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## **Fat Injection for Aesthetic Facial Rejuvenation**

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## Fat Injection for Aesthetic Facial Rejuvenation

I believe that early facial aging is manifested by prosis secondary to volume loss. Moreover, this volume loss creates changes in facial shape that conventional skin tightening procedures either do not address or make worse. Definition is achieved largely at the expense of soft tissue fill.

For example, the eyebrows of young persons typically lie low and flat. The soft tissue over the entire superior third of the face is full. This fullness, with its large radius of anterior curvature, generates a reflective convexity. As make-up artists know, brighter features appear larger or closer and dark features appear smaller or receding. In youth, these shape and reflective characteristics give the impression of high-sitting eyebrows.

In photographic images, the younger face appears to have a larger circumference at brow level than it does later in life. This feature contributes significantly to the top-heavy or heart-shaped configuration of the younger face. As the brow "deflates," the skin settles against the upper lids and the eyebrow becomes foreshortened as it wraps around a smaller circumference. The brow lift elevates the brows by traction, but no corresponding changes in width occur. When the operative plane traverses temporal fat, frequently the result is local fat atrophy and narrowing of the face.

Whereas some patients desire a youthful appearance, others also desire improvement in the aesthetics of their facial features. Facial implants can and have been used to improve both aging and developmental characteristics. However, the effects of these prostheses are localized, and size and shape options are limited. These devices are also associated with problems common to all implants. Craniofacial surgery is effective for severe deformities.

I believe that injecting fat is an effective method of shaping wide areas of the face by the freehand addition of autologous tissue in a simple, minimally invasive way (Figures 1 and 2). Injected fat can be thought of as a malleable, "plastic" facial implant. I have successfully used fat for this purpose for 10 years.

### Technique

The technical aspects of fat injection have improved greatly in the past several years. Time will tell if the ini-

tial encouraging results will be truly long lasting. Fat is withdrawn with 10 ml syringes, suction needles (Grams Medical, Costa Mesa, CA), and modest negative pressure. It is centrifuged approximately 1 minute, separated from non-fat components, and transferred into 1 ml syringes using a transfer hub. The fat is then layered into the tissues using 17-gauge blunt-tipped injection needles (Grams Medical) with a reverse liposuction-like motion. Ten to 20 passes are necessary to deliver the contents of the syringe. I used a 10 ml injection gun initially but found that the results were improved without it. I have also tried removing fat with a sharp 16-gauge needle, but because the donor site morbidity was greater I have not used that technique recently. In my opinion, fat transferred using the described syringe technique works more efficiently than that aspirated with a blunt cannula.

The following personal observations about fat injection are based on 10 years' clinical experience.

1. Fat injection is not a simple technical procedure. Plastic surgeons are trained to contour the face and neck either by removing tissues or by pulling them over deeper shape-defining bone and muscle. It is very different and far more difficult to contour by addition. Curves that seem simple to deal with when a redraping procedure is used become frustratingly complex with direct shaping.
2. Fat permanency increased markedly when I began using 10 to 20 needle passes rather than four to five passes to introduce 1 ml of fat. Injecting less volume per pass also permitted better control of shape and surface smoothness. In general, because unevenness from fat injection is not easily corrected, *it is important to avoid the first irregularity*. Considering the number of needle passes required during a procedure, an intense and unbroken level of concentration is necessary.
3. Curved areas are easier to deal with than flat sur-



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faces. We live in a world of mostly vertical light. Minor irregularities are accentuated on vertical surfaces such as the temple, forehead, and tear trough, because vertical light casts shadows in these areas. This condition may be worse than the original problem; in fact, it is extremely difficult to correct. The tear trough should never be treated as an isolated site. Injecting fat subcutaneously into the tear trough results in a cylinder of tissue that feels distinctly firmer than fat. It casts a shadow that is lower than the tear trough shadow, making the patient look worse. This problem is not responsive to steroid injection; however, it may lessen somewhat with time. A minor lowering of the tear trough can produce an aesthetic result that looks worse than that caused by cutting a facial nerve branch and should be avoided at all cost. Injection *can* be used effectively in the tear trough of an aging face if the trough is filled from below and upward as part of an anterior infraorbital fill. The injection needle should scrape bone as fat is injected.

4. The quality of the harvested fat is dependent on several factors. In my opinion, the more free oil present in the aspirate, the less successful the transfer of fat. Syringe pressure and cannula style are less important factors. In general, the amount of oil increases with the age of the patient. Harvests of dense fat are less oily than those of “soft” fat and seem to survive better. The last syringe of fat harvested from a particular area will contain more oil than the first syringe of fat harvested from that area.
5. Fat injections work best in faces in which it is needed the least. A younger, fuller face will derive more volume gain from fat injections than an older face. It is not clear whether this phenomenon is related to the quality of the donor fat or the recipient site. Moreover, fat seems to survive better in an area in which fat was once present but was then lost than in an area that was never full.
6. My experience with Romberg’s disease is limited to two patients, in whom even technically unsophisticated fat injection improved the site substantially.
7. Success with fat injection is site-related. In the glabella, infraorbital rim, and upper malar region, fat seems to “take” more efficiently than in other areas. Fat appears to survive better in areas that move less than other areas. In my hands, injection of the nasolabial folds, lips, and marionette lines has



**Figure 1. A,** Preoperative appearance of a 40-year-old patient who had a face lift 7 years ago and multiple rhinoplasties performed elsewhere. **B,** Appearance of patient 10 months after undergoing several procedures during which small amounts of fat were injected into the nasolabial fold, brows, temples, and each malar eminence.



**Figure 2. A,** Preoperative appearance of a 58-year-old patient who had a face lift 11 years ago. **B,** Appearance of patient 10 months after a second fat injection procedure.

been unrewarding despite the fact that others report some success in these areas. I do have an occasional triumph in these areas, so I keep trying. Some changes in fold structure, not necessarily for the better, can be seen following the use of a sharp needle to inject fat. The cutting action of the needle on cutaneous retaining structures and muscle tendon slips, rather than the injected fat, may be responsible for this effect.

8. In a given area, the percentage of retained fat seems to increase with subsequent procedures.
9. Fat cannot be molded once it is injected. Part of the volume from the last several passes of the injection

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needle can be milked out of the needle tracts. Cross-tunnel molding is not possible.

10. Fat is used for area fills, and collagen is used for dermis fills. They are not interchangeable. I believe that the use of fat has not caught on because it has been used like collagen, a task for which it is ill suited. In addition, fat injection does not replace the SMAS face lift; the two procedures accomplish different things. Ultimately, the characteristics of the face requiring improvement—not the technical preferences of the surgeon—should define the treatment. ■

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applies not only to women but occasionally to men who cannot grow a beard below the level of the middle of the ear. It is always a good idea to ask the male patient pre-operatively whether he could grow long sideburns when they were fashionable. If he says no, then this incision would be better for him than the conventional incision. Even in secondary face lifts in which the initial incision was made in the scalp but is followed by a pre-sideburn incision—creating an island limited by incisions anteriorly and inferiorly and a scar line posteriorly—the tissue survives nicely. ■

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