

Nonsurgical Rhinoplasty: Long-Term Follow-Up of High G' HA Nasal Injections

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Abstract

Keywords

- ▶ rhinoplasty
- ▶ hyaluronic acid
- ▶ nonsurgical rhinoplasty
- ▶ facial
- ▶ aesthetic

Rhinoplasty is one of the most requested aesthetic procedures performed by plastic surgeons world-wide and nonsurgical rhinoplasty is becoming the gold standard in aesthetic nasal treatment. Follow-up clinical examinations were performed on all 107 patients, being a safe and predictable technique with a high degree of satisfaction for the patients. Nonsurgical rhinoplasty using hyaluronic acid is an effective, fast, and safe nasal reshaping procedure with a high degree of patient satisfaction. Generally, due to the gradual reabsorption of the filler, the results last up to 8 to 12 months after treatment, making it a valid minimally invasive alternative to surgical rhinoplasty. Consequently, to maintain the effects it is necessary to repeat the treatment once a year.

Rhinoplasty is one of the most requested aesthetic procedures performed by plastic surgeons world-wide and nonsurgical rhinoplasty is becoming the gold standard in aesthetic nasal treatment.¹ In this article, follow-up clinical examinations were performed on all 107 patients, being a safe and predictable technique with a high degree of satisfaction for the patients.

For some years to date, the American Society for Aesthetic Plastic Surgery and the American Society of Plastic Surgeons have shown a steady increase in requests for nonsurgical rhinoplasty.² Actually, on the total cosmetic procedures performed in 2020 in the United States, minimally invasive procedures accounted for >85%.³

While major structural changes in the nose are best achieved through osseocartilaginous structure surgery, soft tissue fillers offer an excellent method of augmenting areas or perfecting irregularities.⁴

The most employed soft-tissue fillers are composed of crosslinked hyaluronic acid (HA) molecules,¹ with high G' and high cohesively properties. The popularity of HA injection as a well-accepted alternative to surgical rhinoplasty is due to its immediate aesthetic results, no need for general anesthesia, minimal downtime associated with recovery, cost-effective, good safety profile,⁵ and with the advantage of being reversible with hyaluronidase.⁶

Generally, nonsurgical rhinoplasty is considered a non-permanent procedure. Usually, the duration of the effect persists from 8 to 12 months but based on the authors' experience it can persist even >12 months. This could be due to the type of filler used or the individual variability of product degradation.

Although there are several studies on the longevity and efficacy of various dermal fillers used for various purposes in the facial area,^{7–11} there are only few accurate studies

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focused on the long-term effects of HA fillers in the nasal region.¹²⁻¹⁵ Thus, the aim of our study was to evaluate the duration and long-term effects of HA fillers for nose correction through an accurate anthropometric and instrumental analysis.

Materials and Methods

Study Design

A total of 107 patients ($n = 107$) were treated by the first author between October 2019 and October 2021 with only one session of HA injections. This cohort included 33 Caucasian males and 74 Caucasian females aged between 19 and 57 years (mean 36.7 years). Informed consent was obtained from all patients before treatment.

Exclusion criteria comprised the following: previous facial surgical treatments, abnormal skin thickness and texture, history of sinusitis or rhinitis, connective tissue disease, congenital or iatrogenic bleeding disorders, known hypersensitivity to lidocaine or HA, and requiring dental or oral surgery.

Types of nose deformity treated were nasal hump, inadequate nasal projection, acute nasolabial angle (NLA), hidden columella, crooked nose, saddle nose, and nasal base asymmetry.

Injection Plan and Procedure

Treatment was based on a nasal grid analysis technique¹² (► Fig. 1A, B) during an initial analysis consultation before

filler injection. The grid was traced onto the patient's nose with dermatographic pencils. This analysis (overlaid with nasal anatomy and significant nasal landmarks) allowed precise records of the defective areas and the quantity of injected HA.

The procedure begins with skin disinfection using 75% alcohol solution. The nasal grid analysis was traced, and the treatment performed by a sole injector following the injecting protocol. We used a HA gel crosslinked with Vycross technology with a very high G' (VYC-25; Allergan, Inc., Irvine, CA), 25 mg/mL with 0.3% lidocaine, characterized by intrinsic viscosity and cohesivity. A 27-gauge, 13-mm needle was used.

The volume range of the HA filler injected was between 0.4 and 1.7 mL (0.9 mL on average). For all injections, several key precautions were taken to minimize the risk of vascular complications. The plane of injection was supraperiosteal injection in the glabella/nasal dorsum/anterior nasal spine/columella and deep dermal into the nasal ala/tip and also permitted in the glabella in addition to the supraperiosteal injections.

Following the nasal grid points, associated defects of the nasal structure were treated with the following sequence: subnasal (Sn), right nasal bone area (Rnb) and left nasal bone area (Lnb), nasal tip (Nt), and nasion (Na) and nasal dorsum (Nd). The remaining points through the grid are right and left nasal ala and right and left nasal base (Rna, Lna and Rnb, Lnb) for each side.

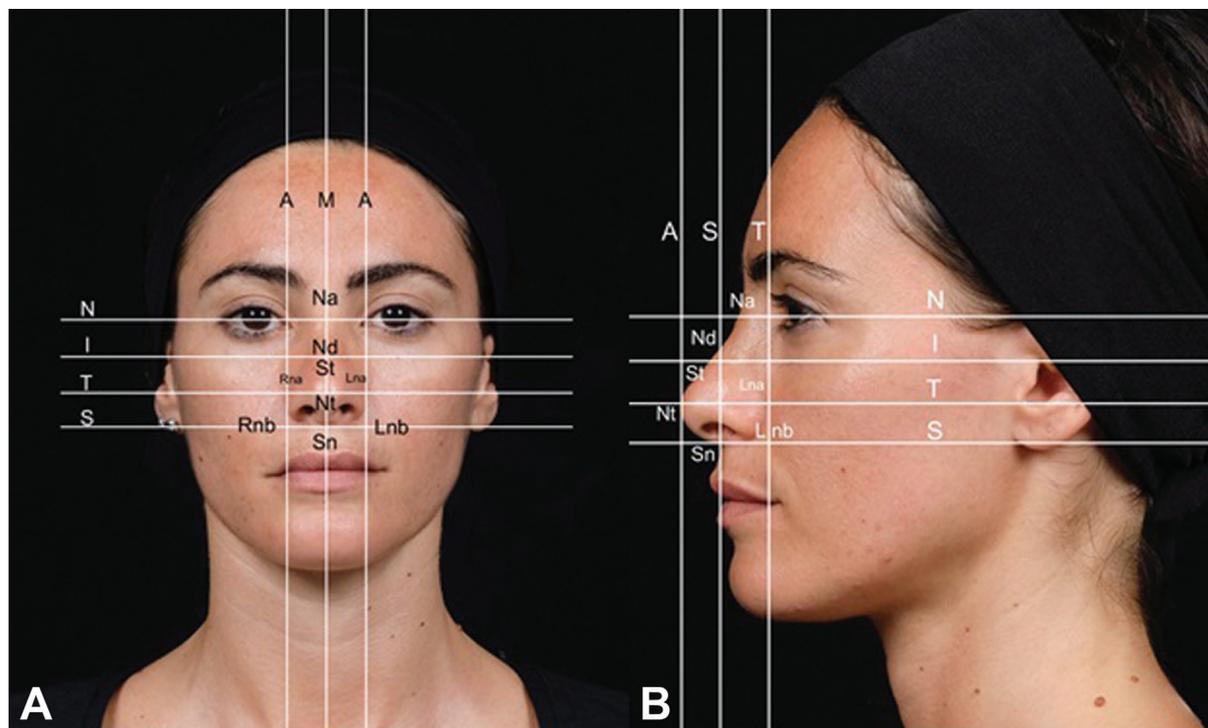


Fig. 1 (A and B) Frontal and lateral view illustration of the nasal grid area in a 28-year-old woman. Vertical lines are: M (midline, through the midline interpupillary to the subnasal point); A (nasal ala, bilateral line running through nasal ala insertion parallel to M); S (on profile view, passing through the subnasal); and T (on profile view, passing through the most protruding point of the nasal tip). Horizontal lines are: S (through the subnasal perpendicular to line M), T (through the nasal tip perpendicular to line M), N (through the nasion perpendicular to line M), and I (intermediate between N and T perpendicular to line M). Specific points are Na (nasion), Nd (nasal dorsum), St (supratip), Nt (nasal tip), Sn (subnasal), Rnb (right nasal bone area), and Lnb (left nasal bone area).

Patients were asked to avoid unnecessary external compression of the nose, which could cause filler displacement, indentation, or depression of the dorsal surface.

Assessments

Patient age, sex, and nasal defects were recorded for all enrolled patients at baseline. Follow-up clinical examinations were performed on all 107 patients. The first post-treatment evaluation for efficacy was conducted at week 4; then, using the same methods of analysis, patients were evaluated at 1 week, 1 month, 6 months, and 12 months.

All the patients were subjected to an accurate photogrammetric analysis. Photographs were taken before the injection and at follow-up intervals: frontal, lateral, 45 degrees bilateral, basal, superior, and above below views.

We evaluated the volume stability with ultrasound (US) and clinical pictures.

Taking as reference the mid-pupillary line (MPL), we monitored the sagittal pre- and posttreatment distance of the following soft-tissue points: Na, Nd, Nt, Sn, NLA. All these anthropometric factors were measured and compared before and after treatment (►Fig. 2).

The second part of our analysis was the nasal UA analysis that we carefully performed in four patients to evaluate the amount of residual HA filler 12 months after the procedure.

Complications were assessed throughout treatment and follow-up.

Statistical Analysis

Descriptive statistics are provided throughout, including mean, standard deviation, and range for continuous variables, and frequency and percentage for categorical variables. A Wilcoxon test was performed for statistics at $p < 0.05$

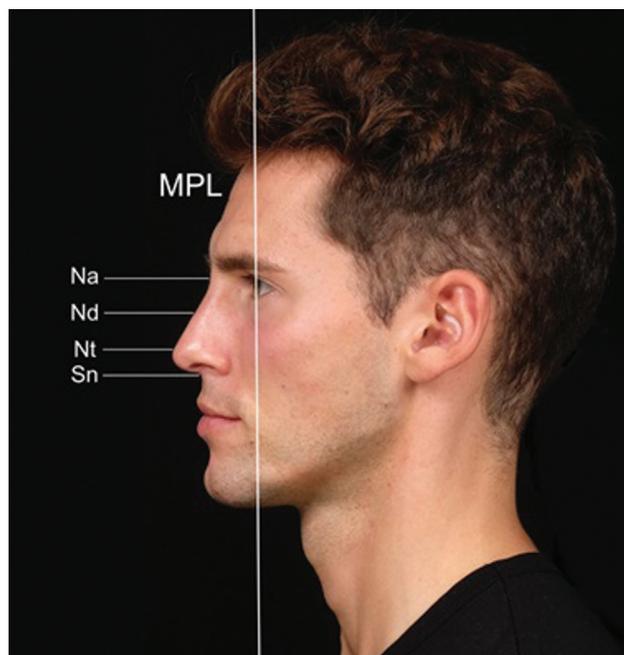


Fig. 2 Mid-pupillary line (MPL).

Table 1 Defects identified and treated

	Dorsal hump	Deprojected nose	Downrotated tip
Total ($n = 107$)	89	11	7
Female ($n = 74$)	63	8	5
Male ($n = 33$)	26	3	2

Results

A total of 107 patients were included in the analysis. The mean age was 36 ± 7 years (range, 19–57 years). The group included 33 males (30.8%) and 74 females (69.2%). Patients were followed-up for 14 months.

The nasal grid became the reference for the quantity and sequencing of injections, increasing the potential for reproducible future treatment. The following defects were recorded and treated at baseline utilizing the grid (►Table 1): dorsal nasal hump, $n = 88$ (83.2%); deprojected nose, $n = 11$ (10.3%); tip downrotated, $n = 7$ (6.5%). No more nose treatments were done on patients during the follow-up period.

The average injection volume was 1.0 to 0.5 mL for nasal dorsum augmentation, 1.0 to 0.4 mL for tip rotation, and 1.7 to 0.6 mL for whole nose augmentation. By specific subsites of injection, the average injected volume was 0.4 to 0.3 mL for the glabella-to-radix area, 0.9 to 0.5 mL for the nasal dorsum, 0.5 to 0.3 mL for the nasal tip, and 0.8 to 0.4 mL for the columella–nasolabial junction, respectively.

All treated patients ($n = 107$) demonstrated good improvement at the end stage in the photographic analysis, especially in the lateral view.

We especially focused on morphological changes in the long term through an accurate photogrammetric analysis and the execution of a nasal US in selected patients. At the 14 months after treatment control, all patients were re-evaluated. The results of our photogrammetric analysis are shown in ►Table 2 as the average of the measurements of all patients (►Figs. 3 and 4).

With the use of nasal pyramid US that we performed in four patients, we observed and analyzed the long-term effects of nonsurgical rhinoplasty (►Fig. 5). With the focus on the residual amount of the filler in soft-tissues of the nose, we could observe a volume contraction of approximately 30% after 6 months and approximately 50% 12 months after treatment.

Discussion

Nonsurgical rhinoplasty is one of the newest applications of dermal fillers to improve the profile and to correct defects of the nose and is becoming the gold standard in nasal aesthetic treatment, being a safe and predictable technique with a high degree of patient satisfaction.¹⁶

Careful selection of patients and knowledge of nasal anatomy and filler rheology are crucial.⁴ Most common

Table 2 Comparison of the mean of the anthropometric factors of the patients in the period following the treatment with respect to the mid-pupillary line

Anthropometric factors	Pretreatment	Immediately postinjection	12 months postinjection	Difference
Nasion	1.72 ± 0.5 cm	2.5 ± 0.7 cm	2.19 ± 0.5 cm	0.31 ± 0.5 cm (−40%) <i>p</i> < 0.01
Nasal dorsum	2.77 ± 0.7 cm	3.21 ± 0.8 cm	3.16 ± 0.6 cm	0.05 ± 0.6 cm (−10%) <i>p</i> < 0.05
Nasal tip	3.66 ± 1.1 cm	4.5 ± 1.0 cm	4.12 ± 0.6 cm	0.38 ± 0.8 cm (−45%) <i>p</i> < 0.001
Subnasal	2.4 ± 0.9 cm	2.7 ± 0.8 cm	2.65 ± 0.7 cm	0.05 ± 0.7 cm (−16%) <i>p</i> < 0.02
NLA	92.3° ± 6°	99.5° ± 9°	94.5° ± 9°	−5.0° ± 7° (−5%) <i>p</i> < 0.05

Abbreviation: NLA, nasolabial angle.



Fig. 3 Frontal and lateral views of a 24-year-old woman before (A, C) and 8 months (B, D) after treatment of the nose with VYC-25L filler.

indications are minor defects of the nose, such as pronounced hump, under-projected tip, nasal depressions, saddle nose, and correction of trauma outcomes. Moreover, the injection of HA filler can also be used as a complement to surgery or for the correction of minor postsurgical defects (5–15% of surgical rhinoplasties).⁶ But when patients' expectations are greater than possible corrections with HA injections, it is necessary to move to a rhinoplasty surgery.



Fig. 4 Frontal and lateral views of a 32-year-old woman before (A, C) and 8 months (B, D) after treatment of the nose with VYC-25L filler.

A high degree of patient satisfaction is explained by the immediate aesthetic results that can be obtained with fillers, stable results, no need for general anesthesia, and low cost. The nonpermanent nature of HA and reversibility with hyaluronidase are also favorable properties.¹⁷ In addition to these benefits, a key factor for many patients is the absence of recovery time. Nonsurgical rhinoplasty with an HA filler

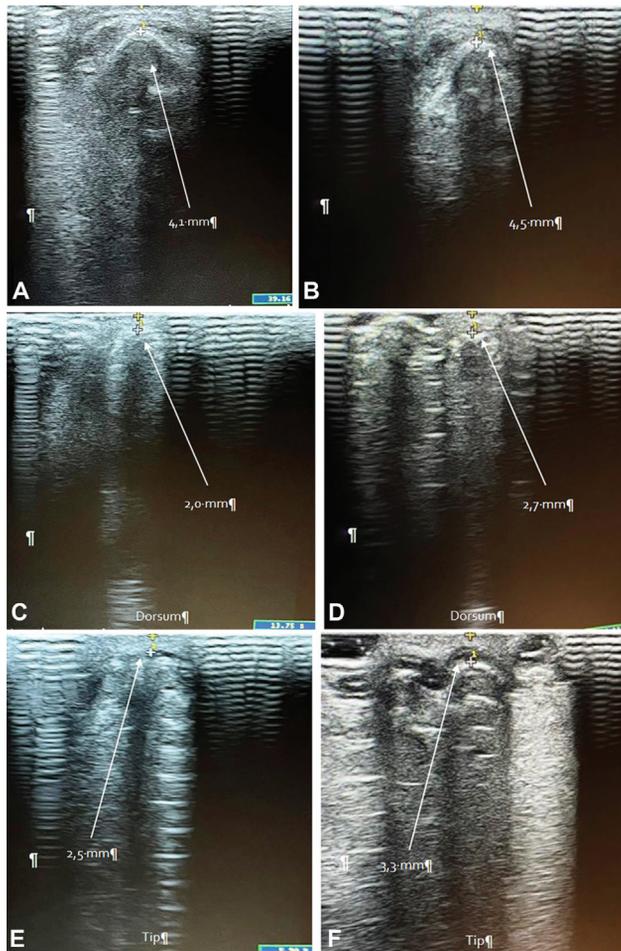


Fig. 5 Ultrasound images of the nose of a 30-year-old woman immediately before treatment and 8 months after treatment. Nasion (A, B), nasal dorsum (C, D), nasal tip (E, F).

allows individuals to return to work and other commitments as rapidly as the same day.

In this study we used a grid template in all 107 patients for mapping anatomical landmarks and nasal regions, as previously published.^{18,19} This tool helped us to be aware of the danger territories and to be logical in our sequencing of treatment areas. It gave support to the injector to standardize the treatment and to the reproducibility of the procedure.

To the best of our knowledge, there are several published studies that report reliable and effective data on the permanence of HA-based dermal fillers in the long term,^{7–11} but there are only few studies focused on the longevity of dermal fillers used in the nasal area.^{12–15}

There are different types of HA-based substances, with different concentrations and different biochemical structures.^{20,21} High G' HA gel is currently the gold standard, and it is advisable to choose a high viscosity or highly cohesive filler. Generally, in the nonsurgical rhinoplasty technique, a filler with a high concentration of crosslinked HA is used, which lasts approximately 8 to 12 months. Other types of semi-permanent dermal fillers are also available. But semi-permanent filler such as calcium HA or permanent soft tissue fillers can also dislocate and produce severe granulomatous reactions with nasal cellulitis, nodules, and

ulcers that are difficult to treat and cannot be reversed in the case of intravascular injection.^{22,23} For this reason, nowadays they are almost never used in aesthetic medicine.

Our analysis revealed how HA dermal fillers persist over the long term and how there is a constant decrease over time in their effective volume in the nasal region. We have been able to observe how the effects of nonsurgical rhinoplasty are maintained up to 8 to 12 months from the injection and how they can be seen in some cases even after 12 months. This duration range may reflect the individual variability in gel degradation, which has been reported from clinical studies. Possible explanations may be lower degradation rates in the nose, minimal muscle activity, and/or differences in metabolic activity compared with, for example, the lips and nasolabial folds.⁶

Probably in the future new types of HA fillers will be studied and marketed with a different biochemical and molecular structure that allows to guarantee longer lasting results than those currently available in conjunction with a non-increase in risks for patients.^{24–31}

The results have also demonstrated that most side effects of facial fillers are transient and minor in nature.¹⁷ Complications are rare, and they include infections, lumps, Tyndall effect, vascular compromise, and necrosis.^{21,32–34} Bleeding is associated with patient use of aspirin, nonsteroidal anti-inflammatory drugs, or blood-thinning medications. In such cases, the treatment must be delayed. In this study, we did not record any case of skin necrosis and/or blindness, or transitory visual disturbances in post-surgical cases. It is believed that this is related to the deep placement of HA, just above the periosteum and the perichondrium, and staying in the midline. Aspiration is mandatory.

Conclusion

Nonsurgical rhinoplasty using HA is an effective, fast, and safe nasal reshaping procedure with a high degree of patient satisfaction. Generally, due to the gradual reabsorption of the filler, the results last up to 8 to 12 months after treatment, making it a valid minimally invasive alternative to surgical rhinoplasty. Consequently, to maintain the effects it is necessary to repeat the treatment once a year.

Conflict of Interest

None declared.

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