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Optimizing Nasal Tip Surgery for Asians: A Systematic Review of Techniques and Postoperative Outcomes

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ABSTRACT

Background: The Asian nose is typically characterized by thick skin, abundant soft tissue, and a relatively weak cartilage framework, which often results in an under-projected nasal dorsum and tip. **Methods:** Following PRISMA 2020 guidelines, this systematic review focused exclusively on full-text articles published in English between 2014 and 2024. **Result:** The study conducted a comprehensive review of over 100 publications sourced from reputable databases, including ScienceDirect, SagePub, and PubMed. Following an initial screening, four publications were identified as warranting more in-depth analysis. Consequently, a thorough review of these selected studies was performed to ensure a detailed and rigorous evaluation. **Conclusion:** Recent advancements in Asian tip-plasty, such as combining techniques like spreader grafts, septal extension grafts, and columellar strut grafts, have demonstrated promising postoperative outcomes. Key improvements include increasing nasal length, enhancing tip projection, and reinforcing the nasal tip framework. These techniques show significant potential in achieving more desirable aesthetic results in Asian rhinoplasty.

Keyword: asian nose, tip-plasty, asian rhinoplasty

INTRODUCTION

Nasal tip surgery aims to enhance the proportions and overall appearance of the nose, with nasal tip refinement being a critical aspect of rhinoplasty. In recent years, several surgical techniques have emerged, with nasal lengthening and tip augmentation gaining prominence, particularly in the context of Asian rhinoplasty. Asian noses often present unique anatomical challenges, including thick skin, excessive soft tissue, and a weaker cartilage structure, which results in a less defined nasal dorsum and tip. Relying solely on suture techniques for nasal tip refinement in these patients is insufficient for maintaining adequate tip projection due to the weak cartilaginous framework. These anatomical features necessitate advanced techniques for surgeons performing nasal tip surgery on Asian patients.[1,2]

Additionally, the small size of the nasal tip further complicates the procedure, requiring precise surgical techniques. To achieve a natural and aesthetically balanced result, surgeons must be well-versed in nasal tip analysis, proportional facial assessment, and the specific dynamics of the nasal tip concerning different ethnicities. Important considerations such as tip rotation, projection, and definition play a vital role in ensuring successful outcomes. A comprehensive understanding of Asian nasal tip anatomy is essential in selecting the appropriate surgical and grafting techniques that will create an aesthetically refined and natural-looking nasal tip.[2,3]

Although various nasal tip surgery techniques have been introduced specifically for Asian patients, there is still ongoing debate regarding the most effective methods for achieving a natural post-operative result. This systematic review aims to consolidate the fundamental knowledge of nasal tip dynamics in the context of Asian rhinoplasty and examine studies that have explored different surgical approaches. By comparing postoperative results, particularly focusing on nasal angle measurements, the review seeks to determine the most effective techniques for achieving optimal outcomes in Asian tip-plasty. The analysis will provide insights into surgical strategies tailored to the unique anatomical

characteristics of the Asian nose, to refine the nasal tip while maintaining a natural appearance.

METHODS

Protocol

The investigation was carried out with scrupulous conformity to the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) 2020 criteria, guaranteeing strict respect to accepted methodological principles. Strictly following PRISMA 2020 standards demonstrates a dedication to improving the clarity, replicability, and systematic thoroughness of the review process. The study incorporated thorough methodologies for conducting literature searches, extracting data, and synthesizing findings. These methods were well implemented to minimize biases and guarantee the strength of the conclusions.

Criteria for Eligibility

This study presents a comprehensive evaluation of research conducted over the past decade, focusing on the dynamics of nasal tip surgery in Asian rhinoplasty. By systematically reviewing and synthesizing data from numerous studies, the research aims to provide a deeper understanding of nasal tip aesthetics and surgical techniques specifically suited for the anatomical characteristics of Asian patients. The study meticulously compares different approaches, drawing on peer-reviewed research published between 2014 and 2024. To ensure validity, only articles with verified DOIs were included, and non-research materials, such as reviews and editorials, were excluded to maintain the dataset's integrity.

The primary goal of this analysis is to offer a clear framework for selecting the most effective surgical techniques for Asian rhinoplasty, while also identifying gaps in the current literature. Rigorous inclusion and exclusion criteria were applied, ensuring that the selected studies provided reliable and relevant data. By focusing solely on empirical research and avoiding duplicate publications, the study ensures a high level of methodological accuracy. The insights gained from this

review are anticipated to significantly advance the field of Asian nasal surgery, offering evidence-based recommendations for improving post-operative outcomes.

Search Strategy

We used "nasal tip surgery OR rhinoplasty OR plastic surgery" as keywords. The search for studies to be included in the systematic review was carried out using the PubMed, SagePub, and Sciencedirect databases.

Data retrieval

The authors conducted a thorough preliminary review of each article by examining its abstract and title to assess relevance before proceeding with a more detailed investigation. Only studies that aligned with the study's objectives and met the predefined inclusion criteria were considered for further review. This method allowed for the identification of a clear and consistent pattern across the research.

Full-text articles were restricted to those published in English to maintain consistency in the language of the studies. A rigorous screening process was applied to select content that was directly relevant to the study's focus and adhered to all established inclusion criteria. Articles not meeting these criteria were systematically excluded from further analysis and not included in the final evaluation.

The evaluation process included a comprehensive review of various factors such as study design, titles, authors, publication dates, research locations, and methodologies. This meticulous approach ensured that the content analyzed was of the highest relevance and quality, thereby strengthening the overall findings of the study.

Quality Assessment and Data Synthesis

The authors performed a meticulous review of each article's abstract and title to identify those deserving further investigation. After this initial screening, all relevant documents underwent a comprehensive examination. The results of this evaluation guided the selection of review papers, ensuring that only the most

pertinent studies advanced to detailed analysis. This rigorous approach streamlined the selection process and facilitated a thorough and nuanced assessment of the existing research and its context.

Table 1. Search Strategy

Database	**Search Strategy**	***Hits***
Pubmed	*("nasal tip surgery" AND "rhinoplasty" AND "plastic surgery")*	13
Science Direct	*("nasal tip surgery" AND "rhinoplasty" AND "plastic surgery")*	77
Sagepub	*("nasal tip surgery" AND "rhinoplasty" AND "plastic surgery")*	24

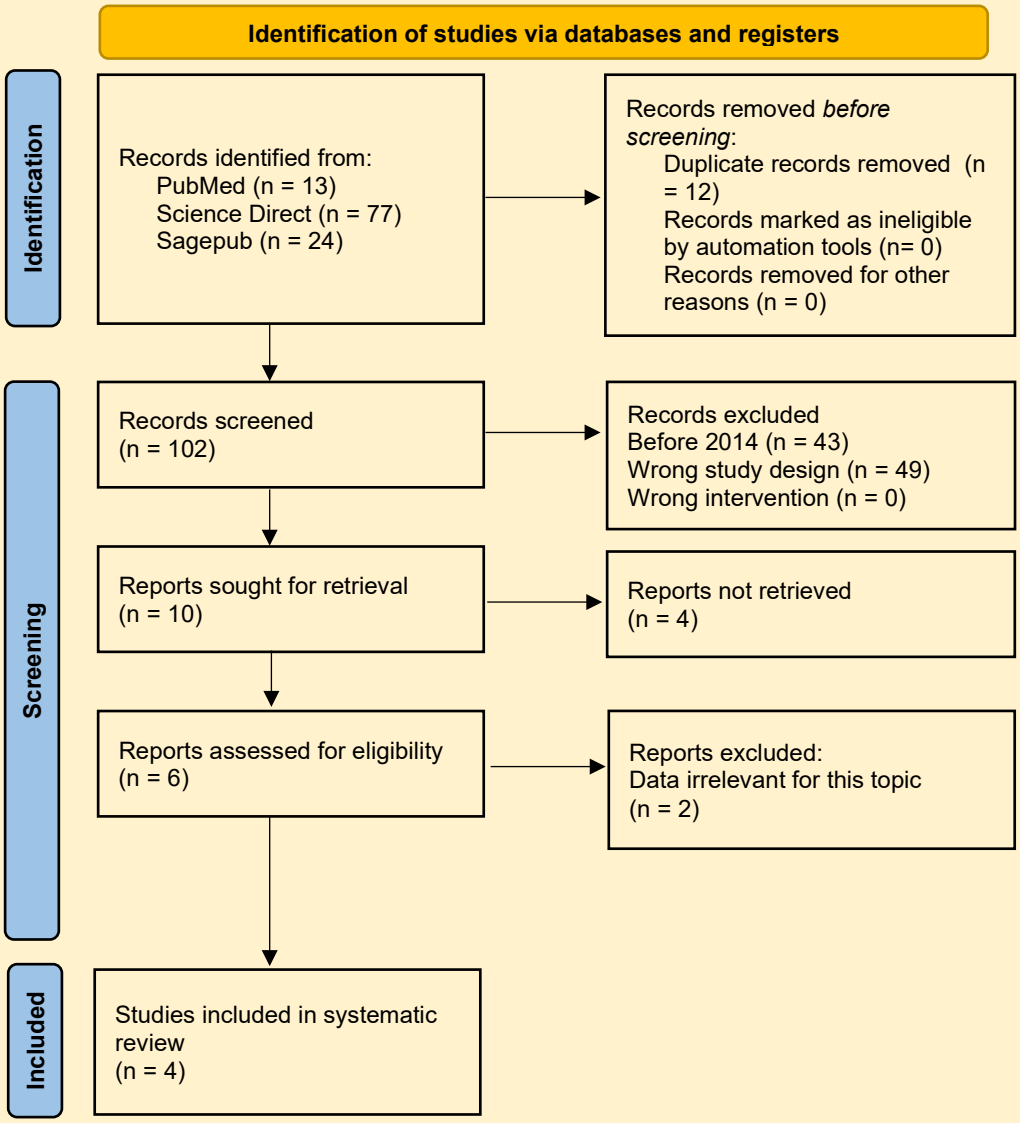

Figure 1. Article search flow chart

Table 2. Critical appraisal of Study

Parameters	(An et al., 2019)	(Ahn et al., 2020)	(Mo et al., 2021)	(Zhang et al., 2022)
1. Bias related to temporal precedence Is it clear in the study what is the "cause" and what is the "effect" (ie, there is no confusion about which variable comes first)?	Yes	Yes	Yes	Yes
2. Bias related to selection and allocation Was there a control group?	No	No	No	No
3. Bias related to confounding factors Were participants included in any comparisons similar?	No	No	No	No

4. Bias related to administration of intervention/exposure				
Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest?	Yes.	Yes.	Yes.	Yes.
5. Bias related to assessment, detection, and measurement of the outcome				
Were there multiple measurements of the outcome, both pre and post the intervention/exposure?	No	No	No	No
Were the outcomes of participants included in any comparisons measured in the same way?	Yes	Yes	Yes	Yes
Were outcomes measured in a reliable way?	Yes	Yes	Yes	Yes
6. Bias related to participant retention				
Was follow-up complete and, if not, were differences between groups in terms of their follow-up adequately described and analyzed?	Yes	Yes	No	Yes
7. Statistical conclusion validity				
Was appropriate statistical analysis used?	Yes	Yes	Yes	Yes

RESULT

We initiated the investigation by systematically gathering a significant assortment of papers from reputable sources such as Science Direct, PubMed, and SagePub. After a thorough three-stage screening process, we selected eight papers that were considered very pertinent to our ongoing systematic inquiry. Subsequently, we selected certain topics for further examination and meticulously evaluated each report. In order to expedite our study, we have included a concise summary of the evaluated information in Table 3.

Table 3. The literature included in this study

Author	Origin	Method	Sample	Result
An et al.[4] (2019)	China	Experimental Study	33 participants	The novel technique significantly increased nasal tip projections and lengths, while decreasing columellar-labial angles in individuals who underwent surgical treatment.

Ahn et al.[5] (2020)	Korea	Experimental Study	30 participants	Postoperatively, there were significant improvements in nasal length, tip projection, and nasolabial angle, with all patients being subjectively satisfied. Two surgeons had excellent or good opinions in 28 (94%) patients, and all patients were subjectively satisfied.
Mo et al.[6] (2021)	Korea	Experimental Study	38 participants	The nasal tip projection and location ratios significantly varied before and after surgery, and no revision surgery was necessary, and no direct graft-associated complications occurred.
Zhang et al.[7] (2022)	China	Experimental Study	38 participants	The "twin tower" folding ear cartilage nasal stent is a safe and feasible method for nasal stent construction and tip shaping, providing reliable support for the nasal columella, increasing supporting force on the ear cartilage, and maintaining long-term stability after rhinoplasty.

DISCUSSION

The growing demand for facial aesthetics, particularly in Asian rhinoplasty, has spurred the development of new techniques for refining the nasal tip. Pre-operative nasal tip analysis plays a crucial role in guiding surgeons to select the appropriate graft technique for each patient. Asian noses typically feature thick nasal envelopes and underdeveloped middle crus cartilage, which leads to a weaker, narrower framework.[8] This structural weakness often results in under-projection of the nasal tip, retracted columella, and wide, round nostrils. Common nasal tip deformities in Asians include boxy, deviated, and short-tip noses, all of which generally require nasal tip reconstruction surgery. Understanding the key elements

of nasal tip surgery, such as projection, rotation, position, and definition, is essential to achieving an aesthetically pleasing and natural-looking result.[1,8,9]

The anatomical complexity of the Asian nasal tip, characterized by its bulbous appearance and thick skin, makes surgical correction challenging. According to Anderson's tripod theory, the nasal tip can be visualized as a tripod formed by the columella and paired lower lateral cartilages, with each part needing adequate support to maintain proper projection. Various grafting techniques, including the extended spreader graft and septal extension graft (SEG), are used to lengthen and strengthen the nasal tip. The columellar strut graft, based on the M-arch theory, further enhances nasal tip projection by supporting the medial crura. Although different techniques have been introduced, they all share the goal of reinforcing the nasal framework and improving tip projection in Asian patients. Techniques such as the "tip nasal cap graft" or "pagoda-shaped stacked" graft have been developed to provide better tip definition and overall nasal aesthetics.[1,10-12]

Accurate nasal anthropometric measurements are key to achieving an ideal and natural nasal tip. Parameters such as the nasofrontal angle (NFA), nasofacial angle (NFcA), nasolabial angle (NLA), and nasal length help surgeons assess the aesthetic proportions of the nose. Studies comparing facial attractiveness between Caucasian and Southeast Asian noses have shown significant differences, with Asians typically having wider nasofrontal and nasofacial angles. The reviewed studies successfully applied these measurements in both pre-and post-operative evaluations, highlighting significant improvements in nasal length, NLA, and tip projection. These findings underscore the importance of strengthening the nasal tip framework, particularly in patients with weaker cartilage, to achieve a lasting and refined outcome.[7,13,14]

Several techniques have been developed to overcome the limitations posed by the weak cartilage structure in Asian noses. For instance, adding thickness to the graft using double-layered cartilage or bending the cartilage without incision has been shown to enhance the nasal tip's structural integrity and projection. The principle of inertia plays a role here, as folded or bent cartilage provides greater resistance against movement, maintaining the nasal tip's stability post-surgery. The

studies reviewed reported satisfactory aesthetic results with these techniques after an average follow-up of 12 months, suggesting that these methods provide a durable solution for nasal tip refinement.[1,11,12]

Despite the advancements in nasal tip surgery for Asians, certain factors can still compromise the long-term aesthetic outcome, particularly the durability of tip support. Major factors affecting tip support include the size, shape, and flexibility of the medial and lateral crura, as well as the strength of interconnections between these structures. Surgeons must take care to preserve or repair these connective tissues to ensure the longevity of the surgical outcome. Other contributing techniques, such as cranial and caudal rotation, lateral crural overlay, and transdermal sutures, play a role in fine-tuning the nasal tip, but they are less suitable for the structural needs of the Asian nose, which requires enhanced projection and lengthening. Techniques such as the caudal SEG, extended spreader graft, and columellar strut graft remain the most effective for achieving a strong and natural-looking nasal tip in Asian patients.

CONCLUSION

The demand for facial aesthetics, especially in Asian rhinoplasty, has led to the development of new techniques for refining the nasal tip. Asian noses have thick nasal envelopes and underdeveloped middle crus cartilage, resulting in a weaker framework. Common nasal tip deformities include boxy, deviated, and short-tip noses. Various grafting techniques, including extended spreader grafts and septal extension grafts, are used to lengthen and strengthen the nasal tip. Accurate nasal anthropometric measurements are crucial for achieving an ideal nasal tip. Techniques like double-layered cartilage and bending cartilage have been shown to improve nasal tip projection.

DISCLOSURE STATEMENT

Disclosure Statement: The authors have no conflicts of Interest to declare.

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