

Rhinoplasty

Rhinoplasty Combined With Centrofacial Lipofilling to Optimize Facial Proportions

Marcelo Carvas, MD; Patrick Tonnard, MD, PhD; and Alexis Verpaele, MD, PhD

Aesthetic Surgery Journal Open Forum 2020, 1–9

© 2020 The Aesthetic Society. This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted reuse, distribution, and reproduction in any medium, provided the original work is properly cited.
DOI: 10.1093/asjof/ojz034
www.asjopenforum.com

OXFORD
UNIVERSITY PRESS

Abstract

Background: The perceived appearance of the nose is influenced by its foundations (ie, malar areas, lip, and chin). The association of nasal hump and centropacial volume deficiency is not uncommon.

Objectives: We evaluated and analyzed the role of centropacial lipofilling simultaneously to rhinoplasty to sculpt facial proportions and shapes all in one procedure.

Methods: Volumes and placement of fat graft were determined preoperatively. Centropacial microfat grafting was performed concomitantly to the rhinoplasty. Treated areas were malar, upper lip, pyriform aperture, and chin.

Results: From January 2016 to January 2019, concurrent lipofilling was performed in 23 rhinoplasties. Fat graft volumes ranged from 2 to 31 mL.

Conclusions: Centropacial lipofilling is a simple and effective tool that can easily be associated with rhinoplasty techniques to optimize the results and may even influence the procedure towards a more conservative approach.

Level of Evidence: 4

Editorial Decision date: November 14, 2019; online publish-ahead-of-print July 11, 2020.



Nasofacial proportions and relationships between facial soft-tissue and bony framework play a role in determining the ideal rhinoplasty for each patient. Preoperative facial and nasal analysis is essential not only to determine surgical steps but also to manage patient's expectations. Planning the rhinoplasty relies on multiple factors to achieve facial balance that include facial volumes and contours, symmetry, age, sex, and ethnic group.¹⁻⁷

Association of nasal hump and skeletal deficiencies such as malar hypoplasia, periapical hypoplasia, and microgenia is not uncommon. Because of its central position on the face and its relation to surrounding structures, concurrent treatment of the nose and the malar prominence, pyriform aperture, and/or chin may provide optimization of the overall outcome.^{8,9} Creating convexity to a deficient midface alters the perception of an otherwise

prominent nose and may influence the surgeon to plan the ideal nose accordingly.¹⁰ Likewise, in patients with under-projected chin, a nose may appear to project excessively, even though nasal projection may be appropriate to the face.^{9,11}

Over the past decade, lipofilling has emerged as an effective and safe alternative to facial implants and/or advancement osteotomies.¹²⁻¹⁶ Autologous fat graft is a durable filler material easily harvested by means of a minimally

Dr Carvas is at a private plastic surgery practice in São Paulo, Brazil. Drs Tonnard and Verpaele are plastic surgeons in private practice in Ghent, Belgium.

Corresponding Author:

Dr Patrick Tonnard, Coupure Centrum for Plastic Surgery, Coupure Rechts 164, 9000, Ghent, Belgium.
E-mail: patrick@coupurecentrum.be

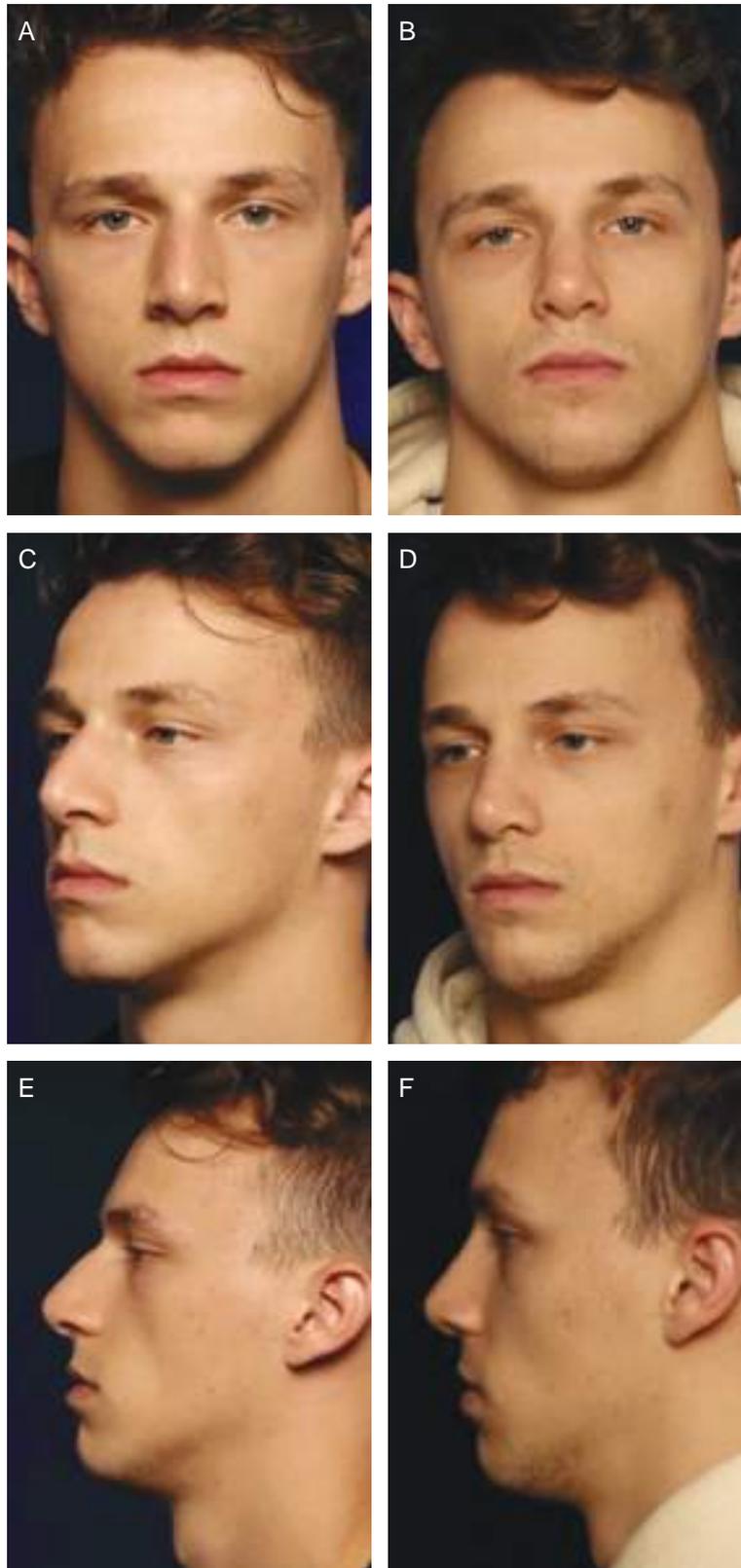


Figure 1. (A, C, E) A 22-year-old male at baseline and (B, D, F) at 7 months follow-up. Rhinoplasty and microfat lipofilling to malar area (5 mL each side). Note the change in the concavity of the midface.



Figure 2. (A, C, E) A 30-year-old female at baseline and (B, D, F) at 12 months follow-up. Rhinoplasty and microfat lipofilling to malar area (4 mL each side) and to chin (14 mL).



Figure 3. The influence of lipofilling to the upper lip on the perceived appearance of the nose demonstrated on a 48-year-old female. (A) Preoperative profile photograph shows low projection of the upper lip associated with an over-projected nose. (B, top) The intraoperative supine profile view shows baseline relation between upper lip and nose before any work is done. (B, middle) Lipofilling alone done to the upper lip (10 mL) influences of the perceived projection of the nose before initiation of rhinoplasty. (B, bottom) Immediate postoperative view shows the effect of combining rhinoplasty to lipofilling.

invasive approach. Advantages of its use as an adjunct to rhinoplasty include low-associated morbidity, ease to precise titration to patient's specific needs, and long-lasting results. Complications associated with facial lipofilling are considered small and are easily managed. They include oil cysts, lumps, asymmetries, overcorrections, and undercorrections.^{12,17}

Despite the remarkable gain in popularity of facial fat grafts and its indications in recent years, few studies have reported the simultaneous association of lipofilling and rhinoplasty. The aim of the present study is to describe and analyze the association of these procedures for a multimodal treatment of facial proportions.

METHODS

We retrospectively evaluated all concurrent rhinoplasty and centropacial microfat grafting from January 2016 to January 2019 (consecutive cases) performed by one of the senior authors (P.T.). Preoperative and postoperative photographs were compared. Informed consent was obtained by all patients. According to the principles of the Declaration of Helsinki, all subjects were thoroughly informed of all relevant information regarding both

rhinoplasty and lipofilling. Complications and refill procedures (if any) were recorded. Indication for facial lipofilling as an adjunct to the rhinoplasty was provided either after the senior authors' aesthetic analysis or when the patient actively wanted a change in facial appearance or in its proportions. To date, there is no specific contraindication of lipofilling in our practice. Volumes and placement of fat graft were determined preoperatively and markings of the areas to be augmented were done with the patient in upright position before induction of anesthesia. All procedures were done under general anesthesia and patients were given IV antibiotic (cefazolin 1 g) at the induction of anesthesia.

Microfat harvesting was performed after the infiltration of modified Klein's solution (1:1,000,000) using a 2.4 mm diameter cannula with 20 sharpened 1-mm holes (Tulip Medical, San Diego, CA). Preferred donor areas were lower abdomen (11 cases, 50%), hips (4 cases, 18.2%), inner thigh (3 cases, 13.6%), lateral thigh (2 cases, 9.1%), anterior thigh (1 case, 4.5%), and gynecomastia (1 case, 4.5%). Preparation of the microfat graft consisted of rinsing the harvested fat with saline over a sterile nylon cloth with 0.5-mm perforations mounted of a sterile cannister. Microfat was then transferred to 1-mL syringes and a blunt 0.7-mm



Figure 4. (A, C, E) A 24-year-old female at baseline and (B, D, F) at 27 months follow-up. Profiloplasty: rhinoplasty and microfat lipofilling exclusively to chin (20 cc). Long-term follow-up shows persistent result.



Figure 5. (A, D, G, J) This 25-year-old male previously underwent 3 rhinoplasties elsewhere. Quaternary rhinoplasty was done using rib graft and 31 mL of microfat graft for treatment of periapical hypoplasia and upper lip retrusion. (B, E, H, K) At 4 months follow-up, note the change in the previously concave and under-projected midface. (C, F, I, L) At 29 months follow-up, even though patient had lost 40 kg, a durable result of the lipofilling is seen.

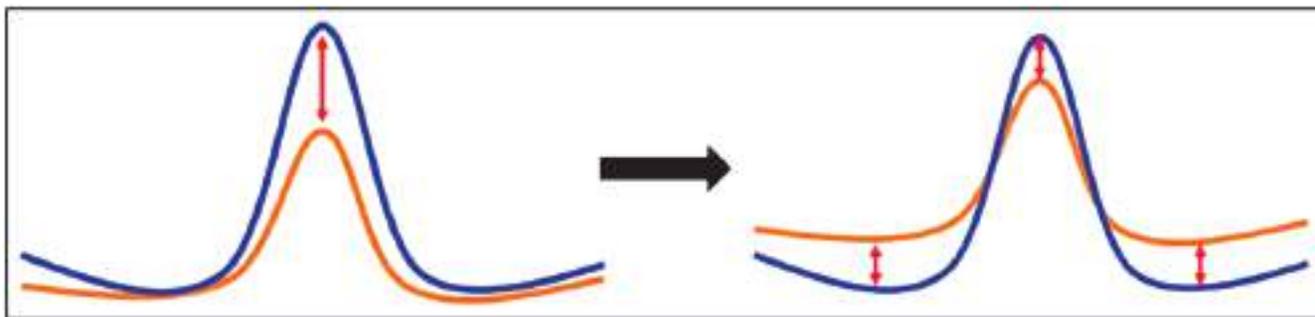


Figure 6. Combination of lipofilling and rhinoplasty may shift to procedure to a more conservative approach.

microcannula with a single lateral hole at the end (Tulip Medical, San Diego, CA) was used for grafting.

Microfat grafting was always performed at the beginning of the procedure (before rhinoplasty). This approach minimizes cold ischemia time of the microfat graft and facilitates facial analysis and precise titration of the grafting (once rhinoplasty-related edema is still not present). Also, after the centropacial volumes are replenished or corrected, rhinoplasty itself can be affected and a more conservative approach may be possible.

Recipient sites were infiltrated with a lidocaine/adrenaline solution (0.3% lidocaine with adrenaline 1:600.000) subcutaneously before initiation of the microfat grafting. After creation of a puncture hole made by a 19-gauge needle, the microcannula was introduced and microfat was deposited through the typical multistroke Coleman technique. For every treated area, 2 access sites are made so that the direction of the tunnels created for grafting is not coincident. Angulation between them varies according to the location. Typically, 90° angle between them is used for malar and tear trough treatment. For upper lip, pyriform, and chin treatment, 1 access site is chosen in each hemiface so that both “grafting tracks” can cross each other with different directions. For malar and tear trough augmentation, fat was grafted at a deep supraperiosteal layer over the maxilla and orbital rim bending into the eyelid. For upper lip, pyriform, and chin treatment, a multilayer approach (from deep and to superficial) was used. Volume of grafting to each area is determined according to surgeon’s experience. For large volumes in 1 location (typically for chin augmentation), intraoperative assessment of tissue’s compliance and expansion also plays a role in determining the amount of grafting. Labiomental crease is also addressed in the same manner to soften it if needed.

RESULTS

From January 2016 to January 2019, 61 rhinoplasties were performed. Concurrent facial fat grafting was associated

in 23 of these procedures (37.7%). Among this later group, 15 patients were female (65.2%) and 8 were male (34.8%). The patients’ ages ranged from 22 to 73 years old (mean, 40.9 years). Most commonly recipient sites were malar areas (18 cases, 78.3%), chin (6 cases, 26.1%), and upper lip and pyriform aperture (5 cases, 21.7%). Isolated malar lipofilling was done in 11 cases (47.7%, [Figure 1](#)). Asymmetrical malar fat grafting was performed in 4 of these cases (17.42%) to correct malar asymmetry. In 5 patients (21.7%), both malar area and chin were addressed concurrently in adjunct to the rhinoplasty ([Figure 2](#)). No microfat grafting was done to the nose or to correct nasal irregularities in any patient.

Injected volumes of microfat ranged from 2 to 11 mL (median, 5 mL) per side per malar area, 8 to 20 mL (median, 14 mL) to the chin, and 2 to 31 mL (median, 7 mL) to upper lip. Follow-up ranged from 1 to 29 months (median, 4.5 months) and during that period no complications were recorded nor was any refill procedure done.

DISCUSSION

Symmetry and balanced facial proportions are considered key components not only for the impression of beauty but also of youthfulness. Many systematic evaluations have been proposed for a full-face analysis.^{10,18-20} Due to the central position of the nose, the surrounding facial structures play a role in determining the visual impression of the nose itself.^{8,9,11,12} Since the nasal pyramid sits between the malar areas, a deficient midface may alter the perceived appearance of the nose and may render it larger than it really does. This may be due to a congenital or acquired bony deficiency but also to the deflation due to the aging process.²¹⁻²³

Similarly, an under-projected upper lip may create the impression of an overly projected nose ([Figure 3](#)). The underlying causes include retruded maxilla, periapical hypoplasia, and aging process. Ramaut et al.²⁴ recently reported the age-related changes in the upper lip such as

loss of volume, lengthening, and thinning based on MRI measurements in young compared with an elderly population. With regard to the skeletal aging, pyriform aperture widening^{8,22,23} may also play a role in changing the projection of the upper lip.

The neck and the chin also influence the perceived appearance of the nose. Using computer-altered photographs of necks, Greer et al.¹¹ found that nonaltered noses were rated to have a “better” appearance in better-contoured necks after image editing. Likewise, in patients with under-projected chins, the nose appears to project excessively, even though nasal projection may be appropriate to the face.^{9,12} This is particularly true when the nasofacial proportions are analyzed in the profile view. Addressing nose and chin simultaneously in a so-called profiloplasty may optimize results (Figure 4).

Historically, a multitude of alloplastic implants was described to provide a more youthful and proportionated appearance, treating congenital or acquired skeletal deficiency and/or correcting facial asymmetry.^{8,25-31} However, short- and long-term complications of facial implants include displacements/malposition, prominence problems, bony resorption, transient or permanent nerve injury, infections, capsule formation, and scarring.³²⁻³⁵

Initially used as an adjunct to facelifts and facial rejuvenation procedures to replenish age-related volume loss,^{14-16,36} lipofilling has gained a wider spectrum of indications with its ability to also achieve additional projection. Its use was associated as an alternative to facial implants and advancements osteotomies.¹² To date, the authors consider microfat grafting as effective in replenishing age-related volume loss as it is for correction of skeletal deficiency. One of the patients in the present study had 3 previous unsuccessful rhinoplasties and presented to us with an under-projected nose corrected with rib cartilage graft and with a severe midface retrusion and periapical hypoplasia corrected by 31 mL of facial fat injection to the upper lip and pyriform aperture (Figure 5).

With the recent trend toward more conservative techniques in rhinoplasty,³⁷ correcting centropacial volumes and shapes as an adjunct to rhinoplasty may affect the classical reductional rhinoplasty. A commonly used comparison is a mountain surrounded by its valleys. Instead of exclusive reduction of the mountain, a combined filling of the valleys reduces the extend of resection and reshaping of the relief (Figure 6).

Advantages of this concomitant lipofilling include the minimal lengthening of surgical procedure, low-associated morbidity, the ease to precise titration of patient's needs, and the possibility to correct asymmetries. Although resorption rates vary, a refill procedure can easily be performed under local anesthesia if needed. Our previous study suggested the resorption ranges from 15% in the immobile malar and chin areas to 50% in the mobile lip and chin area.¹²

Limitations of our study are its retrospective character, the limited sample size, and the short-term follow-up limiting the global estimation of fat graft resorption and the need of refill procedures. Also, patient's perceived outcomes were not evaluated.

CONCLUSIONS

Centropacial lipofilling is a simple and effective tool that can easily be associated with rhinoplasty techniques to optimize the results and may even influence the rhinoplasty towards a more conservative approach.

Disclosures

The authors declared no potential conflicts of interest with respect to the research, authorship, and publication of this article.

Funding

The authors received no financial support for the research, authorship, and publication of this article.

REFERENCES

1. Farkas LG, Kolar JC. Anthropometrics and art in the aesthetics of women's faces. *Clin Plast Surg.* 1987;14(4):599-616.
2. Farkas LG, Katic MJ, Forrest CR, et al. International anthropometric study of facial morphology in various ethnic groups/races. *J Craniofac Surg.* 2005;16(4):615-646.
3. Daniel RK. Rhinoplasty and the male patient. *Clin Plast Surg.* 1991;18(4):751-761.
4. Kim EK, Daniel RK. Operative techniques in Asian rhinoplasty. *Aesthet Surg J.* 2012;32(8):1018-1030.
5. Rohrich RJ, Hollier LH, Jr., Janis JE, Kim J. Rhinoplasty with advancing age. *Plast Reconstr Surg.* 2004;114(7):1936-1944.
6. Springer IN, Zernial O, Nolke F, et al. Gender and nasal shape: measures for rhinoplasty. *Plast Reconstr Surg.* 2008;121(2):629-637.
7. Toriumi DM, Pero CD. Asian rhinoplasty. *Clin Plast Surg.* 2010;37(2):335-352.
8. Yaremchuk MJ, Vibhakar D. Pyriform aperture augmentation as an adjunct to rhinoplasty. *Clin Plast Surg.* 2016;43(1):187-193.
9. Sykes JM, Suarez GA. Chin advancement, augmentation, and reduction as adjuncts to rhinoplasty. *Clin Plast Surg.* 2016;43(1):295-306.
10. Rohrich RJ, Ahmad J, Gunter JP. Chapter 6: nasofacial proportions and systematic nasal analysis. In: Rohrich RJ, Adams WP, Ahmad J, Gunter JP, eds. *Dallas Rhinoplasty: Nasal Surgery by Masters.* 3rd ed. New York, NY: Thieme; 2014:85-110.
11. Greer SE, Matarasso A, Wallach SG, Simon G, Longaker MT. Importance of the nasal-to-cervical relationship in rhinoplasty surgery. *Plast Reconstr Surg.* 2001;108(2):522-531; discussion 532-525.

12. Lindenblatt N, van Hulle A, Verpaele AM, Tonnard PL. The role of microfat grafting in facial contouring. *Aesthet Surg J*. 2015;35(7):763-771.
13. Krastev TK, Beugels J, Hommes J, Piatkowski A, Mathijssen I, van der Hulst R. Efficacy and safety of autologous fat transfer in facial reconstructive surgery: a systematic review and meta-analysis. *JAMA Facial Plast Surg*. 2018;20(5):351-360.
14. Coleman SR. Structural fat grafting: more than a permanent filler. *Plast Reconstr Surg*. 2006;118(3 Suppl):108s-120s.
15. Tonnard PL, Verpaele AM, Zeltzer AA. Augmentation blepharoplasty: a review of 500 consecutive patients. *Aesthet Surg J*. 2013;33(3):341-352.
16. Zeltzer AA, Tonnard PL, Verpaele AM. Sharp-needle intradermal fat grafting (SNIF). *Aesthet Surg J*. 2012;32(5):554-561.
17. Marten TJ, Elyassnia D. Fat grafting in facial rejuvenation. *Clin Plast Surg*. 2015;42(2):219-252.
18. Rohrich RJ, Ahmad J. Rhinoplasty. *Plast Reconstr Surg*. 2011;128(2):49e-73e.
19. Rohrich RJ, Ahmad J. A practical approach to rhinoplasty. *Plast Reconstr Surg*. 2016;137(4):725e-746e.
20. Woodard CR, Park SS. Nasal and facial analysis. *Clin Plast Surg*. 2010;37(2):181-189.
21. Farkas JP, Pessa JE, Hubbard B, Rohrich RJ. The science and theory behind facial aging. *Plast Reconstr Surg Glob Open*. 2013;1(1). pii: e8-e15.
22. Mendelson B, Wong CH. Changes in the facial skeleton with aging: implications and clinical applications in facial rejuvenation. *Aesthetic Plast Surg*. 2012;36(4):753-760.
23. Shaw RB, Katzel EB, Koltz PF, et al. Aging of the facial skeleton: aesthetic implications and rejuvenation strategies. *Plast Reconstr Surg*. 2011;127(1):374-383.
24. Ramaut L, Tonnard P, Verpaele A, Verstraete K, Blondeel P. Aging of the upper lip: part I: a retrospective analysis of metric changes in soft tissue on magnetic resonance imaging. *Plast Reconstr Surg*. 2019;143(2):440-446.
25. Hinderer UT. Malar implants for improvement of the facial appearance. *Plast Reconstr Surg*. 1975;56(2):157-165.
26. Metzinger SE, McCollough EG, Campbell JP, Rousso DE. Malar augmentation: a 5-year retrospective review of the silastic midfacial malar implant. *Arch Otolaryngol Head Neck Surg*. 1999;125(9):980-987.
27. Flowers RS. Tear trough implants for correction of tear trough deformity. *Clin Plast Surg*. 1993;20(2):403-415.
28. Flowers RS. Correcting suborbital malar hypoplasia and related bony deficiencies. *Aesthet Surg J*. 2006;26(3):341-355.
29. Marianetti TM, Cozzolino S, Torroni A, Gasparini G, Pelo S. The "beauty arch: " a new aesthetic analysis for malar augmentation planning. *J Craniofac Surg*. 2015;26(3):625-630.
30. Soares DJ, Silver WE. Midface skeletal enhancement. *Facial Plast Surg Clin North Am*. 2015;23(2):185-193.
31. Mladick RA. Alloplastic cheek augmentation. *Clin Plast Surg*. 1991;18(1):29-38.
32. White JB, Dufresne CR. Management and avoidance of complications in chin augmentation. *Aesthet Surg J*. 2011;31(6):634-642.
33. Rojas YA, Sinnott C, Colasante C, Samas J, Reish RG. Facial implants: controversies and criticism. a comprehensive review of the current literature. *Plast Reconstr Surg*. 2018;142(4):991-999.
34. Garner JM, Jordan JR. An unusual complication of malar augmentation. *J Plast Reconstr Aesthet Surg*. 2008;61(4):428-430.
35. Bain CJ, Odili J. Late infection of an alloplastic chin implant masquerading as squamous cell carcinoma. *J Plast Reconstr Aesthet Surg*. 2012;65(6):e151-152.
36. Rohrich RJ, Sanniec K, Afrooz PN. Autologous fat grafting to the chin: a useful adjunct in complete aesthetic facial rejuvenation. *Plast Reconstr Surg*. 2018;142(4):921-925.
37. Daniel RK. The preservation rhinoplasty: a new rhinoplasty revolution. *Aesthet Surg J*. 2018;38(2):228-229.