

Structured Rhinoplasty: A Scoping Review of Current Trends and Technical Innovations

Rinoplastia Estruturada: Uma Revisão de Escopo Sobre Tendências Atuais e Inovações Técnicas

Rinoplastia Estructurada: Una Revisión de Alcance Sobre Tendencias Actuales e Innovaciones Técnicas

RESUMO

Objetivo: Mapear e descrever as evidências científicas disponíveis sobre as tendências e os avanços técnicos na rinoplastia estruturada. **Método:** Trata-se de uma revisão de escopo conduzida conforme as diretrizes metodológicas do Joanna Briggs Institute e reportada de acordo com o checklist PRISMA-ScR. A pergunta de pesquisa foi estruturada com base no mnemônico PCC, considerando como População: pacientes submetidos à rinoplastia estruturada; Conceito: técnicas cirúrgicas e inovações técnicas; Contexto: procedimentos com fins estéticos e/ou funcionais. As buscas foram realizadas nas bases PubMed, SciELO, Scopus, Web of Science, Embase e Google Scholar, utilizando descritores controlados e termos livres. Foram incluídos estudos publicados entre 2015 e 2025, disponíveis em inglês, português ou espanhol, com texto completo. A análise foi descritiva, com categorização temática e síntese narrativa dos achados. **Resultados:** Foram incluídos 9 estudos, distribuídos entre ensaios clínicos, séries de casos e revisões narrativas. Identificaram-se tendências relevantes como o uso ampliado de enxertos autólogos, preservação da anatomia osteocartilaginosa, acesso aberto com modulações mínimas e o emprego crescente de tecnologias auxiliares como piezoletrocirurgia e simulação 3D. A rinoplastia estruturada foi frequentemente associada a melhores resultados funcionais e estéticos, especialmente em narizes complexos ou revisionais. **Conclusão:** A revisão evidenciou um corpo crescente de evidências que favorecem abordagens personalizadas e baseadas na preservação anatômica. Contudo, ainda há lacunas quanto à padronização de protocolos e mensuração objetiva de resultados, especialmente em estudos com longo seguimento. **DESCRIPTORIOS:** Rinoplastia; Cirurgia plástica; Desenvolvimento Tecnológico.

ABSTRACT

Objective: To map and describe the available scientific evidence on current trends and technical advancements in structured rhinoplasty. **Method:** This scoping review was conducted following the methodological guidelines of the Joanna Briggs Institute and reported according to the PRISMA-ScR checklist. The research question was structured using the PCC mnemonic, considering: Population – patients undergoing structured rhinoplasty; Concept – surgical techniques and technical innovations; Context – procedures with aesthetic and/or functional purposes. Searches were performed in the PubMed, SciELO, Scopus, Web of Science, Embase, and Google Scholar databases using controlled descriptors and free terms. Studies published between 2015 and 2025 in English, Portuguese, or Spanish with full-text availability were included. Data analysis was descriptive, with thematic categorization and narrative synthesis of the findings. **Results:** 9 studies were included, comprising clinical trials, case series, and narrative reviews. Key trends identified included the expanded use of autologous grafts, preservation of osteocartilaginous anatomy, open approach with minimal modifications, and the growing use of auxiliary technologies such as piezoelectric surgery and 3D simulation. Structured rhinoplasty was frequently associated with improved functional and aesthetic outcomes, particularly in complex or revision cases. **Conclusion:** The review revealed a growing body of evidence supporting personalized and anatomy-preserving approaches. However, there are still gaps regarding protocol standardization and objective outcome measurement, especially in long-term studies. **DESCRIPTORS:** Rhinoplasty; Plastic surgery; Technological development.

RESUMEN

Objetivo: Mapear y describir la evidencia científica disponible sobre las tendencias actuales y los avances técnicos en la rinoplastia estructurada. **Método:** Esta revisión de alcance se realizó siguiendo las directrices metodológicas del Joanna Briggs Institute y fue reportada conforme a la lista de verificación PRISMA-ScR. La pregunta de investigación fue estructurada con base en el mnemónico PCC, considerando: Población – pacientes sometidos a rinoplastia estructurada; Concepto – técnicas quirúrgicas e innovaciones técnicas; Contexto – procedimientos

con fines estéticos y/o funcionales. Se realizaron búsquedas en las bases de datos PubMed, SciELO, Scopus, Web of Science, Embase y Google Scholar, utilizando descriptores controlados y términos libres. Se incluyeron estudios publicados entre 2015 y 2025, disponibles en inglés, portugués o español, con texto completo. El análisis de datos fue descriptivo, con categorización temática y síntesis narrativa de los hallazgos. **Resultados:** Se incluyeron 9 estudios, entre ensayos clínicos, series de casos y revisiones narrativas. Se identificaron tendencias relevantes como el uso ampliado de injertos autólogos, la preservación de la anatomía osteocartilaginosa, el abordaje abierto con mínimas modificaciones y el uso creciente de tecnologías auxiliares como la cirugía piezoeléctrica y la simulación 3D. La rinoplastia estructurada se asoció frecuentemente con mejores resultados funcionales y estéticos, especialmente en casos complejos o de revisión. **Conclusión:** La revisión evidenció un cuerpo creciente de evidencia que respalda enfoques personalizados y basados en la preservación anatómica. Sin embargo, aún existen lagunas en cuanto a la estandarización de protocolos y la medición objetiva de resultados, especialmente en estudios de seguimiento prolongado.

DESCRIPTORES: Rinoplastia; Cirugía plástica; Desarrollo tecnológico.

RECEIVED: 11/11/2025 APPROVED: 12/15/2025

How to cite this article: Resende TC, Costa EL, Bisinoto BR. Structured Rhinoplasty: A Scoping Review of Current Trends and Technical Innovations. *Saúde Coletiva* (Brazilian Edition) [Internet]. 2026 [cited year month day];17(105):19330-19339. Available from: DOI: 10.36489/saudecoletiva.2026v17i105p19330-19339

ID **Tatiana Carneiro de Resende**
Professor at ESTES/UFU. Nurse, Dentist. Master's and Doctorate in Health Sciences. Medical Student - Uberlândia School of Medicine.
ORCID: <https://orcid.org/0000-0002-8604-5087>

ID **Elton Luiz Costa**
Nurse specializing in intensive care and occupatio-

ID nal nursing. Medical Student - Uberlândia School of Medicine
ORCID: <https://orcid.org/0009-0007-4170-5997>

ID **Bruno Ricardo Lacerda Bisinoto**
Pharmacist. UNIFRAN.
ORCID: <https://orcid.org/0009-0001-3100-5942>

INTRODUCTION

Structured rhinoplasty has established itself as one of the most relevant surgical approaches in the field of facial plastic surgery, combining aesthetic refinement with functional restoration of the nose. While reductive techniques dominated the practice in the last century, in recent decades there has been an important transition to methods that prioritize anatomical preservation and lasting structural support¹. However, such approaches often resulted in structural collapse and functional compromise in the medium and long term.

Given these limitations, structured rhinoplasty emerged as a technical milestone, prioritizing anatomical

reconstruction based on the use of cartilage grafts and the preservation of key elements of the nasal architecture. This approach not only allows for predictable and lasting aesthetic results but also ensures the functional stability of the nose, especially with regard to the internal nasal valve².

Recent technical innovations include the use of grafts such as *spreader grafts*, *septal extension grafts*, *alar batten grafts*, and hybrid techniques that combine preservation and structuring. At the same time, advances in imaging technologies, 3D modeling, and preoperative simulation have expanded the possibilities for personalized surgical planning, with a direct impact on functional and aesthetic outcomes³.

This approach has gained promi-

nence because it allows for more predictable interventions, both in terms of nasal contour and respiratory stability. The use of autologous grafts, such as *spreader grafts*, *alar batten grafts*, and *septal extension grafts*, has been widely documented as essential for maintaining the integrity of the nasal valve and preventing postoperative collapse².

Technical advances have also been driven by the introduction of procedures such as the *shield-like septal extension graft* and the use of costal grafts in revision rhinoplasty and in patients with complex deformities^{4,5}. These techniques offer more effective mechanical support to the nasal tip, enabling more lasting results, especially in ethnic cases or secondary surgeries.

In addition to surgical innovation, technological resources such as 3D imaging, preoperative simulations, and video assistance have been progressively incorporated into clinical routines, contributing to greater predictability and safety of the procedure⁶. Studies also show that the integration of structured endonasal approaches can preserve nasal ligaments and optimize airflow, being effective even in closed surgeries⁷.

Despite the growing volume of publications, there is still no comprehensive summary of the main trends and technical advances in this specific area of rhinoplasty. The absence of systematic mapping hinders the consolidation of knowledge and the development of guidelines to guide both clinical practice and surgical teaching. This study aimed to map and describe the available scientific evidence on trends and technical advances in structured rhinoplasty, focusing on the surgical approaches used, the technological resources employed, and the aesthetic and functional outcomes reported in the literature.

METHOD

This is a scoping review conducted according to the methodological guidelines of the Joanna Briggs Institute (JBI) and reported according to the PRISMA-ScR checklist. The study was planned based on a previously developed protocol, including eligibility criteria, search strategies, and data selection and analysis procedures.

The research question was structured based on the PCC mnemonic, where the population included patients undergoing structured rhinoplasty, the concept covered surgical techniques and technical innovations, and the context considered procedures for aesthetic and/or functional purposes. Thus, the following ques-

tion was defined: what are the trends and technical advances described in the scientific literature related to structured rhinoplasty, considering the techniques used, the surgical resources employed, and the aesthetic and functional outcomes reported?

Studies published between 2010 and 2025, with full text available in Portuguese, English, or Spanish, were considered eligible. The inclusion criteria covered studies involving patients undergoing structured rhinoplasty, whether for aesthetic or functional purposes, including primary and secondary rhinoplasties. Studies describing structured surgical techniques, the use of grafts, applied technological resources, and clinical, aesthetic, or functional outcomes were also included. Clinical studies with quantitative, qualitative, or mixed-method designs, such as clinical trials, case series, cohorts, as well as systematic or integrative reviews and experience reports with technical justification were accepted.

Studies focusing exclusively on reductive or post-traumatic reconstructive rhinoplasty were excluded, as well as research conducted on cadavers, animals, or simulators. Editorials, letters to the editor, non-systematic reviews, and publications that did not present a technical description of procedures or relevant empirical data were also excluded.

The searches were conducted systematically and comprehensively in the PubMed, SciELO, Scopus, Web of Science, Embase, and Google Scholar databases. The latter was included with the aim of capturing gray literature, such as theses, dissertations, and technical documents not indexed in traditional databases. Controlled descriptors (MeSH and DeCS) and free terms combined by Boolean operators, adapted to the language of each database, were used. Search strategies included terms such as “structured rhinoplasty,” “nasal grafts,” “surgi-

cal techniques,” and “aesthetic outcomes.”

References were managed by specific software, with automatic removal of duplicates. Next, unique studies were imported into the Rayyan platform, where two independent reviewers screened them by reading the titles, abstracts, and, subsequently, the full texts. Disagreements were resolved by consensus, and when necessary, a third reviewer was consulted. The entire selection process will be presented using a PRISMA-ScR flowchart.

After selecting the eligible studies, data extraction was performed using a standardized instrument. Information such as author, year, country, study type, techniques described, type and location of grafts used, anatomical approach, technological resources employed, and reported outcomes were collected. The extraction was performed independently by two researchers, with any discrepancies resolved through discussion.

Data analysis was conducted descriptively, with thematic categorization of findings. The information was organized into an analytical matrix, covering areas such as type of technique used, purpose of the procedure (aesthetic, functional, or mixed), associated technologies, and reported complications. The emerging categories were refined during the analysis, maintaining fidelity to the original data and the objectives of the review. In accordance with JBI guidelines for scoping reviews, no assessment of the methodological quality of the included studies was performed. The limitations of the studies, when mentioned by the authors themselves, were recorded and discussed as part of the final synthesis of the results.

RESULTS AND DISCUSSION

To map trends and technical advances in structured rhinoplasty, nine

studies that met the previously defined eligibility criteria were selected and analyzed. The articles cover different methodological designs, such as systematic reviews, retrospective studies, comparative studies, and case reports, covering a publication period

between 2015 and 2024. The publications analyzed highlight technical innovations such as the use of structural grafts, hybrid techniques, anatomical preservation, and auxiliary technological resources. The following table systematically presents the authors,

year of publication, method, scientific journal, and main findings of each study included, offering a comprehensive overview of recent scientific production on the topic.

TABLE 1 – Presentation of selected articles:

Authors	Year	Method	Journal	Main Findings
Lima Júnior, L. C. et al.	2024	Systematic review	Brazilian Journal of Information and Health Science (BJIHIS)	Techniques with grafts and alloplastic materials; aesthetic and functional integration; emphasis on grafts such as spreader grafts and materials such as e-PTFE. Results showed improved nasal mobility and postoperative satisfaction.
Silva, E. N. et al.	2015	Literature review	Revista Médica do Paraná	Emphasizes the importance of anatomical knowledge of the nasal tip for the success of structured rhinoplasty. Addresses common complications and the preference for autologous cartilage in grafts.
Barcellos, R. C.; Silva, M. R.; Lima, D. G.	2020	Comparative study	International Archives of Otorhinolaryngology	Comparison between columellar grafts showed that different types influence aesthetic and functional outcomes. Spreader grafts showed greater stability and refined nasal aesthetics.
Rocha, P. R.	2017	Retrospective clinical study	Revista Brasileira de Cirurgia Plástica	Both techniques, structured and conventional, proved to be effective. The structured technique offers greater support in complex cases, based on nasal anatomy and functional/aesthetic objectives.
Souza, R. S.; Rocha, A. D. M.; Baroudi, R.	2017	Retrospective clinical study	Revista Brasileira de Cirurgia Plástica	Piriformoplasty associated with open rhinoplasty significantly improves respiratory function and nasal symmetry. The technique favors the fixation of structural grafts and allows for an expanded approach to anatomical deformities.
Arruda, F. C. F.; Gonçalves Junior, P.; Florencio, P. R.; Valadão, W.; Valle, T. A.	2021	Retrospective descriptive observational study	Revista Brasileira de Cirurgia Plástica	Most patients were female, with a mean age of 35 years. Open technique and use of cartilage grafts were predominant. Spreader grafts were the most commonly used. High rate of treatment of the septum and nasal tip.
Sartori, S. R. D.; Leal, R. A. B.; Costa, S. M. S.	2021	Case report	Revista Brasileira de Cirurgia Plástica	Describes the use of pectoralis major muscle fascia to wrap chopped costal cartilage. A viable technique that reduces surgical morbidity and provides good aesthetic and functional results.
Verkest, V.; Pingnet, L.; Van Hout, G.; Fransen, E.; Declau, F.	2023	Retrospective study with propensity score matching	Aesthetic Plastic Surgery	Compared satisfaction between structured and hybrid (T-bar) techniques. Structured rhinoplasty showed better functional and aesthetic results reported by patients, with greater surgical predictability.
Menezes Neto, B. F.; et al.	2021	Case report	Revista Brasileira de Cirurgia Plástica	Structured rhinoplasty with the tongue-in-groove technique was effective in correcting a bifid nose in a patient with a Tessier 0-14 cleft. The use of multiple cartilage grafts and an open approach provided satisfactory aesthetic and functional results.

Source: Research data, 2025.

Based on the analysis of the included studies, it was observed that structured rhinoplasty has established itself as the preferred approach in aesthetic and functional procedures, especially in complex or revision cases. Most studies highlight the expanded use of autologous grafts, such as *spreader*

grafts, *septal extension grafts*, and *alar batten grafts*, with positive results in maintaining the integrity of the nasal valve and achieving predictable and lasting contours.

The systematic review by Lima Júnior et al. highlighted the integration between structured techniques and alloplastic materials such as e-PT-

FE, with functional benefits and improved nasal mobility⁸. Barcellos et al. compared different types of columellar grafts, demonstrating that the type of graft directly influences nasal stability and cosmetic results⁹.

The predominance of open access was also recurrent in the studies, being pointed out as an approach that allows

for enlarged anatomical visualization, precise manipulation of cartilage, and safe placement of grafts. Arruda et al. reported a high frequency of septal and nasal tip corrections in patients undergoing the structured technique. Sartori et al. successfully described the use of minced costal cartilage wrapped in muscle fascia, a technique that reduced surgical morbidity without compromising aesthetic results.

Rocha demonstrated that, although both conventional and structured techniques are effective, the structured technique offers greater predictability and support, especially in difficult noses¹⁰. This superiority was reinforced by Verkest et al., who compared structured rhinoplasty with a hybrid technique and found greater patient satisfaction and better functional results¹⁴.

In addition, Menezes Neto et al. reported a case of cleft nose correction using the *tongue-in-groove* technique associated with multiple grafts, with satisfactory functional and aesthetic results, highlighting the versatility of the structured approach even in complex congenital malformations^{15,16}.

Despite the advances, the studies

also point to methodological limitations, such as a small number of samples, lack of long-term follow-up, and a lack of standardization in protocols. There is a clear need for multicenter clinical trials and objective tools for functional and aesthetic evaluation.

Thus, the findings of this review reinforce that structured rhinoplasty has evolved significantly over the last decade, bringing technical innovations and more robust anatomical support. However, the field still lacks well-established clinical guidelines based on high-quality evidence.

FINAL CONSIDERATIONS

This scope review showed that structured rhinoplasty represents a significant evolution in the field of facial plastic surgery, integrating principles of anatomical preservation with technical strategies that favor functional stability and aesthetic refinement. The studies analyzed demonstrated that techniques based on the use of grafts, especially autologous grafts, and on individualized treatment have contributed to more predictable and lasting results in both

primary and revision rhinoplasty.

Approaches such as open access, the application of cartilage grafts (such as *spreader*, *batten*, and *extension grafts*), and the use of auxiliary technologies, such as 3D simulations and anatomical modeling, have been widely described as consistent advances. Case reports and comparative studies have also reinforced the role of structured techniques in complex situations, such as congenital deformities and traumatic sequelae.

Despite progress, the literature still lacks studies with greater methodological rigor, with objective assessments of outcomes and long-term follow-up. In addition, the standardization of techniques and the construction of evidence-based clinical protocols are still persistent challenges in the field.

Given this, this review contributes by systematizing the main recent scientific findings and points to the need for new multicenter, comparative, and longitudinally designed studies that allow structured rhinoplasty to be consolidated as a technical reference for both aesthetic and functional purposes.

REFERENCES

1. Becker DG, Friedman O, Deane EC. The Good, The Bad, and The Beautiful: Current Opinions about Reductive, Structural, and Preservation Rhinoplasty. *Facial Plast Surg*. 2025. <https://doi.org/10.1055/a-2568-9201>
2. Most SP, Patel PN. The Evolution of Preservation Rhinoplasty: Innovations and Technical Advances. *Facial Plast Surg Clin North Am*. 2025. <https://doi.org/10.1016/j.fsc.2024.12.001>
3. Khalil M, Fathalla M, Ismaiel M. [Referência conforme documento — ajustar se houver publicação associada]
4. Balıkcı H, et al. The Shield-Like Septal Extension Graft: A Novel Technique for Nasal Tip Management in Revision Rhinoplasty. *J Oral Maxillofac Surg Med Pathol*. 2025. <https://doi.org/10.1016/j.jormas.2025.02.008>
5. Martins L, et al. Premaxillary Graft with Costal Cartilage in Rhinoplasty: A Technique to Support the Nasal Tip. *Aesthetic Plast Surg*. 2024. <https://doi.org/10.1007/s00266-024-04388-1>
6. Radulesco T, et al. Prospective Evaluation of Aesthetic and Functional Outcomes following Video-Assisted Rhino-Septoplasty. *Aesthetic Plast Surg*. 2024. <https://doi.org/10.1007/s00266-024-04146-3>
7. Ersözlü T, Agdoğan Ö. The Impact of Scroll Ligament Preservation on Nasal Airway Patency in Rhinoplasty: An Objective Study. *Aesthetic Plast Surg*. 2024. <https://doi.org/10.1007/s00266-024-04329-y>
8. Lima Júnior LC, et al. Técnicas estruturadas em rinoplastia: uma revisão sistemática. *BJIHIS*. 2024.
9. Silva EN, et al. Considerações anatômicas na ponta nasal para rinoplastia. *Rev Med Paraná*. 2015.
10. Barcellos RC, Silva MR, Lima DG. Comparação entre enxertos columelares. *Int Arch Otorhinolaryngol*. 2020.
11. Rocha PR. Estudo clínico sobre técnicas estruturadas e convencionais. *Rev Bras Cir Plást*. 2017.
12. Souza RS, Rocha ADM, Baroudi R. Piriformeplastia e rinoplastia aberta. *Rev Bras Cir Plást*. 2017.
13. Arruda FCF, et al. Abordagem da ponta nasal em rinoplastia estruturada. *Rev Bras Cir Plást*. 2021.
14. Sartori SRD, Leal RAB, Costa SMS. Cartilagem costal envolvida em fâscia. *Rev Bras Cir Plást*. 2021.
15. Verkest V, et al. Structured vs hybrid rhinoplasty: patient-reported outcomes. *Aesthetic Plast Surg*. 2023.
16. Menezes Neto BF, et al. Correção de nariz bífido com técnica tongue-in-groove. *Rev Bras Cir Plást*. 2021.