

Dermatologic Surgery Into the Next Millennium, Part II

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This is the second article in a 4-part series on dermatologic surgery. This section provides detailed information about filling agents and botulinus toxin A. The filling agents discussed here are frequently used in our office. It is emphasized that meticulous technique and patient selection predict a good cosmetic result. To select the right agent, patient safety must be a priority.

The previous section (*Cutis*. 1999;64:245-248) discussed liposuction, with special emphasis on preoperative and postoperative patient follow-up to provide the highest safety profile. Furthermore, it detailed technologic changes and provided suggestions for future developments. This section addresses a variety of agents known as filling agents, including microfat injections, expanded polytetrafluoroethylene (ePTFE) implants, collagen injections (bovine, porcine, and autologous), as well as botulinus toxin A (botox). These agents are often requested by patients seeking a more youthful appearance. Dermatologists and dermatologic surgeons use these filling agents predominantly for face-centered procedures.

Filling Agents

The use of fat as a filling agent has increased dramatically. Autologous fat implantation is used in lipodysmorphea, in cosmetic surgery for the rejuvenation of the face, and especially for smoothing the nasolabial fold. Fat injection is combined with a variety of other procedures. We have performed it in combination with laser resurfacing and with facial liposuction

without negative outcome. In our experience, microlipoinjection shows consistently good results.

Cases of blindness after microfat injection have been reported, as well as calcification in the breast after augmentation with autologous fat implantation; however, we consider it a safe procedure. In addition, this filling material is often readily available, and hypersensitivity reactions do not occur. It is our observation that although the filling effect is reduced over time, there remains a consistent benefit, most likely due to survival and growth of intact lipocytes from the fat implant.

There are a variety of techniques for storing fat after liposuction. The storage conditions are varied, and there is a risk of biologic degradation of the lipids harvested.¹ We envision storing appropriately harvested and processed fat for many years, especially after procedures such as liposuction. The ultimate consequence would be a "fat bank." The patient could have touch-up fat injections, which would circumvent repeating the harvesting procedure. For the patient's safety, however, meticulous monitoring of fat depots must be provided to avoid fat donor and fat recipient mix-ups, which could have serious implications (eg, transmission of viral infections, rejection reactions).

We prefer microfat injection rather than the collagen implant procedures, although these procedures are available to our patients. We reiterate that correct implantation technique avoids even minimal side effects, such as erythema and edema at the injection sites.

Other filling substances are ePTFE and variants of collagen, including autologous collagen injection. The agent ePTFE is a pliable, inert material implanted into the subcutaneous fat of the lips and folds of the nasolabial and glabella. We have found it to provide consistently good results (Figure). The insertion technique is made easier by the newly

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Preoperative (A) and postoperative (B) expanded polytetrafluoroethylene implant in upper lip.

developed tunneling devices. These allow for custom molding according to the patient's need. Because the aging process is continuous, touch-ups may be required. The implant technique appears simple. An insertion of the appropriate length, width, and area will help to avoid disfigurement, inflammation, and pouching. Theoretically, there can be displacement and rarely extrusion of the implants; however, appropriate placement avoids these complications.^{2,4}

Bovine collagen has a history of being used as a filling substance in cosmetic surgery for facial lines and wrinkles. There are several variants available. Zyderm I and II are injectable suspensions of bovine collagen types I and III that are placed into the papillary dermis. Zyplast collagen implant is processed with glutaraldehyde, thereby increasing the collagen cross-linking and prolonging the effect duration (3 to 6 months, on average). It is injected into the deep dermis. Although the 3% rate of hypersensitivity is relatively low, it is a concern. Hypersensitivity develops in about 1% of patients with a negative skin test result. Serum sickness has been reported after bovine collagen injections in single cases.⁵ For patients allergic to bovine collagen, porcine collagen could represent an alternative. The products, which are not available in the United States, must be properly tested prior to patient injection using a skin-testing procedure similar to that of bovine collagen.

Most recently, autologous collagen has been promoted. This involves injecting patients with their own collagen that is grown in a culture. This "natural" technique avoids the possibility of allergic reaction; however, the logistics of the transport and transfer of the biopsy, which is cultured in a laboratory, within 48 hours can be difficult. Patients' expectations might not be met, and the procedure is costly.^{5,6}

We recognize a definite trend in cosmetic surgery using implants favoring allogenic substances such as fat and autologous collagen rather than foreign, and potentially harmful, materials. It is conceivable that growth techniques for producing this autologous tissue will become simpler, enabling it to be used on a larger scale. This method could find applications in the reconstructive fields for improving appearances after trauma, tumor excisions, and disfiguring illnesses.

Botulinus Toxin A

Botulinus toxin A, or botox, is a neurotoxin produced by *Clostridium botulinum*. It has been used to treat strabismus and hyperfunctional muscles since the late 1970s. This toxin is now one of the ideal substances for addressing the appearance of lines and wrinkles. In our office, the lyophilized botox is suspended in preservative-free normal saline. The patient is injected in the area of the smile lines, the forehead folds, glabella folds, and neck lines. Shortly after injection, the treated muscles will relax, thus making superficial muscle movement in the treated areas impossible. Although the effect might initially only last for 3 to 6 months, the treatment intervals prolong over time. It is speculated that this results from functional atrophy of the treated muscles.^{7,8}

Contrary to some beliefs, the patients do not appear masklike. In fact, the opposite is true in our experience. The patient has a natural smooth look. The main advantages are the reversibility of the procedure if patients do not like their appearance, the standardized product, and the noninvasive administration.

We believe that this is a safe procedure. We do not reuse solubilized botox. If there is a significant complication, such as diplopia or brow asymmetry,

an antidote is now available to reverse these complications immediately. The use of botox can make eyebrow lift procedures and blepharoplasties redundant. Indication for its use is expanding rapidly and includes the treatment of palmar dyshidrosis and, most recently, axillary hyperhidrosis.⁹

Conclusion

In summary, the discussed filling agents and botox are all welcome weapons in halting the ravages of time in patients who desire removal of lines and wrinkles and in whom more aggressive procedures are currently not indicated or requested. In the patient's interest, the pros and cons of each filling agent must be discussed, and the most appropriate filling must be chosen to best meet the patient's needs. It is important to ascertain that the patient has realistic expectations and does not have any adverse reaction toward the agent (hypersensitivity reaction toward collagen). We believe there is a trend among patients toward either autologous implant materials or inert ones (ePTFE) in an effort to avoid the risk implicated by other substrates.

The third section of this series will discuss in-office face-lift procedures and blepharoplasties.

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