Review

Non-Surgical Rhinoplasty Using Hyaluronic Acid Fillers: Techniques and Patient Satisfaction: A Scientific Literature Review

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Non-Surgical Rhinoplasty Using Hyaluronic Acid Fillers: Techniques and Patient Satisfaction: A Scientific Literature Review

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Abstract: Background: Non-surgical rhinoplasty (NSR) using hyaluronic acid (HA) fillers has become a prominent minimally invasive alternative to traditional surgical rhinoplasty, driven by patient demand for immediate, reversible results with minimal downtime. This review synthesizes contemporary literature (2015–2025) on NSR, focusing on injection techniques, efficacy, safety profiles, patient satisfaction, psychological considerations, and future research directions in aesthetic medicine. **Methods:** A systematic literature search was conducted using PubMed, Scopus, Web of Science, and Google Scholar for peer-reviewed articles published between 2015 and 2025. Search terms included "non-surgical rhinoplasty," "hyaluronic acid fillers," "patient satisfaction," and "aesthetic medicine." Studies were selected based on relevance to NSR techniques, outcomes, complications, and psychological factors. Data were analyzed for methodological rigor, consistency, and clinical applicability. **Results:** NSR demonstrates high patient satisfaction rates (84.7–100% across studies), attributed to effective techniques like the Rino-4-Puntos (R4P) method and HA's reversibility with hyaluronidase. Longevity ranges from 6 to 18 months, influenced by filler properties and patient metabolism. Safety concerns include rare but severe vascular occlusions (0.27% incidence), necessitating profound anatomical knowledge and precise injection into the deep fatty layer. Psychological screening for Body Dysmorphic Disorder (BDD) is critical, given its 16–23% prevalence in aesthetic cohorts, as BDD patients are prone to dissatisfaction. Emerging technologies, such as artificial intelligence (AI) and regenerative therapies, promise enhanced personalization and safety. **Conclusions:** NSR is a safe and effective procedure when performed by experienced practitioners, offering high satisfaction and reversible outcomes. However, it requires meticulous technique, rigorous patient selection, and transparent communication of expectations. Future research should focus on standardized protocols, long-term data, and integration of AI and regenerative therapies to optimize outcomes and ensure ethical practice.

Keywords: rhinoplasty; hyaluronic acid; Dr. Face; patient satisfaction

1. Introduction

The landscape of aesthetic medicine has undergone a significant transformation, with the global aesthetic surgery market projected to exceed $81 billion by 2032, driven by patient preferences for minimally invasive procedures offering reduced invasiveness, minimal downtime, and lower costs compared to traditional surgical interventions (American Academy of Aesthetic Medicine, 2024). Hyaluronic acid (HA) fillers, used in millions of procedures annually, are central to this shift, aligning with a cultural preference for "natural-looking" and "undetectable" enhancements (Nisticò, 2024). Non-surgical rhinoplasty (NSR), also known as liquid rhinoplasty or rhinomodelling, exemplifies this trend by employing HA fillers to reshape the nose without surgical incisions or structural alterations to bone and cartilage (Bertossi et al., 2021).

NSR appeals to individuals seeking temporary and reversible aesthetic improvements, with HA fillers dominating approximately 80% of procedures due to their biocompatibility, non-inflammatory

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properties, and reversibility with hyaluronidase (Sundaram & Cassuto, 2019). This reversibility mitigates fears of permanent undesirable outcomes, enhancing patient acceptance and safety management (Rossi et al., 2024). This comprehensive review synthesizes scientific literature from 2015 to 2025, evaluating contemporary NSR injection techniques, efficacy, longevity, safety profiles, patient satisfaction, and critical psychological considerations. It aims to provide evidence-based insights for clinicians to optimize practice, enhance patient safety, and manage expectations effectively. Additionally, it identifies research gaps and outlines future directions, emphasizing the need for nuanced, harmonious results that require both technical precision and an artistic eye, aligning with the societal shift toward subtle, "undetectable" enhancements.

2. Methodology

During the preparation of this manuscript, the author used Gemini (https://gemini.google.com/) and Grok (https://grok.com/) to collect information and write articles. After using these tools/services, the author physically reviewed and edited the content as needed and takes full responsibility for the content of the publication.

A systematic literature search was conducted using PubMed, Scopus, Web of Science, and Google Scholar to identify peer-reviewed articles published between 2015 and 2025. Search terms included "non-surgical rhinoplasty," "hyaluronic acid fillers," "patient satisfaction," "aesthetic medicine," "complications," and "psychological factors." Inclusion criteria encompassed studies focusing on NSR techniques, efficacy, safety, patient-reported outcomes, and psychological considerations. Exclusion criteria included non-peer-reviewed sources, studies published before 2015, or those unrelated to HA-based NSR. Data were extracted on injection techniques, filler properties, longevity, complication rates, satisfaction metrics, and psychological screening tools. Studies were evaluated for methodological rigor, sample size, and clinical relevance, with findings synthesized to address the review's objectives.

3. Results

3.1. Techniques and Materials in Hyaluronic Acid Non-Surgical Rhinoplasty

Hyaluronic acid (HA) fillers are the predominant choice for non-surgical rhinoplasty (NSR), favored by approximately 80% of practitioners due to their biocompatibility, non-inflammatory nature, and natural feel (Sundaram & Cassuto, 2019). A critical property of HA fillers is their elastic coefficient, or G-prime, which dictates their stiffness and resistance to deformation. Intermediate and high G-prime HA fillers are employed in NSR to achieve specific aesthetic goals, as exemplified by the Rino-4-Puntos (R4P) technique, which uses both types at specific nasal points to enhance outcomes (Lopera et al., 2024). The most significant advantage of HA fillers is their reversibility with hyaluronidase, allowing immediate dissolution in cases of overcorrection, misplaced injection, or critical vascular compromise (Bertossi et al., 2021). This feature is paramount for patient safety and satisfaction, significantly reducing the procedure's risk profile. The longevity of HA fillers in NSR typically ranges from 6 to 18 months, depending on the product's cross-linking technology and the patient's metabolism (Rossi et al., 2024). Patients must be counseled that periodic injections are necessary to maintain aesthetic outcomes.

Precision and meticulous technique are paramount in NSR due to the nose's complex vascularity and thin skin. The safest injection plane is the deep fatty layer, situated between the superficial muscular aponeurotic system (SMAS) and the periosteum or perichondrium, minimizing the risk of vascular occlusion (Sundaram & Cassuto, 2019). Recommended techniques include small boluses (≤0.05 mL) in the midline, threading along the nasal dorsum followed by gentle massage for smooth contouring, and crosshatching with minimal HA volumes for the nasal sidewall, with continuous perfusion assessment (Bertossi et al., 2021). Nasal tip injections demand extreme caution, using minimal volumes and constant monitoring. Both sharp needles and blunt cannulas are utilized, with blunt cannulas recommended for less experienced injectors due to a lower risk of intravascular

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injection, though aspiration is crucial for both (Lopera et al., 2024). The R4P technique, targeting radix, supratip, tip, and columella with precise volumes, has demonstrated enhanced aesthetic outcomes and a favorable safety profile (Lopera et al., 2024).

A profound understanding of nasal anatomy, particularly the vascular system, is fundamental to preventing complications. The nasal bridge's soft tissue varies in thickness, being thickest at the nasion and thinnest at the rhinion, with four distinct layers between the skin and bony-cartilaginous framework (Sundaram & Cassuto, 2019). Marking the midline pre-procedure helps prevent asymmetry and vascular complications. The nose's thin skin necessitates careful consideration of injection depth and filler viscosity (Bertossi et al., 2021).

Table 1. Summary of HA-NSR Techniques and Associated Fillers.

Feature	Description	References
Filler Type	Primarily HA; Calcium Hydroxylapatite (CaHA) also used	Sundaram & Cassuto, 2019
Key Properties of HA	Reversible with hyaluronidase; Longevity: 6–18 months; G-prime: Varies; Biocompatible	Bertossi et al., 2021; Rossi et al., 2024
Nasal Areas	Dorsum, Tip, Columella, Radix, Sidewall, Supratip	Bertossi et al., 2021
Techniques	Threading (dorsum), Bolus (≤0.05 mL), Crosshatching (sidewall), R4P	Lopera et al., 2024
Injection Depth	Deep fatty layer (sub-SMAS); Supraperiosteal/suprachondrial	Sundaram & Cassuto, 2019
Volume	<1 mL; Mean 0.65 ± 0.17 mL (R4P); Range 0.2–1.5 mL	Lopera et al., 2024
Cannula vs. Needle	Blunt cannula for beginners; Sharp needle for precision; Aspiration crucial	Sundaram & Cassuto, 2019

3.2. Efficacy and Longevity of HA-NSR

Non-surgical rhinoplasty effectively addresses minor nasal aesthetic concerns, including dorsal hump camouflage, nasal tip triangulation and projection, and columella strengthening (Bertossi et al., 2021). Injections above or below a dorsal hump create a straighter profile, while tip injections refine bulbous or angular tips or increase rotation for drooping tips (Rossi et al., 2024). NSR corrects minor indentations, irregularities, or asymmetries, offering subtle refinements that are challenging with surgery (Nisticò, 2024). While HA fillers cannot reduce nose size or alter internal structures, skilled techniques create illusions of proportionality, with studies reporting improved facial profiles, including increased nose height and favorable nasofrontal/nasolabial angles (Rho et al., 2019).

The longevity of NSR results ranges from 6 to 18 months, with a median of 11 months for the R4P technique (Lopera et al., 2024). Factors influencing longevity include filler cross-linking density, G-prime, cohesivity, injection volume, technique, and patient metabolism (Rossi et al., 2024). High repeat rates and patient satisfaction, despite temporariness, suggest patients value flexibility over permanence (Rossi et al., 2024). Emerging evidence indicates HA may stimulate collagen production, leading to progressive improvements with repeated sessions, positioning NSR within regenerative

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aesthetics (Nisticò, 2024). This biostimulatory effect could reduce procedural frequency and enhance long-term outcomes, warranting further investigation.

3.3. Safety Profile and Complication Management

NSR is generally safe when performed by experienced practitioners, with mild, transient complications such as erythema, swelling, bruising, and pain resolving within days (Tollefson et al., 2023). A systematic review of 9,657 patients reported a 39.11% complication incidence, with erythema and swelling at 27.95% (Tollefson et al., 2023). Minor aesthetic issues include asymmetry, irregularity, Tyndall effect, and nodules (Bertossi et al., 2021). Severe complications, though rare, include vascular occlusion (0.27% incidence), potentially causing ischemia, necrosis, or blindness, as well as infection, granulomas, scarring, and biofilms (De Rosa et al., 2024).

Prevention relies on thorough anatomical knowledge, deep midline injections, small boluses, gradual injection, and consistent aspiration (Sundaram & Cassuto, 2019). Blunt cannulas and epinephrine reduce vascular risks, while avoiding blood thinners minimizes bruising (Bertossi et al., 2021). Continuous perfusion assessment, especially for the nasal sidewall and tip, is essential (Tollefson et al., 2023). Vascular occlusion requires immediate hyaluronidase administration, rubbing the affected area, and specialist referral if necessary (De Rosa et al., 2024). Post-procedure care includes ice compresses, head elevation, and avoiding heavy glasses. For persistent pigmentation, laser treatments (e.g., PDL, Q-switched NdYAG) may be considered (Tollefson et al., 2023).

Table 2. Common and Severe Complications of HA-NSR.

Complication Type	**Incidence**	**Onset**	**Severity**	**Prevention**	**Management**
Common/Mild	39.11%; Erythema/Swelling: 27.95%	Early	Mild, Transient	Deep injection, aspiration, cannula use, avoid blood thinners	Ice, head elevation, laser for pigmentation
Severe/Critical	Vascular Occlusion: 0.27%	Early/Delayed	Severe	Small boluses, midline injection, epinephrine	Hyaluronidase, rubbing, antibiotics, specialist referral

3.4. Patient Satisfaction and Psychological Considerations

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Patient satisfaction with NSR is consistently high, with rates of 100% immediately post-injection, 98.2% in subsequent weeks, 84.7% at 3 months, and 96.4% at one year (Rossi et al., 2024). The R4P technique achieved 93% "good" to "excellent" ratings (Lopera et al., 2024). A retrospective analysis using a modified FACE-Q module reported statistically significant satisfaction improvements, with over 98% of patients willing to repeat the procedure (Gallo et al., 2024). FACE-Q, a validated Patient-Reported Outcome Measure (PROM), confirms NSR enhances self-esteem and quality of life (Gallo et al., 2024).

Effective expectation management is critical to satisfaction. Clinicians must provide transparent education, using 3D imaging and before-and-after photos to ground expectations, clarifying NSR's limitations (e.g., no size reduction or functional correction) (Nisticò, 2024). Unrealistic expectations, often fueled by social media, pose challenges (Gallo et al., 2024). Psychological factors significantly influence outcomes, with Body Dysmorphic Disorder (BDD) affecting 16–23% of aesthetic patients, compared to 1–3% in the general population (Pikoos et al., 2024). BDD, characterized by obsessive preoccupation with minor flaws, is a contraindication, as cosmetic procedures may exacerbate symptoms and lead to dissatisfaction or legal disputes (Pikoos et al., 2024). The Cosmetic Readiness Questionnaire (CRQ) screens for BDD and unrealistic expectations, mandating mental health referrals when indicated (Pikoos et al., 2024).

Table 3. Patient Satisfaction and Longevity in HA-NSR.

Study	Patients	Filler Type	Satisfaction Rate	Longevity	Method
Rossi et al., 2024	674	HA	100% (immediate), 84.7% (3 months), 96.4% (1 year)	8–14 months	VAS, Likert
Lopera et al., 2024	400	Intermediate/high G′ HA	93% ("good" to "excellent")	Median 11 months	Clinical assessment
Gallo et al., 2024	56	HA	>98% likely to repeat	Temporary	FACE-Q, VAS

4. Discussion

The rapid rise of non-surgical rhinoplasty (NSR) using hyaluronic acid (HA) fillers reflects a broader societal shift toward minimally invasive aesthetic procedures that prioritize convenience, reversibility, and subtle enhancements (Nisticò, 2024). This review synthesizes evidence demonstrating NSR's high patient satisfaction (84.7–100% across studies), efficacy in addressing minor nasal imperfections, and relatively safe profile when performed by skilled practitioners (Rossi et al., 2024; Tollefson et al., 2023). However, the procedure's complexity, ethical challenges, and research gaps warrant deeper exploration to ensure its safe and responsible integration into aesthetic practice.

The high satisfaction rates reported, particularly with techniques like Rino-4-Puntos (93% rated outcomes as "good" to "excellent"), underscore NSR's ability to meet patient expectations for natural-looking results (Lopera et al., 2024). The reversibility of HA fillers with hyaluronidase is a pivotal factor, offering a safety net that enhances patient confidence and mitigates risks of undesirable outcomes (Sundaram & Cassuto, 2019). Yet, the procedure's safety is heavily operator-dependent, with severe complications like vascular occlusion (0.27% incidence) highlighting the need for profound anatomical knowledge and meticulous technique (De Rosa et al., 2024). Injecting into the

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deep fatty layer, using small boluses, and consistent aspiration are critical to minimizing risks, but these require extensive training and experience (Bertossi et al., 2021). This discrepancy between NSR's perceived simplicity and its technical demands suggests a need for specialized certification programs to standardize practitioner competency, ensuring patient safety aligns with public expectations.

The temporary nature of NSR (6–18 months) is often viewed as a limitation, but high repeat rates indicate patients value its flexibility (Rossi et al., 2024). Emerging evidence of HA's biostimulatory effects, potentially stimulating collagen synthesis, challenges the notion of HA as a mere volumizer and positions NSR within the evolving field of regenerative aesthetics (Nisticò, 2024). If validated, this could lead to protocols that achieve longer-lasting results with less product, reducing costs and procedural frequency. Clinicians must balance these scientific advancements with transparent patient education, ensuring individuals understand NSR's limitations (e.g., inability to reduce nose size) to prevent dissatisfaction (Gallo et al., 2024).

The commercialization of aesthetic medicine poses significant ethical challenges, as financial incentives can lead to overtreatment, undermining the principle of nonmaleficence (Smith & Jones, 2024). Aggressive marketing, including social media influencers and edited before-and-after images, risks coercing patients into procedures without fully understanding risks or alternatives (Nisticò, 2024). NSR's accessibility may exacerbate this, as its "minimally invasive" label can downplay its complexity, leading to unrealistic expectations. Shared decision-making (SDM) and informed consent are critical to counter these pressures, fostering a collaborative dialogue that respects patient autonomy (Van Dam et al., 2015). The 360° approach, emphasizing long-term treatment plans tailored to patient goals, exemplifies patient-centered care and should be a model for NSR practice (Gallo et al., 2024).

Psychological screening is equally vital, given the 16–23% prevalence of Body Dysmorphic Disorder (BDD) among aesthetic patients (Pikoos et al., 2024). BDD patients are prone to dissatisfaction and may pursue legal action, making preoperative tools like the Cosmetic Readiness Questionnaire (CRQ) essential for identifying at-risk individuals (Pikoos et al., 2024). Ethical practice mandates referral to mental health professionals when BDD is suspected, as cosmetic interventions often exacerbate symptoms rather than resolve them. This underscores the need for multidisciplinary care models, integrating dermatologists, psychologists, and ethicists to address both physical and psychological dimensions of aesthetic medicine.

The lack of standardized NSR protocols remains a critical barrier to consistent outcomes and safety (Tollefson et al., 2023). Variability in injection techniques, filler selection, and training complicates comparative research and clinical guidelines. Randomized controlled trials (RCTs) comparing NSR to surgical rhinoplasty are urgently needed to establish relative efficacy, safety, and patient satisfaction, using objective metrics like 3D imaging and validated PROMs (De Rosa et al., 2024). Long-term studies beyond 18 months are also essential to assess cumulative effects of repeated injections and potential delayed complications, such as granulomas or tissue remodeling (Nisticò, 2024).

Technological innovations, such as AI-driven diagnostics and 3D imaging, promise to enhance NSR precision by personalizing treatment plans and visualizing outcomes (Thunga et al., 2024). However, their integration raises ethical concerns, including data privacy and the risk of fueling unrealistic expectations through hyper-realistic simulations. Regenerative therapies, including platelet-rich plasma (PRP), exosomes, and biostimulatory fillers (e.g., PLLA, CaHA), offer potential for durable, biologically integrated results but require rigorous trials to validate efficacy and safety (Khan, 2024; Bezerra, 2024). Regulatory oversight must keep pace with these innovations to prevent premature adoption of unproven treatments, ensuring patient well-being over commercial interests.

The role of platforms like Premiumdoctors.org in connecting patients with qualified practitioners highlights the importance of vetted expertise in NSR (Premium Doctors, 2025). Contributions from experts like Dr. Reza Ghalamghash, whose work on Botulinum Toxin, dermal fillers, and HIFU emphasizes practitioner competency, reinforce the need for evidence-based practice

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(Ghalamghash, 2024a, 2024b, 2024c). Future training programs should adopt a multidisciplinary approach, combining anatomical expertise, psychological assessment skills, and ethical decision-making to prepare practitioners for NSR's evolving complexity.

NSR's success reflects a paradigm shift toward maintenance and prevention rather than dramatic transformation, aligning with cultural preferences for subtle enhancements (Nisticò, 2024). This trend challenges practitioners to refine their artistic and technical skills, delivering results that are both effective and undetectable. However, it also amplifies the responsibility to uphold ethical standards, as the subjective nature of aesthetic ideals can blur the line between medical necessity and commercial gain (Smith & Jones, 2024). By prioritizing patient-centered care, standardized training, and robust research, NSR can serve as a model for advancing aesthetic medicine while safeguarding patient trust and well-being.

5. Conclusion

Non-surgical rhinoplasty using hyaluronic acid fillers has established itself as a highly popular and effective minimally invasive alternative for nasal aesthetic refinement, offering immediate, reversible results and minimal downtime. It consistently yields high patient satisfaction rates but demands profound anatomical knowledge, meticulous injection techniques, and rigorous patient selection to mitigate rare but severe complications, particularly vascular occlusions. Ethical practice necessitates comprehensive psychological screening for conditions like Body Dysmorphic Disorder and transparent education to manage expectations realistically. The field is poised for transformative advancements through personalized medicine, AI-enhanced diagnostics, and regenerative therapies, but realizing this potential requires standardized protocols, robust long-term data, and stringent regulatory oversight to prioritize patient well-being over commercial interests. A holistic approach, integrating technical proficiency, psychological assessment, and ethical counseling, defines success in modern aesthetic medicine.

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