Fat Grafting to the Nose

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Juan Monreal

48.1 Introduction

In recent years, clinicians are facing an increasing number of patients wishing to achieve an aesthetic improvement of nasal shape without having to undergo surgical rhinoplasty. Although surgical rhinoplasty must be the primary indication in any patient seeking aesthetic improvement of the nose, the ability to smooth out irregularities or contour deformities and asymmetries with an injectable material holds great appeal due to apparent simplicity. The ability to fix a deformity with local or no anesthesia, less financial expense, and no downtime is an appealing advantage. The great majority of treatments the author has witnessed include or are based on using permanent or semipermanent fillers injected to the dorsum, tip, and columela. Regarding semipermanent fillers, clinicians have an acceptable degree of safety pending on an even and complete resorption, but still clinicians must face some potential complications [1, 2]. The patient must forego a permanent result unless he or she has repeat injections on a regular basis, and in the event that the patient finally wishes to undergo a standard surgical rhinoplasty, clinicians must wait for the complete resorption of the implant until surgical planning can be done with confidence. The use of permanent fillers in the nose poses additional risks of severe adverse reactions, skin necrosis, and extrusion and addition of the almost complete difficulty in a thorough evacuation of the filler and the obvious difficulties in eventual surgical planning.

The author will discuss his experience in nonsurgical rhinoplasty using autologous fat grafting instead of injectable fillers in patients that refused primary or secondary surgical rhinoplasties. It will be discussed as well the combination of open or closed rhinoplasty with fat grafting to paranasal regions to get equal or better results than with cartilage grafts or solid prosthesis in same regions.

48.2 Author's Experience

From April 2007, the author has performed 51 procedures in 48 patients with a maximum follow-up of 18 months and a mean follow-up of 8 months. In 23 patients, nasal lipoimplants were done as the unique method of improving nasal aesthetics whether it was previously operated or not (Fig. 48.1, 48.2, and 48.3). In these cases, patients always refused a standard rhinoplasty although they all were informed and advised about the differences in final results, limitations, and aesthetic improvements that each technique

J. Monreal, M.D.
Plastic, Reconstructive and Aesthetic Surgery,
San Rafael Hospital, Serrano, 207-1º, 28016,
Madrid, Spain

Plastic, Reconstructive and Aesthetic Surgery,
San Rafael Hospital,
Madrid, Spain
e-mail: juanmonreal@me.com

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Fig. 48.1 (**a**) Preoperative view of a patient after a previous rhinoplasty performed by another surgeon. (**b**) Postoperative view at 6 months of nasal lipoimplant and touch-up procedure to improve dorsal and tip contours

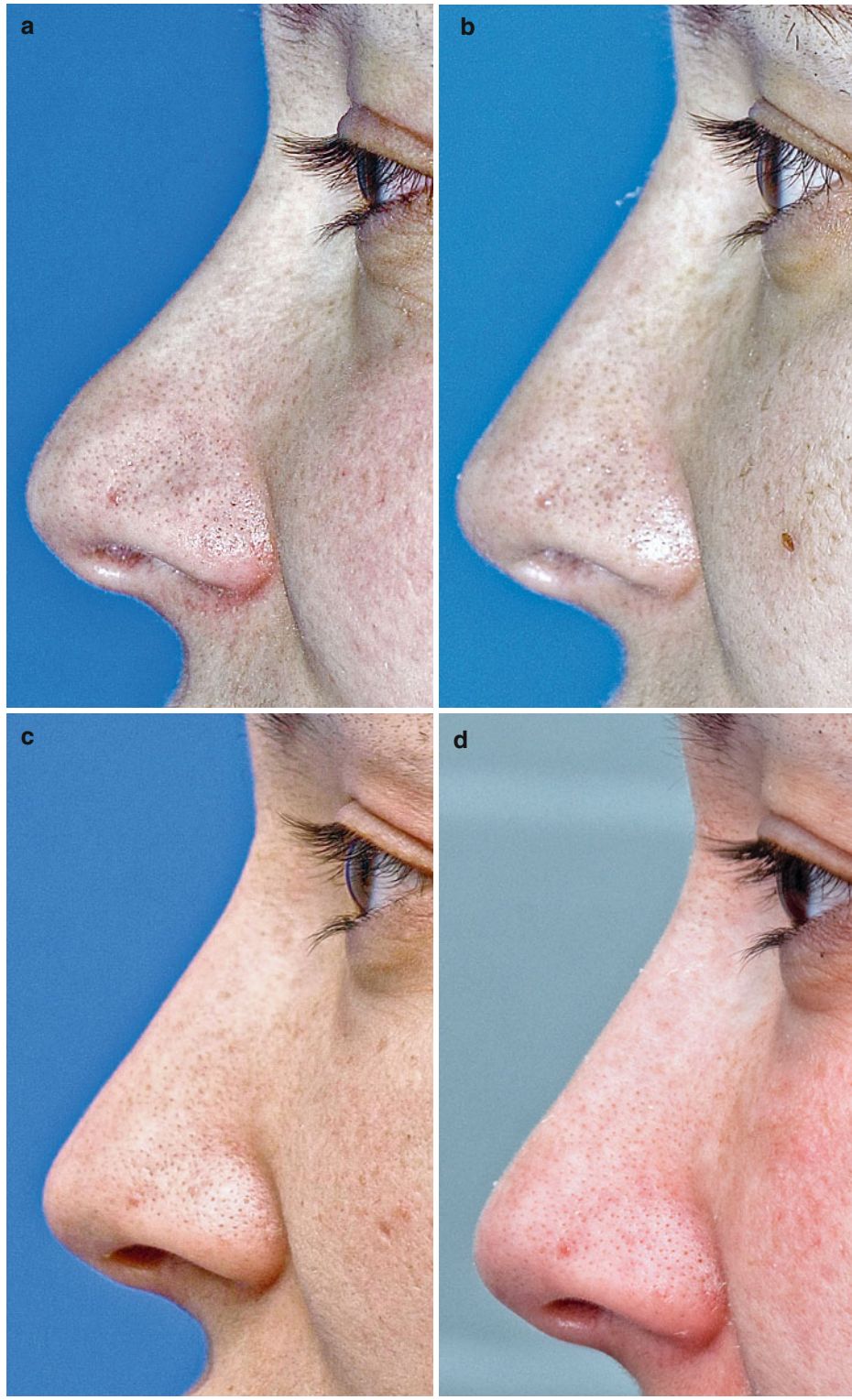

Fig. 48.2 (**a**) Preoperative. (**b**) Postoperative at 2 weeks. (**c**) Six-month postoperative. (**d**) Fourteen months after nasal lipoimplant to improve tip and dorsum contours

Fig. 48.3 (**a**) Preoperative. (**b**) Five-month postoperative. (**c**) Twelve months after performing nasal lipoimplant to correct slight dorsal deviation and pinching of the tip

Fig. 48.4 (**a**) Preoperative. (**b**) Twelve-month postoperative following a combination of open rhinoplasty and lipoimplant to premaxillary area to improve facial profile and nasal base proportions

can provide. All patients were informed and acknowledged these limitations when comparing lipoimplant with a surgical rhinoplasty.

The remaining 25 patients underwent nasal lipoimplants as a complement to surgical rhinoplasty (open or closed) with the aim of reshaping bony dorsum, radix, glabella, or premaxillary region (Fig. 48.4). Traditionally, patients presenting with short nasal bones, frontal recession, or premaxillary retrusion have been treated with

Fig. 48.5 (**a**, **b**) Preoperative. (**c**, **d**) Postoperative nasal lipoimplant to improve irregularities of a previous rhinoplasty. (**e**, **f**) Note the excellent smooth contours after 6 months

cartilage grafts or solid prosthesis during rhinoplasties to supplement deficient bone in this area. In this study, fat grafts were used instead of cartilage or prosthesis to supplement deficient bone to assess their efficacy.

Nasal reshaping performed only with lipoimplants is done under local anesthesia, using 3–12 mL of fat harvested from lower abdomen or inner thighs. All lipoimplants performed in combination with rhinoplasties were done under general anesthesia, using 6–12 mL of fat harvested from the same areas. Due to severe postrhinoplasty deformities, three patients needed an additional procedure to refine the final result (Fig. 48.5).

Follow-ups were scheduled at 7 days, 15 days, 3 months, 6 months, and 12 months although unfortunately it was not easy to get patients back

in the office from the sixth postoperative month. Basic analysis including changes in volume and shape, aesthetic improvement, and patient satisfaction was performed by comparing preoperative and postoperative photographic controls.

48.3 Nasal Danger Zones and Technical Details

The arterial supply of the nose is derived from the ophthalmic artery and facial artery (Fig. 48.6). The ophthalmic artery arises from the internal carotid, just as that vessel is emerging from the cavernous sinus. The central retinal artery is the first and one of the smaller branches of the ophthalmic artery. The ophthalmic artery terminates in two branches, the supratrochlear artery and the dorsal nasal artery. The dorsal nasal artery emerges from the orbit above the medial palpebral ligament and divides into two branches: the first one crosses the root of the nose and anastomoses with the angular artery and the other runs along the dorsum of the nose supplying its outer surface in its route towards the nasal tip and anastomoses with its fellow artery of the opposite side and with the lateral nasal branch of the facial artery.

The lateral nasal artery is derived from the facial artery as that vessel ascends along the side of the nose. It supplies the ala and dorsum of the nose, anastomosing with its fellow, with the septal and alar branches, with the dorsal nasal branch of the ophthalmic, and with the infraorbital branch of the internal maxillary. Finally, the columellar artery, a branch of the superior labial artery, runs up the columella, ending and anastomosing in the tip with branches of the lateral nasal artery.

From this anatomical review, clinicians can obtain the main conclusions. The proximal blood supply of the nose has direct and short connections with the internal carotid and retinal arteries. This means that embolization of this network during injection in the area of the dorsum, radix, or glabella can cause a variety of disastrous consequences such us blindness or brain infraction [1, 3]. The distal blood supply, mainly at the tip and in alar regions, can be affected by embolization, causing a variety of ischemic phenomena.

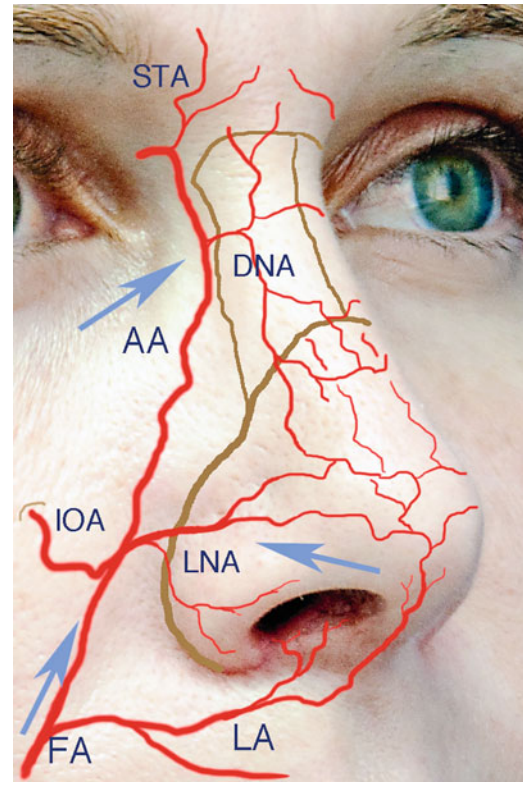

Fig. 48.6 Main arterial supply of the nose and danger zones regarding fat injection (*blue arrows*). *STA* supratrochlear artery, *DNA* dorsal nasal artery, *AA* angular artery, *IOA* infraorbital artery, *LNA* lateral nasal artery, *LA* superior labial artery, *FA* facial artery

Thus, it is of outmost importance to follow the same strict principles when performing fat grafting to the nose as in any other facial region if one wishes to avoid serious complications. The use of blunt-tip cannulas whenever possible reduces the chance of perforating the arterial wall and thus cannulating the arterial lumen. Applying soft pressure to the plunger of the syringe will aid to deposit the smallest fat fragments possible and to reduce as well the chance of propelling the fat through arterial lumen in the event it is cannulated. Unfortunately, fat grafting to the nose in some previously operated patients is more challenging due to two main reasons: First, blood supply architecture is usually distorted and tissue planes less identifiable, and second, fat grafting

Fig. 48.7 Cannulas used by the author since 1998 to perform atraumatic harvest of 2–3-mm fat fragments

through blunt-tip cannulas can be difficult due to severe soft tissue scarring and adherence, particularly over the nasal dorsum. In these cases, fat grafting is performed with 18-gauge needles.

Fat grafting to the nose does not differ so much from the technique used in other body areas, as reported previously [4–6] including the treatment of perinasal areas such as the premaxillary region [6]. The technique consists basically of atraumatic harvesting under local anesthesia of fat fragments using a 3-mm multi-orifice cannula (Fig. 48.7) attached to 10-mL syringes. This kind of cannula allows harvesting of 2–3-mm fat fragments with ease. Usually, it is not necessary to obtain more than 12 mL of fat ready for injection to treat the whole nose and perinasal areas. This usually means that clinicians need to harvest at least 24 mL of lipoaspirate due to the loss of tissue during washing and decanting process. Harvested fat is washed with Ringer lactate and allowed to decant for 20 min. Once decanted, fat can be cautiously passed to smaller syringes of 1 or 2.5 mL for easily handling. Fat is injected routinely in a retrograde manner using 1.2–1.4-mm blunt-tip cannulas and applying very gentle pressure on the plunger. The author is using conventional 18-gauge needles only when dealing with highly adherent or fibrous tissues in the nasal dorsum of previously operated patients. There is no need to use conventional sharp needles in primary cases as they pose an additional risk of intravascular injection with disastrous consequences. In any case, the clinician must have in mind all danger zones and vascular territories of the nose to prevent an unwanted intravascular injection. Special care must be taken when dealing with supratip and glabellar region introducing cannula or needle from the tip as these approaches are most at risk.

The clinician can take advantage of two main tissue planes when injecting fat in the nose. Sub-SMAS plane is present along the entire nasal dorsum, and it has continuity with radix and glabella. Subcutaneous plane is also useful in the dorsum and is the only plane the clinician will find over the tip and lateral crura of lower lateral cartilages. In secondary cases, clinicians should be cautious as probably clinicians will not find these planes with ease, and different degrees of fibrosis will impair cannula advancement and fat placement. Clinicians are asked to always evaluate and remember the vascular anatomy of the patient's nose and glabellar area to avoid severe complications such as intravascular injection of fat.

Unlike other body and face areas where the usual approach is to create a three-dimensional mesh, the soft tissues of the nose do not allow this approach. This is the reason why clinicians need to be cautious when performing fat injection, both in quantity and location. Due to the relative small caliber of cannulas and needles used in nasal fat grafting, clinicians can choose whatever access point they need; however, it is preferable to avoid entering the nasal skin directly or near the principal arterial trunks of the nose. The author usually performs fat grafting to the nose under regional block of the nose, avoiding direct infiltration of nasal tissues to avoid any distortion of profile. Once the procedure is finished, the author routinely does not use any splint or tape to immobilize nasal tissues.

Those nasal lipomplants performed in combination with rhinoplasties were done, following the same principles described once the rhinoplasty was finished and all wounds closed. The glabellar region, radix, or premaxillary regions were treated individually if deficient to improve final nasal profile. The glabella and radix were approached from the middle frontal region 1 cm

above eyebrows, and the premaxillary region [6] was approached from nasolabial fold 2 cm, lateral to nasal ala. Unlike the technique described by Cardenas and Carvajal [7], the author does not place fat parcels in dorsal nasal skin of these patients, but only in the radix, glabella, and piriform aperture with the aim of adding volume if deficient to further enhance nasal profile and proportions. Final nasal dressings and splinting were done as usual at the end of the rhinoplasty.

The follow-up visits and photographic controls were scheduled at 24 h, 7 days, 15 days, 3 months, and 12 months to evaluate improvement and stability in results. In those nasal lipomplants performed in combination with rhinoplasties, dorsal splint was removed at 7 days, and follow-up visits were scheduled at the same time intervals.

After 24 h, nasal swelling was of mild degree with nearly complete absence of ecchymosis in primary cases; patients were happy to recover daily activities and daily work in a fairly short period of time. Lipoimplants performed in previously operated patients showed a little bit more swelling and ecchymosis than primary cases. When combined with rhinoplasties, the degree of swelling and ecchymosis was equivalent to cases performed without associated lipoimplantation except in the glabellar area. Grafted fat volume slowly decreased over the first 15 days after treatment and until the first month but showed a high degree of stability thereafter. After 4–5 months, neither patient showed changes in contour or volume. The final graft take percentage was difficult to calculate due to small volumes used, but based on photographic controls, it was estimated to be about 60% in secondary cases and 75% in primary cases. Patient satisfaction was good to high in 80% of cases, particularly in cases of postrhinoplasty deformities. Only three patients were disappointed, expecting more profound changes from this technique. Only four patients presenting with severe postrhinoplasty deformities needed a touch-up procedure to add volume to an originally highly depressed and adhered dorsal skin and to two under projected and scarred tips that could not receive all fat volume required in the first procedure. Swelling improvement in combined cases does not differ so much from rhinoplasty cases where no lipoimplantation was done.

Besides pure modeling capabilities, fat grafts offer proven biological benefits in scarred, pigmented, and other skin disorders. It was not the purpose of this study to evaluate the biological improvements provided by fat grafting to the nose. Nonetheless, the improvements in skin quality particularly in pigmentations, adherences, and texture have been witnessed by the author and were more evident after treating secondary cases (Fig. 48.3). It will be necessary to conduct specific studies to objectively evaluate and measure these findings.

There were no complications or untoward results that required additional treatment or surgical interventions. Only in one combined case where there was a minimal displacement of the grafted fat in the radix that was probably caused during the nasal splinting and was easily treated without major consequences. None of the patients have experimented significant changes in body weight during follow-up, so the impact of body weight changes in fat graft behavior could not be evaluated. Patients that complained about functional or obstructive airway problems were informed about the inefficacy of fat grafting to correct the symptoms. No new symptoms of airway obstruction or worsening of previous were noticed in any patient.

48.4 Discussion

The tendency of patients to seek minimally invasive cosmetic treatments also reaches nasal aesthetics. Nonsurgical rhinoplasty, also called medical rhinoplasty, has been performed traditionally using permanent or semipermanent injectable fillers [2]. With semipermanent fillers, the patient must forego a permanent result unless he or she has repeat injections on a regular basis. With the use of permanent fillers, it may be impossible or fairly difficult to remove the implant completely or to safely make a surgical plan in the event that the patient desires an eventual surgical rhinoplasty. In either case, complications arising

from the use of injectable fillers are already known. Some disastrous complications reported in the literature include blindness and strokes [3] or other local complications such as intolerance, granulomas, extrusion, or a subtotal necrosis tip or nasal ala.

Fat grafting to the nose must not be considered as a risk-free technique as potential complications can be devastating. The use of fat grafting removes certain side effects filler-dependent like the need for repeating treatments in the long term, intolerance, or rejection to foreign material, or the difficulty of planning in the event that a patient needs or wants an eventual surgical rhinoplasty. Embolization of arterial nasal network is a technique-dependent complication that can occur with fat grafting and with other injectable fillers as well, and it has been well documented previously [3], so every plastic surgeon dealing with this technique must have a thorough knowledge of the nasal arterial network and soft tissue anatomy to prevent its occurrence. In this sense, arterial embolization of angular or dorsal nasal artery in a cranial direction (via tip approach) will cause immediate pain, blindness, or stroke, whereas arterial embolization of dorsal nasal artery or lateral nasal artery in a caudal direction (via glabellar, radix, or lateral alar approach) will cause necrosis of soft tissues of variable degree. Using a proper technique that includes injection with blunt cannulas whenever possible, very gentle pressure applied on the syringe plunger and placement of fat parcels in a retrograde manner are mandatory when performing nasal fat grafting.

It is essential to understand that true nasal modeling is obtained through improving architectural elements of bone and cartilage, leaving soft tissues to adapt to changes and draw the final result. Autologous fat grafting applied to nasal aesthetics works opposite by altering only soft tissues to mask architectural imbalances or irregularities except when it is used in combination with rhinoplasty to supplement deficient bone in radix, glabella, and premaxillary region. In this later case, fat grafting worked with the same efficacy as cartilage grafts or solid prosthesis in the same locations. Obviously, clinicians will face patients with bone or cartilage architectures unable to be camouflaged by fat grafts such as, for example, a coarse boxy tip, an over projected tip, or a tension nose. For these reasons, autologous fat grafting to the nose is an indication only in some selected nasal deformities of patients that refuse rhinoplasty as the primary choice and understand clearly the limitations in the final results. Based on the biological improvements that the author has observed in secondary cases, fat grafting to the nose could be the first choice in some selected cases in which a high degree of scarring or adherence could jeopardize dissection or blood supply during open or closed rhinoplasty. Fat grafts have demonstrated the ability to release tightly adherent skin in such a way that provides better conditions and makes secondary surgical rhinoplasty safer.

Some other authors have previously reported their personal experiences with fat grafting to the nose [7–10]. Cárdenas and Carvajal [7] reported the use of lipoinjection of the nasal dorsum in combination with open rhinoplasties to obtain smooth dorsal contours with good results. Coleman [8] gives a thoroughly description of his nasal fat grafting technique in his last book and Marketa Duskova [10] et al. report their experience in cleft nose refinement.

Conclusions

Surgical rhinoplasty must be the primary indication for any patients seeking aesthetic improvement of the nose. Fillers or fat grafting is not a substitute for an adequate surgical technique and will never provide better results. Nonetheless, autologous fat grafting also reveals itself as the first line nonsurgical alternative to modeling nasal shape and profile in primary and secondary cases of patients that refuse surgical rhinoplasties and admit limitation in results. Clinicians will be able to treat the whole aesthetic nasal and paranasal units or treat aesthetic subunits individually as needed. It is also possible to combine surgical rhinoplasty with lipoimplants in dorsum, radix, glabella, or premaxillary area to improve volume and shape in these areas without the need of using cartilage grafts or solid prosthesis.

This kind of approach to nasal remodeling is an easy, safe, and reliable procedure that lacks serious complications, side effects, or untoward results if properly done. However, this is technically demanding in order to obtain good results and to avoid serious complications. Unlike permanent injectable fillers, autologous fat grafts do not pose any risk or difficulties in planning or performing an eventual rhinoplasty throughout the patient lifetime.

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