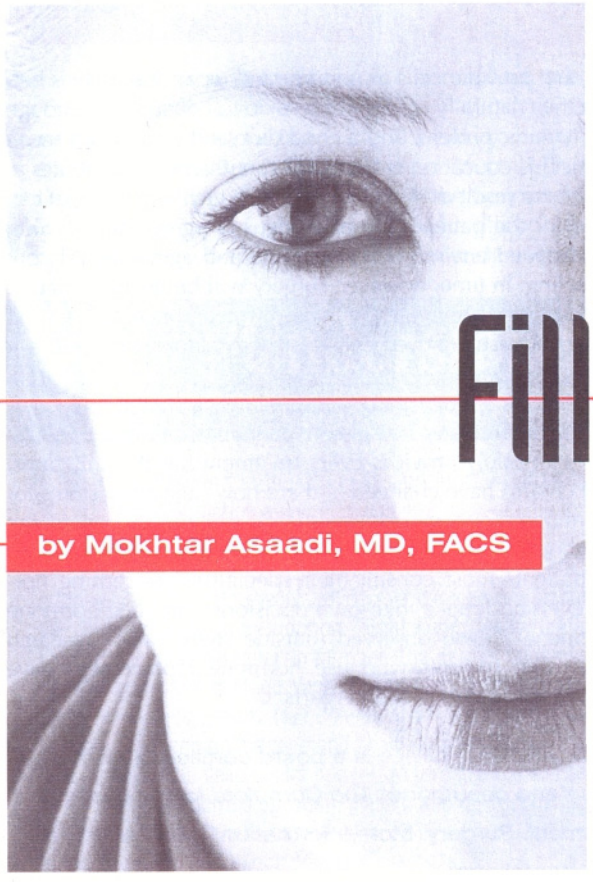

# Filling in the Lines

by Mokhtar Asaadi, MD, FACS

**Soft-tissue fillers are proving to be a popular choice among patients due to their limited side effects and minimal downtime**

**Plastic surgeons face demanding patients** who are interested in looking younger. They fight the aging process by dieting, exercising, and looking for cures for their facial and bodily imperfections. The lines, wrinkles, scars, and folds of the face are annoying to many individuals. Soft-tissue fillers are popular because of the increased demand generated by this dissatisfaction.

The injection of soft-tissue filler is well accepted by patients because the procedure can be performed as an in-office procedure, with few or no side effects. The patient can return to work and normal activity soon after treatment. An ideal filler would be inexpensive, easily available, and relatively long lasting, but not necessarily permanent. It would be painless at the time of injection, and it would produce reproducible results. There should be minimal adverse effects (such as bruising, irritation, allergic reaction, migration, and infection). At present, there is no substance that can meet all these requirements.

## Microspheres in Collagen

One permanent soft-tissue filler has not yet been approved by the US Food and Drug Administration (FDA), but is available in Europe, Canada, and Mexico. It is a suspension of polymethylmethacrylate (PMMA) microspheres in 3.5% bovine collagen solution. The microspheres are 30 to 40 µm in size, with a smooth surface that is said to cause less foreign-body reaction than previous fillers of this type. The size of the microspheres allows their injection through a 27-gauge needle; it also prevents migration and phagocytosis. The body degrades the collagen within 1 to 3 months, and a fine capsule encapsulates the microspheres in 2 to 4 months.

This product is used for lip augmentation and in the treatment of facial lines and scars. Crow's feet should be avoided as treatment sites because the implant may be visible. The product should not be used in patients who are allergic to collagen. It is injected into the subdermis with a 27-gauge needle, under constant pressure. At the time of injection, the needle should be drawn back and forth, creating tunnels. This product should never be infiltrated into the dermis. Intradermal injection could cause swelling, pain, erythema, and palpable granules. Skin testing is recommended before treatment.

Overcorrection is not recommended. Two to three treatments may be necessary to achieve desirable results. After the injection, local pressure over the implant is applied, and the area is covered with tape for 3 days. The patient is advised to massage the area for 3 to 5 days after treatment. One undesirable effect is granuloma formation; this is rare, but it could affect one case per 1,000 patients.' The major advantages of the microsphere product is its permanence and that 90% of patients have

been satisfied with their treatment .[2] The overall complication rate is very low; prolonged redness or visible granules, if present, are due to implantations that are too superficial. PMMA microspheres are produced by a technique called suspension polymerization. Microspheres with absolutely smooth surfaces, without residue or contaminants, are dispersed in a heated 3.5% collagen solution derived from the skin of calves raised in districts free of bovine spongiform encephalopathy.3 The solution is then cooled to remain in a gel state. It is stable at room temperature, but refrigeration is recommended.

This preparation is less easily applied than collagen because it remains under the skin for many years. Therefore, any mistake made during implantation could be everlasting. The gel is supplied in syringes of 1 or 0.5 mL, each with a short (13-mm) 27-gauge needle affixed to a Luer lock. Since the level of injection is subdermal, the solution should not be lost through the sebaceous pores.

The main indications for the use of microspheres in collagen are glabellar frown lines, nasolabial folds, perioral lines, and depressed corners of the mouth. Other possible indications are lip augmentation, philtrum augmentation, horizontal chin folds, depressions after rhinoplasty, and horizontal frontal furrows and neck folds. Limited indications are acne scars, shadowed eyelids, and unevenness and depressions after a face-lift. Contraindications are known allergy to collagen, thin or atrophic skin, and history of keloids. All patients are given a test injection in the left elbow 4 to 6 weeks before facial implantation. Possible adverse effects are swelling, redness, moderate pain, herpes labialis, and acute allergy. The delayed side effects are persistent redness, a palpable implant, uneven distribution, small visible granules, unpleasant tightness in the lip, secondary folds, and delayed allergy.

## Hyaluronic Acid

Hyaluronic acid is derived from the fermentation of sugar by streptococci. The hyaluronic acid in the skin, responsible for dermal hydration, decreases with age; this causes increased wrinkling. Hyaluronic acid gel is not FDA approved and is not yet available in the United States. It is nontoxic and nonimmunogenic. The product does not contain an anesthetic, so topical or nerve-block anesthesia is necessary before its injection. The product does not require refrigeration and can be stored for 1 year at room temperature. Once it has been opened, it should be used within 24 hours. About one third of patients still have some improvement approximately 8 months after treatment.'

## Collagen

Injectable collagen is a purified, enzyme-digested bovine dermal collagen suspended in a phosphate-buffered saline with lidocaine. Collagen has been used since 1977, and the FDA approved its use in 1981. Bovine dermal collagen is 95% type 1 and 5% type 3 collagen. Collagen is available, in the United States, in three injectable forms, with the most recently introduced (collagen cross-linked with glutaraldehyde) being less susceptible to degradation and less immunogenic.4 Collagen may cause an allergic reaction, and skin testing is required before treatment.

Of the general population, 3% are allergic to bovine collagen, and 1% to 2% of nonallergic patients develop a hypersensitivity reaction after injection of the collagen (although the skin test was negative). A repeated skin test is highly recommended. The older two collagen products are injected into the superficial papillary epidermis and the cross-linked collagen is placed into the midreticular epidermis. The implantation of the collagen is done with a 30 gauge needle. The needle is positioned at a 30° angle, with the bevel up, and is tunneled into the dermis for injection. With the original two collagen products, the needle should be visible when the injection is done at the level of the superficial papillary dermis, and the skin should blanch when the implant is placed. No blanching is seen when cross-linked collagen is injected into the reticular dermis. Overcorrection using collagen is highly recommended. The original products are recommended for superficial wrinkles, and cross-linked collagen should be used for deeper wrinkles (but is contraindicated in the glabella). The disadvantage of collagen is its lack of permanent effects; repeated injections are required every 3 to 4 months. In addition to allergic reactions, swelling can be seen after the use of collagen.

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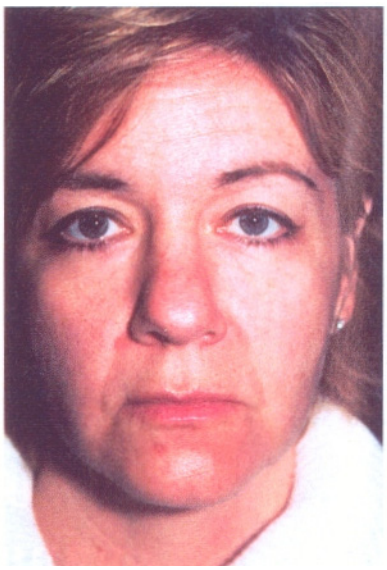

Figure 1. Preoperative: 45-year-old.

Postoperative: Fat grafting to naso-labial folds, upper and lower lips, and lines of lower lips.

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## Autologous Fat

The injection of autologous fat as a soft-tissue filler is very popular at present. The use of fat grafting dates back to 1893. In the 1950s, Peer' of St Barnabas Medical Center, Livingston,

NJ, demonstrated that 50% of the free fat transplant survived. In the past 15 years, there has been more interest in soft-tissue filling through the use of fat. A few principles of handling the fat should be applied in order to obtain better survival of fat cells. Naturally, aseptic and atraumatic handling of the fat are critical for increasing fat survival. At St Barnabas Medical Center, we have used 100 units of regular insulin in 1,000 mL of lactated Ringer's solution for washing the fat. Our current technique of fat harvesting is to use a 10-mL disposable syringe attached to a blunt cannula. Minimal negative pressure is created by withdrawing the plunger of the syringe by hand. We separate and wash the fat on a piece of nonadherent material. The fat is then transferred to a 1 -mL syringe and is injected, using an 18-gauge cannula, in small increments and at different levels, to correct lines and wrinkles or create more fullness of the lips. There is a high rate patient satisfaction with this technique at our facility. We use the abdomen, flanks, upper inner thighs, or trochanteric areas as donor sites. The procedure can be done on an outpatient basis under local anesthesia. The donor site is injected with a one-third dilution of 1 % xylocaine and 1/100,000 epinephrine solution. After the fat has been harvested, the recipient site is anesthetized using a local block (so as not to disturb the tissue). For augmentation of the lips, small incisions are made on the vermilion in each corner of the upper and lower lip. Fat is injected into the vermilion border and the vermilion of the lips at different levels.

An overcorrection of about 10% to 15% is done. For correction of the nasolabial fold, a small incision is made, using a #11 blade, in the lower part of the nasolabial fold, and fat micrografting is done at different levels (including the deep subcutaneous tissue and areas close to the skin) in small increments (Figure 1, page 28). Injecting too much fat in one area must be avoided because it decreases the chance of fat survival and may cause hardness (fat necrosis). Fat grafting in the lower part of the body for areas with depressions is very successful. We have shown 100% correction of deep depression of the lateral thigh with one injection through the use of fat grafting (Figure 1, page 28). ▌

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## References

1. Cheng IT, Perkins SW, Hamilton MM. Collagen and injectable fillers. *Otolarygol Clin N Am.* 2002;35:73-85.
2. Lemperle G, Hazan-Gauthier N, Lemperle M. PMMA microspheres (Artecoll) for skin and soft-tissue augmentation. Part II: clinical investigations. *Plast* Reconstr *Surg.* 1995;96:627-634.
3. Collagen safety. Available at: www.artecoll.com/collagensafety.htm. Accessed May 21, 2003.
4. Ashinoff R. Overview: soft tissue augmentation. *Clin* Plast *Surg.* 2002; 27:479-487.