

# Autologous Fat Augmentation of the Face

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## KEYWORDS

• Autologous fat • Fat injection • Structural fat grafting • Facial rejuvenation • Facial aging • Volume loss

## KEY POINTS

- Structural fat grafting is an ideal procedure for the revolumization and rejuvenation of the aging face.
- Understanding facial aging involves knowledge of how bone, soft tissue, and skin play a role in this process.
- Aesthetically pleasing, safe, and reproducible results can be obtained by performing fat grafting per established protocols.
- This article will demonstrate the autologous fat transfer procedure: operative set up, intraoperative procedure and techniques, and post-operative instructions.
- Autologous fat grafting can be combined with additional procedures to enhance patient outcomes.

## Introduction

In recent years, the goal of facial fillers has shifted from filling lines to restoring volume loss and rebalancing facial features. As the paradigm for facial filling has evolved, the amount of fillers required to achieve these results has increased. With most synthetic fillers being supplied in syringes of 1 mL or less of product, cosmetic surgeons have had to look elsewhere for the ideal filler. Autologous fat has many of the attributes of an ideal filler. It is soft and natural appearing, usually available in sufficient quantities, and based on a per milliliter basis, very cost-effective. Autologous fat has additional benefits beyond volumizing the face, with improvement noted in the overlying skin texture and appearance.<sup>1</sup>

## Anatomic considerations

Fat loss, muscle atrophy and hypertrophy, bone resorption, and loss of skin elasticity all contribute to the features of the aging face that are considered cosmetically displeasing. An understanding of the role that each of these plays allows the cosmetic surgeon to plan and execute a rejuvenation plan that best meets the needs of the patient.

Over the last decade, there has been increased elucidation of the subdermal facial structure and age-associated changes. Rohrich and Pessa<sup>2</sup> demonstrated that rather than the subcutaneous fat being one continuous layer, it was distributed in

multiple fat compartments separated by fibrous septae and muscle.

Awareness of the location and boundaries of the fat compartments and understanding how volume loss over time contributes to the appearance of the aging face allow for selection of targets for volume enhancements. As defined by Rohrich and Pessa,<sup>2</sup> the nasolabial fat compartment lies anteriorly to the medial cheek fat and is bounded superiorly by the orbicularis retaining ligament, laterally by the sub-orbicularis oculi fat, and inferiorly by the zygomaticus major muscle. The cheek fat is subdivided into medial, middle, and lateral temporal cheek fat. The medial cheek fat compartment is bounded medially by the nasolabial fold, superiorly by the orbicularis retaining ligaments, and laterally by the orbital compartment. The middle cheek fat lies anterior to the parotid gland and is bounded superiorly by the zygomaticus major muscle and the zygomatic ligament and medially by the medial cheek fat at the parotid masseteric ligaments. It was subsequently shown that there are additional fat compartments deep to the superficial cheek fat: the deep medial fat and "Ristow's space," which are deep and medial to the zygomaticus major muscle.<sup>3</sup> Recently, Surek and colleagues<sup>4</sup> further defined "Ristow's space" and proposed the compartment be anatomically named the "deep pyriform space." It was shown to be bounded medially by the depressor septi nasi, laterally and superficially by the deep medial cheek fat and lip elevators. Of note, the angular artery courses through a septum at its anterior surface. Volume enhancement to the deep medial and the superficial medial and middle compartments can improve upon the appearance of a prominent orbitomalar groove.

As originally defined, the lateral temporal cheek fat is anterior to the parotid and is bounded superiorly by the temporal fat and inferiorly by the cervical subcutaneous fat.<sup>2</sup> The remaining compartments were identified as the 3 forehead compartments: central extending to the nasal dorsum and bounded laterally on both sides by the medial temporal compartments, which extend superiorly from the orbicularis

Disclosures: S. Obagi is on the scientific advisory board for Galderma and for Valeant Pharmaceuticals. She is scientific consultant for Nextcell Medical Corp. C. Willis has no interests to declare.

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retaining ligament to the lateral border at the superior temporal septum and the orbital fat compartments. The orbital fat was shown to be separated into 3 compartments: a superior one bounded inferiorly by the circumferential orbicularis retaining ligament, an inferior one just below the lower lid tarsus and bounded inferiorly by the malar septum and medially and laterally by the canthi, and the lateral orbital fat compartment bordered superiorly by the inferior temporal septum and inferiorly by the superior cheek septum.

The anatomy of the fat compartments is still an active area of study. A computed tomographic study looked at the age-related changes to the fat compartments and further defined the buccal fat pad lying inferior to the zygoma and anterior to the mandibular ramus surrounding the medial pterygoid and masseter muscles anterior to the cheek compartments (Fig. 1).<sup>5</sup>

Now that the fat compartments have become more well defined, it allows for more precise identification and correction of deficits. Fat transfer can address fat volume

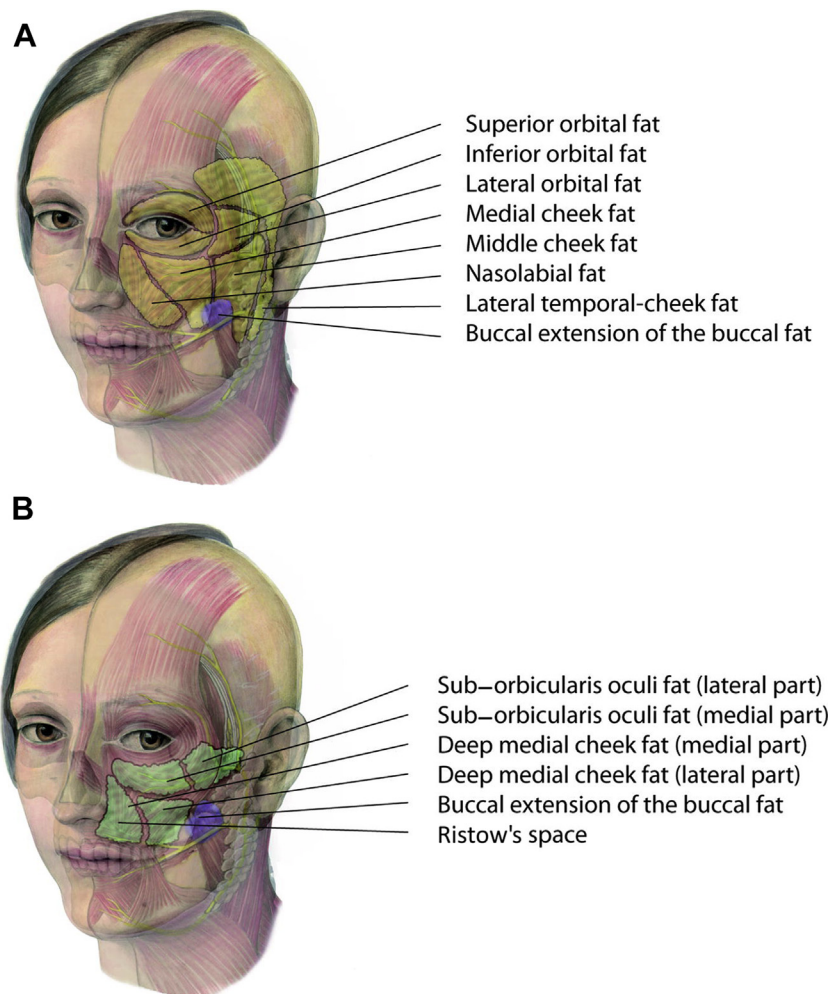
loss and bone resorption. Fat grafting to the deep compartments will provide lift and contour restoration, whereas fat grafting more superficially will improve wrinkling and skin texture.

## Preoperative planning

As with any cosmetic procedure, a desirable end result hinges on the proper selection of procedures for each patient. Patient selection begins with the proper assessment of the patient. A thorough history and physical examination must be performed.

## Medical history

Pertinent history includes a thorough medical history, prior cosmetic surgery procedures in the areas to be treated (including prior implants or permanent fillers), smoking history or exposure to secondhand smoke (because it effects fat



**Fig. 1** (A, B) Stylistic drawing of the anatomic relationships of deep midfacial fat compartments. It is composed of the suborbicularis oculi fat (medial and lateral parts) and the deep medial cheek fat (medial and lateral parts). Three layers of distinct fat compartments are found laterally to the pyriform aperture, where a deep compartment is located posterior to the medial part of the deep medial cheek fat. The buccal extension of the buccal fat pad extends from the paramaxillary space to the subcutaneous plane. (From Gierloff M, Stohring C, Buder T, et al. Aging changes of the midfacial fat compartments: a computed tomographic study. *Plast Reconstr Surg* 2012;129(1):271; with permission.)

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