he goal of every facial enhancement should be to mimic nature as aesthetically and as reasonably as possible without the deleterious stigmata associated with bad cosmetic procedures. The driving force is to achieve a better “blink” appearance, that is, to judge an outcome instantaneously using the right brain (the artistic, gestalt side of cerebral awareness) whether someone looks better or younger or simply does not.

Subtle and natural appearing changes should be the rule with volumetric treatments. Unnatural results are often due to mistaking volume as a goal rather than as a technique for achieving a desired aesthetic endpoint. Fuller has become better in place of understanding the goals of volume rejuvenation.

Every face is unique, but the shadows that develop as we age are relatively consistent. Not everyone develops every shadow, but there are typical patterns of facial shadowing that signal advancing age. The ease with which a charcoal artist can depict an aging face with a few shadow strokes makes this thesis easy to grasp. These shadows are often defined by facial attachments points, such as the facial retaining ligaments and McGregor’s patch (zygomaticocutaneous ligaments), which tether the skin to the underlying facial structures. As the volume of the face deflates, these attachment points will define most of the shadows that develop with age.

The goal of volume rejuvenation is the modification or elimination of age-specific shadow patterns and restoring the balance of volume seen in a youthful face. The shadowing effects on the face will first be examined by analyzing the frames of the face followed by a more detailed description of the specific changes in the face which occur with aging and the shadows they engender.

**FACIAL FRAMES**

The 3 circular frames of the face constitute a paradigm by which we may understand how we can achieve a better blink rejuvenation. The global facial frame (edge of the face from temple to jawline) extends along the jawline to offset the face from the neck and then flows up the lateral contour of the face from the angle of the mandible along the contour of the buccal, zygomatic, and temple line. The frame of the mouth (including the marionette and nasolabial groove) and the frame of the eyes (brow, upper eyelid, and lower eyelid) complete the 3 circles that are the true focus of attention for facial rejuvenation (Fig. 1).

The global facial frame strongly affects our perception of a face on many levels: age, gender, and attractiveness. A soft, upside-down, egg-shaped lateral facial contour suggests youthful femininity, while a more angular/rectangular line is more masculine. The scalloped (concave) appearance of the temple and the subzygomatic recess, the area below the zygomatic arch down to the buccal and ending with the prejowl depression, renders a much older appearance to the face. Achieving a youthful appearance is highly dependent on recreating an ideal oval of the face from the frontal
When performing volume rejuvenation, it is imperative to constantly evaluate the frontal view of the face as it is the best perspective to ensure that the shadows of senescence are most effectively diminished. Too often, surgeons are used to seeing the face from the lateral or oblique perspectives, which are important vantages, but are not the most critical perspectives (Fig. 2).

Many women are frightened that if they fill the temple and the subzygomatic recess, they will look wider or fatter, which is not the case if the area is filled appropriately. When these 2 adjoining concavities are managed along with the anterior prejowl region, the face can actually look thinner as the absence of upper facial volume with some early gravitational descent of the lower outer face is the combination that makes the face heavier in appearance with aging. By filling the upper and outer face, albeit in a tasteful and controlled fashion, the face can actually regain improved shape and thereby look slimmer in many cases (Fig. 3).

The eye frame can be thought of simply as another circle that over time becomes progressively absent. Traditional rejuvenation techniques that remove periorbital volume have led to an appreciation of creating a “done” or aged appearance. Volume augmentation with an appropriate amount of volume to create a frame of light around the eye restores a youthful attractive appearance. Thinking of the aging eyelid and the eyelid shape like 2 opposing triangles with the short arm of the upper triangle being medial and the short arm of the lower triangle being lateral (Fig. 1) is a recent conceptualization that has been particularly helpful when injecting the periorbita. The slanted triangular appearance of the upper and lower eyelids renders an aged appearance, and when they are properly augmented (filling both the short and the long triangular limbs), the eyes resume a horizontal fullness that is much more youthful in shape. When evaluating the eyelids in this fashion, the physician can fill either or both triangular limbs that may be contributing to aging.

The frame of the mouth area is a very important area to volumetrically fill. However, often-times we think only of the obvious 2 landmarks of the nasolabial grooves and the marionette lines. Instead, it is better to think of the circular depression that circumscribes the entire mouth region and causes the mouth/lips to appear floating in a circular shadow. Accordingly, the areas of this circle include the nasolabial groove (with a focus on the upper recess of the groove, known as the canine fossa), the marionette line, the anterior chin depression (especially laterally just medial to the marionette line), and the prejowl depression along the jawline (that overlaps with the above-described outer facial frame). Adding volume to the lips without addressing the surrounding area serves to deepen the shadows and further disconnect the lip and mouth from the perioral region, resulting in many of the odd lip appearances that patients fear.

**UPPER FACE**

A youthful upper eyelid demonstrates a uniform fullness from the eyelid fold inferiorly to the brow superiorly. This creates a seamless transition...
Fig. 2. This 52-year-old woman shown schematically in Figure 1 presents before (left) and 1 year after (right) facial fillers along with neuromodulators and skin-care therapy during that time. Photograph courtesy of Samuel M. Lam, MD.

Fig. 3. This 42-year-old woman is shown before (left) at 35 years of age and after (right) 7 years of progressive facial fillers into her face along with neuromodulators and skin-care therapy. Photograph courtesy of Samuel M. Lam, MD.
devoid of an infrabrow shadow, analogous to the absence of the inferior orbital rim shadow between the lower eyelid and cheek in younger faces. A youthful upper face lacks shadowing from a temporal fossa concavity, the youthful volume masking the senescent skeletal margins, that is, lateral cephalic margin of the superior orbital rim, the superior margin of the zygoma, and the temporal line (Fig. 4).

The degree of visible pretarsal skin is variable in a youthful upper eyelid. Most commonly, a minimal strip of pretarsal skin is visible between the upper-eyelid fold superiorly and the lash line inferiorly (Fig. 4: type 1 upper eyelid). There exists a smaller subset of people who have a greater degree of pretarsal skin show and a more sculpted upper eyelid at a young age (Fig. 5: type 2 upper eyelid). This can be evaluated by looking at youthful photographs of the patient and should be respected in designing facial rejuvenation procedures.

Volume loss in the superior orbital rim and upper eyelid creates infrabrow hollowing manifesting as a deep shadow under the orbital rim. The upper eyelid often appears deflated, and the eyelid fold no longer flows seamlessly up to the brow. Volume loss is most significant above the medial upper eyelid, where there is a greater degree of bone remodeling and/or resorption. As the bony medial rim elevates, it retracts the medial upper-eyelid fold superiorly and increases exposure of the medial pretarsal skin (Fig. 6). Temporal volume loss creates a progressive concavity and shadowing in the temporal fossa. This volume loss exposes the temporal margin of the superolateral orbital rim and superior margin of the zygoma, eliminating the softer, less-shadowed appearance typical of a youthful face (Fig. 7).

We purposely do not define the appearance of a youthful upper face by the height of the brow. The purported “ideal” brow position is classically defined relative to the bony superior orbital rim. In a youthful face, the superior orbital rim is generally not visible due to upper-eyelid volume (Figs. 4 and 5). Aging is associated with soft-tissue volume loss, exposing the superior orbital rim and increasing infrabrow shadowing. Studies have suggested...
that age-related bone loss of the superomedial orbital rim elevates the position of the medial bony orbital rim.\textsuperscript{1,3} A more natural rejuvenation strategy should restore the volume deficiency below the brow and not elevate the brow to the higher position of the bony orbital rim (Fig. 7).

**Fig. 6.** Left, A woman in her mid twenties with a youthful type 1 upper eyelid. Center, The same woman presenting in her mid-sixties for upper-eyelid rejuvenation. Right, Following upper-eyelid blepharoplasty (10 months) to remove skin and autologous fat transfer to the upper eyelid, the characteristics of a youthful upper eyelid are restored. Photograph courtesy of Robert Glasgold, MD. Reprinted with permission from Glasgold Group, Plastic Surgery, 2012.

**Fig. 7.** This woman demonstrates significant volume loss, particularly in the upper face; she is shown at age 18 (left) and age 60 (right). Temporal lipoatrophy exposes the surrounding bony landmarks. Her significant upper-eyelid volume loss is more typical with aging in individuals with a type 2 upper eyelid. Photograph courtesy of Robert Glasgold, MD. Reprinted with permission from Glasgold Group, Plastic Surgery, 2009.
MIDFACE

The midface, which extends from the lower eyelid to the oral commissure, demonstrates changes that are predominantly volume dependent. Aging leads to an overall change in facial shape as volume shifts from the upper midface to the lower face transitioning the youthful, heart-shaped face into a more aged, rectangular shape. Specific patterns of age-related volume transform the midface from a youthful convex platform dominated by unified highlights to an aged platform segmented by shadows (concavities) (Fig. 8).

Younger midfaces have a convexity running from the lower eyelid to the nasolabial fold, creating a uniform cheek highlight. In a youthful face, soft tissue covers the bony skeletal components of the midface providing a softer appearance; the inferior orbital rim is masked, minimizing any delineation between the lower eyelid and cheek. The zygomatic arch, providing the foundation of lateral cheek volume, is adequately covered by soft tissue to hide the shadows that delineate its superior and inferior margins (Fig. 8, left).

Advancing age is associated with a generalized deflation of the midface, particularly in the upper aspects. The combination of volume loss and the effect of underlying facial retaining ligaments contribute to the hallmarks of midfacial aging (Figs. 8 and 9). The most relevant ligaments in the midface are the orbital retaining ligament, malar septum (zygomatico-cutaneous ligament), and McGregor’s patch (zygomatic ligament). Volume loss at the inferior orbital rim creates a concavity and overlying shadow, separating the lower eyelid from the cheek.

Outside the scope of this article, albeit important to assess, is the contribution of pseudoherminated lower eyelid fat on this concavity. The youthful convexity of the anterior cheek changes into a concavity of the midface hollow. Volume loss and tethering of the malar septum create this shadow that runs parallel to the nasolabial fold and is the hallmark of midface aging. Lateral cheek volume loss diminishes the dominance of midface volume and skeletonizes the zygomatic arch, creating a harsh submalar shadow. When present, buccal volume loss accentuates an aged and unhealthy appearance. Finally, recession at the precanine fossa due to bony volume loss contributes to depth of the nasolabial fold.

Volume rejuvenation of the midface is focused on restoring the dominance of midface volume to give a more heart-shaped face and minimizing the segmenting shadows seen with age. Adding volume into the inferior orbital rim should reunify the lower eyelid and cheek segments. Filling the cheek, with a focus on the malar septal depression, should recreate a convex cheek with a strong highlight (Fig. 9). However, filling of the lower eyelid and of the anterior cheek to excess has been problematic in contributing to the overfilled

Fig. 8. Left, A woman in her twenties demonstrates the ideal volume and lack of midface shadows in conveying a youthful appearance. Right, A woman in her sixties demonstrates the aging effect of volume loss, as the midface is dominated by segmented shadows. Photographs courtesy of Mark Glasgold, MD. Reprinted with permission from Lam SM, Glasgold MJ, Glasgold RA. Complementary Fat Grafting. Philadelphia, Pa.: Lippincott Williams & Wilkins; 2007.
look. Instead, filling the lateral cheek can at times already contribute to a partially if not entirely improved lower-eyelid appearance (through a lifting action of the filler) and avoid the necessity of filling very much in the anterior cheek as well.

**LOWER FACE**

Aging is associated with a volume shift from the upper to lower facial regions. The youthful heart shape converts into a rectangular shape secondary to volume loss in the midface (periorbital, malar, submalar, and buccal) and an increase in jowl volume and descent. Despite this big-picture shift in volume toward the lower face with aging, targeted addition of volume to the lower face is an integral component of an optimal facial rejuvenation strategy.

The hallmarks of a youthful lower face include a smooth transition from the cheek to chin, devoid of shadowing at the labiomandibular fold. The jawline is well defined by a curvilinear shadow coursing from the mandibular angle to the anterior chin; on oblique view, the shadow framing the jawline has a “hockey stick” shape (Fig. 8, left).11,12 This youthful jawline shape is dependent on an adequate bony foundation, providing sufficient volume at the prejowl sulcus and angle of mandible.

Volume loss in the labiomandibular fold manifests as a shadow anterior to the jowl from oral commissure to jawline. The prejowl sulcus appears as volume loss progressing along the inferior portion of the mandible and extending anterior to the jowl. Cephalic retraction in the prejowl sulcus is due to fixation of the skin to the underlying resorbing bone via the mandibular ligament.11–14

Shadowing in the labiomandibular fold and prejowl sulcus is accentuated by increased fullness and descent of the jowl. The lateral portion of the jawline experiences volume loss at the mandibular angle. The combination of anterior and posterior mandibular volume loss, in conjunction with jowl descent, converts the youthful “hockey stick”-shaped jawline to an irregular W shape (Fig. 10).

Congenital lower facial volume deficiencies, most common in the chin and mandibular angle, can create an aging appearance in a young person. Deficiencies in the anterior chin and prejowl sulcus will create relative mid-jawline dominance, manifesting as early jowl formation (Fig. 11). These patients tend to present at an earlier age for lower face rejuvenation as the early volume changes will more easily highlight their skeletal deficiencies. In contrast, individuals with a better baseline skeletal structure will manifest more discrete areas of volume loss as they age. In these individuals, the early manifestations of lower face aging are often more easily addressed with a smaller, more focused volume-added strategy (Fig. 10).

![Fig. 9. Preoperative (left) and postoperative (6 months) (right) photographs of a woman in her mid-fifties. The youthful cheek highlight and elimination of midface shadowing were achieved through combination of lower-eyelid transconjunctival blepharoplasty and autologous fat transfer to the inferior orbital rim and cheek. Photograph courtesy of Robert Glasgold, MD. Reprinted with permission from Glasgold RA, Glasgold MJ, Lam SM. Complementary fat grafting. In: Carniol P, Sadick N, eds. Clinical Procedures in Laser Skin Rejuvenation. New York, N.Y.: Informa; 2007.](image-url)
As aging continues into the late forties and beyond, the degree of jowl fullness and descent become an increasingly important factor in facial rejuvenation. Merely adding volume in the jawline will be insufficient to mask a heavier jowl. In these individuals, a lower face-lift has a

**Fig. 10.** Preoperative (left) and postoperative (2 months) (right) lower face volume rejuvenation with injectable fillers. The aging “W”-shaped jawline was converted to a more youthful jawline by filling the prejowl sulcus and lateral jawline (mandibular angle). The labiomandibular fold was also addressed to help camouflage the anterior border of the jowl. Photograph courtesy of Robert Glasgold, MD. Reprinted with permission from Glasgold Group, Plastic Surgery, 2011.

**Fig. 11.** Left, This woman in her late twenties presented with signs of lower aging at a young age. Right, Facial rejuvenation (6 months postoperative) of the lower face was accomplished by adding volume via autologous fat transfer to the prejowl sulcus and mandibular angle as well as mentoplasty with a silastic implant. The overall facial rejuvenation was aided by reduction of the buccal fat pad and autologous fat transfer to the midface and upper eyelid. Photograph courtesy of Robert Glasgold, MD. Reprinted with permission from Glasgold Group, Plastic Surgery, 2013.
primary role in obtaining an optimal, natural rejuvenation. Despite the shift in importance to face-lifting in this age group, failure to address underlying volume loss may result in inadequate lower face rejuvenation. If volume is not restored in the prejowl sulcus at the time of face-lift, the patient may appear to have incomplete correction of the jowl. In addition, inadequate baseline mandibular angle volume may account for incomplete jawline rejuvenation following a face-lift (Fig. 12).

**PERSONAL PERSPECTIVES**

“The difference between an education and an excuse is only that an education is given before a procedure and an excuse is given afterward.” Unfortunately, many physicians and surgeons are not fully aware of the limitations of volume restoration and set themselves up for problems following a procedure because they failed to counsel a patient adequately beforehand. This is particularly true with facial fat grafting (as compared with fillers) as there is variable resorption of the fat that cannot be 100% predicted, and the patient should be counseled about this limitation in advance.

Volumetric analysis and treatment are much more effective when we look more globally at the shadow groups and facial frames and think of adding smaller volumes over larger areas to blend highlights together. Every time we add volume on the face, the flow of light across the face will be affected. Any interruption in contour will introduce or accentuate a shadow. It becomes necessary to think about transitions from light to shadow within a region and between the subregions. Particular care to transitions must be taken when filling the subzygomatic/buccal region and temple (global facial frame). The patient will be viewing these areas tangentially in a mirror, and the slightest irregularity will become evident (Fig. 13). The area that has been of principle concern as the volume revolution began about a decade ago is filling of the anterior cheek. Without a doubt, the anterior cheek offers incredible results as far as femininity and can be construed as an extended frame to the eye. However, there are several potential pitfalls with the anterior cheek. First, isolated augmentation of the anterior cheek without filling the adjacent regions can look unnatural in appearance because it is not properly blended. More importantly, with the trend toward a more liberal overvolumizing of the anterior cheek, we are seeing a rash of people who look too “cheeky” when they smile. This dynamic problem really has caused the issue of a pervasive deformity; whereas before people used to look too pulled, we are now seeing more patients who look too inflated.

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**Fig. 12.** Left, Preoperatively this woman in her sixties had presented for facial rejuvenation. Center, Following deep plane face-lift and autologous fat transfer (1 year postoperative) to the midface, she still had incomplete jawline rejuvenation due to mandibular insufficiency. Right, Autologous fat transfer (1 year post fat transfer, 2 years post primary surgery) to the prejowl sulcus and lateral mandible aided in jawline contouring by further masking the residual jowl. Photograph courtesy of Mark Glasgold, MD. Reprinted with permission from Glasgold Group, Plastic Surgery, 2013.
The desire for symmetry is one of the most important goals to address in consultation. Typically, patients do not perceive the significant asymmetry in their faces, and trying to demonstrate this in a mirror is often difficult. Reviewing standardized photographs with the patient is an extremely effective process. As a general rule, correcting asymmetry is not possible, and in fact, asymmetry may be accentuated by volume. The physician should not allow the patient to make this a goal; it is creating an unrealistic expectation.

The 2 ways that I (S. Lam) judge my aesthetic results are as follows: (1) the moment I walk into the room do I believe my patient looks better without time for elaborate scrutiny (if not why?) (2) how many compliments have the patient attained from others regarding their improved appearance, for example, “Wow, you really look great.” These are my standards, albeit qualitative, for my outcomes (in addition to comparative review of their before-and-after results) and not just how a patient sees one’s own face because many women in particular use their left brains to evaluate their results, that is, I still have asymmetry, I still have these fine lines, etc. Prior to embarking on any cosmetic procedure, I spend considerable time with every prospective patient to have that individual understand my philosophy and the goals of the procedure. I state in advance that I will fail to achieve symmetry or to improve small details but that I should be able to improve their socioprofessional standing among their peers if they allow me to exercise an artistic eye to achieve that objective. Those individuals who are attracted to this perspective become my patients and those who do not will be an unsuitable match for my clinical practice.

This monograph represents the combined and separate observations of the authors when it comes to beauty, aging, and approaches to achieve facial rejuvenation based on an espoused paradigm and derived from personal experience rather than on a rigorous, retrospective case-study evaluation. We are not zealots of methodology and fully recognize the limitations of any singular approach. In many skilled hands, fat repositioning with face-lifting rather than strictly volume restoration can achieve comparable results that are natural, long lasting, and excellent. We hope that this article will help a prospective surgeon gain insight into improved patient communication, perception of youth and aging, and methods that can be incorporated to achieve natural facial rejuvenation.
PATIENT CONSENT

Patients provided written consent for the use of their images.

REFERENCES