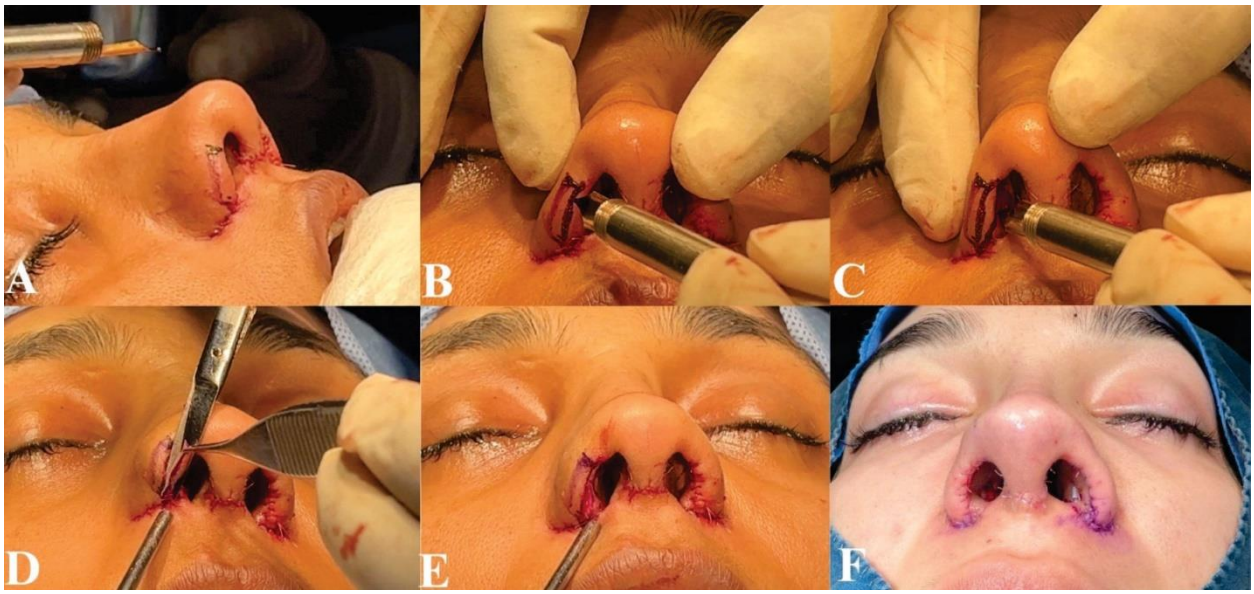

Figure 3: (A) External marking lateral view, (B) External marking basal view, (C) Mirror image internal marking with ellipses at both ends, (D, E) Resection of internal marked area, (F) Closure.

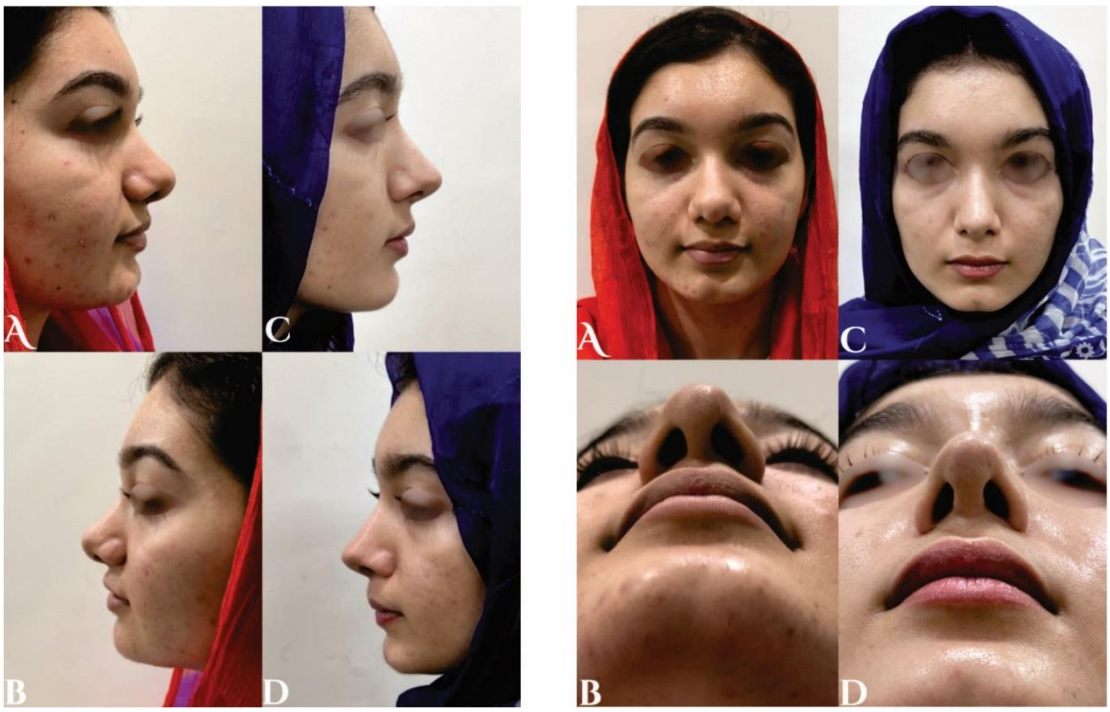

Figure 4: (A) Pre-operative view showing overhanging ala; (B) Pre-operative view showing overhanging ala; (C) Post-operative view showing an improved alar contour; (D) Post-operative view demonstrating an ideal alar-columellar relationship.

Figure 5: (A, C & E) Pre-operative, (B, D & F) Post-operative.

Surgeons' satisfaction postoperatively was assessed using a VAS score. The average VAS rating of the surgeons was 9.31+ 0.49. The VAS score criteria was used to classify VAS score as poor, fair, good and excellent satisfaction. The surgeons achieved an excellent outcome among >95% patients in all measured parameters. This shows that surgeons were highly satisfied with the postoperative results of the aesthetic outcome of an alar rim reduction technique in patients with overhanging ala (Table 1).

The VAS scoring criteria was used to evaluate patient satisfaction after surgery. Mean satisfaction score for patients was 8.82 ± 0.58 (Excellent Patient Satisfaction: 96.7%). Table 2 shows a significant change in patient satisfaction after alar rim reduction. At preoperative, most patients were lowly satisfied, with 40.0% of the patients being poor and 45.0% of the patients being fair, with no patients reporting excellent satisfaction. There was a significant change in the responses at 3 months postoperatively with 96.7% of patients indicating excellent results and no one being in the poor category. The average VAS rating was significantly higher in the postoperative period (8.82 = 0.58) as compared to the preoperative period (3.12 = 0.84), which is clinically and statistically significant ($p < 0.001$). These results indicate that the surgery method showed a high patient satisfaction and a steady improvement in the aesthetics (Table 2).

Patient satisfaction following alar rim reduction was predominantly high across all groups, with the vast majority of patients falling in the excellent category. In the 20–30 years age group, 97.1% of patients reported excellent satisfaction, while 96% of patients aged 31–40 years also demonstrated excellent outcomes, with mean VAS scores of 8.90 ± 0.59 and 8.71 ± 0.56, respectively. Similarly, excellent satisfaction was observed in 95.2% of males and 97.4% of females, with comparable mean VAS scores (8.93 ± 0.53 vs. 8.76 ± 0.61). No patients were categorized as poor or fair in any group. Statistical analysis showed no significant association between patient satisfaction and age ($p = 0.062$) or gender ($p = 0.403$), indicating consistent and favorable outcomes across different demographic groups. (Table 3).

DISCUSSION

Overhanging ala is an aesthetically significant issue, especially in South and Southeast Asian populations, where the bulk of soft tissue may undermine nasal harmony. Even though various surgical methods are outlined, most of them are based on rough estimates and are not standardized in terms of planning thus resulting in erratic aesthetic results and irregular satisfaction rates. The older methods like those of Millard and McKinney target the various layers of the anatomy, but are commonly linked with disadvantages of scarring, unevenness and less predictability, particularly in thick-skinned people.[18]

More recent methods are also used to minimize visible scarring such as vestibular-based methods such as the sail excision method; but variability in contour and possible complications such as mucosal contracture are still of concern. Such a methodical nature is aligned with the current rhinoplasty standards that promote a rigorous planning to achieve a predictable aesthetic results.[19] The discrepancy between surgeon and patient-reported satisfaction and outcome evaluation in rhinoplasty is also an important issue in the field of outcome evaluation. Past literature has demonstrated that there can be a difference between patient expectations and surgeon assessment, and because of this, the combination of the tools is necessary to ensure a high level of satisfaction among both patients and surgeons.[20,21] In this experiment both the patient and the surgeon satisfaction scores were high and similar, indicating that the method does not only attain objective aesthetic improvement, but also satisfies the expectations of the patients. This agreement shows that a gap between subjective and objective results can be minimized in case of a careful preoperative preparation and moderated implementation. Moreover, the observed high satisfaction among demographic groups is consistent with the recent literature, which suggests that standardized methods enhance reproducibility and general satisfaction in aesthetic surgery, and VAS enables delicate identification of aesthetic changes in patients and enables a direct comparison of assessors.[22]

However, this method is more organized and reproducible compared to the previously described ones, and patient and surgeon satisfaction align better, which is more favorable. It is suggested that future research should be done with a longer follow-up period and objective measures to add to validation of these results.

CONCLUSION

A systematic approach to alar rim reduction provides a precise and reproducible method for correcting the overhanging ala. It produced excellent satisfaction for both patients and surgeons, highlighting its value as a safe and effective alar rim resection technique.

Author Contributions

MF: Conception and design, analysis and interpretation of data, drafting the article, critical revision for important intellectual content, final approval.
AY: Conception and design, analysis and interpretation of data.
KK: Analysis and interpretation of data, drafting the article.

MB: Acquisition of data, conception and design, analysis and interpretation.
ZUA: Conception and design, analysis and interpretation of data.
FT: Conception and design, analysis and interpretation of data.

REFERENCES

1. Ishii LE, Tollefson TT, Basura GJ, et al. Clinical practice guideline: improving nasal form and function after rhinoplasty. Otolaryngol Head Neck Surg. 2021;164(2 Suppl):S1–S58. doi:10.1177/0194599820987809
2. Baladiang MN, et al. Surgical correction of alar rim deformities: modern approaches. Aesthetic Plast Surg. 2021;45(3):1120–8. doi:10.1007/s00266-020-01985-3
3. Daniel RK, Palhazi P. Rhinoplasty in Asian patients: anatomical considerations and techniques. Clin Plast Surg. 2020;47(2):215–26. doi:10.1016/j.cps.2020.01.002
4. Gunter JP, Rohrich RJ, Friedman RM. Classification and correction of alar-columellar discrepancies in rhinoplasty. Plast Reconstr Surg. 1996;97(3):643–8. doi:10.1097/00006534-199603000-00026
5. Yap EC. Classification and management of alar deformities in rhinoplasty. J Plast Reconstr Aesthet Surg. 2022;75(4):1350–8. doi:10.1016/j.bjps.2021.11.045
6. Rohrich RJ, Ahmad J. Rhinoplasty: evolution and advances in technique. Plast Reconstr Surg. 2021;147(5):1307–19. doi:10.1097/PRS.0000000000007924
7. Sajjadian A, Rubinstein R, Naghshineh N. Current techniques in alar rim correction. Aesthetic Surg J. 2020;40(6):NP342–50. doi:10.1093/asj/sjaa012
8. Toriumi DM. New concepts in nasal tip and alar contouring. Facial Plast Surg Clin North Am. 2021;29(1):1–12. doi:10.1016/j.fsc.2020.09.001
9. Gruber RP, Chang TN. Alar base and rim modification techniques in rhinoplasty. Clin Plast Surg. 2022;49(1):89–101. doi:10.1016/j.cps.2021.08.009
10. Farkas LG, Katic MJ, Forrest CR. International anthropometric study of facial morphology in various ethnic groups. J Craniofac Surg. 2021;32(4):1445–52. doi:10.1097/SCS.0000000000007376
11. Alsarraf R, Larrabee WF Jr, Anderson S, et al. Measuring cosmetic facial plastic surgery outcomes: validity of the Rhinoplasty Outcome Evaluation (ROE). Facial Plast Surg. 2020;36(2):123–8. doi:10.1055/s-0039-1700801
12. Stewart MG, Witsell DL, Smith TL, et al. Development and validation of the Nasal Obstruction Symptom Evaluation (NOSE) scale. Otolaryngol Head Neck Surg. 2021;164(1):118–24. doi:10.1177/0194599820957302
13. Klassen AF, Cano SJ, Scott A, et al. Measuring patient-reported outcomes in facial aesthetic procedures: a systematic review. Aesthetic Surg J. 2021;41(4):NP456–70. doi:10.1093/asj/sjaa287
14. Hawker GA, Mian S, Kendzerska T, French M. Measures of adult pain: Visual Analog Scale (VAS). Arthritis Care Res. 2021;73(Suppl 2):S240–52. doi:10.1002/acr.24574
15. Gassling V, Koos B, Birkenfeld F, Wiltfang J, Zimmermann CE. Secondary cleft nose rhinoplasty: subjective and objective outcome evaluation. J Craniomaxillofac Surg. 2015;43(9):1855–62.
16. Regalado JA, Yap E. Use of sail excision in alar morphology modification of Asian noses. Philipp J Otolaryngol Head Neck Surg. 2023;38(2):52. doi:10.32412/pjohns.v38i2.2111
17. Luong K, Hummelink S, Stubenitsky B, Slijper HP, Ulrich DJ. Determinants of patient-reported satisfaction with treatment outcome six months after rhinoplasty. JPRAS Open. 2025; (Epub ahead of print). doi:10.1016/j.jpra.2025.09.026
18. Hudise JY, Aldhabaan SA, Alwadani MM, Alqabbani AA, Bafaqeeh SA. Sail excision technique for overhanging thick ala in Saudi Arabia. Saudi Med J. 2020;41(6):635–9. doi:10.15537/SMJ.2020.6.25117
19. Omranifard M, Zare N, Mahabadi M. Concurrent excision of dorsal nasal scars and reduction rhinoplasty: a retrospective cross-sectional study. Plast Reconstr Surg Glob Open. 2021;9(11):e3908. doi:10.1097/GOX.0000000000003908
20. Alosfoor M, Alkhalifah AA, Algadiem EA, Alarfaj AA, Alsalman A. Comparison between patient and plastic surgeon aesthetic analysis in rhinoplasty consultation. Plast Reconstr Surg Glob Open. 2023;11(4):e4948. doi:10.1097/GOX.0000000000004948
21. Khan N, Rashid M, Khan I, Ur Rehman Sarwar S, Ur Rashid H, Khurshid M, Khalid Choudry U, Fatima N. Satisfaction in patients after rhinoplasty using the Rhinoplasty Outcome Evaluation questionnaire. Cureus. 2019;11(7):e5283. doi:10.7759/cureus.5283
22. Al-Ayadhi LY, Alghamdi HA, Almaiman NI, Alanezi MN, Alali MA, Alsubaie AS, Almawash AN, Alobeily NH, Halepoto DM. Assessment of postoperative satisfaction in patients following rhinoplasty: a cross-sectional study. Plast Reconstr Surg Glob Open. 2025;13(10):e7210.