Micronized Acellular Tissue for Soft Tissue Augmentation

The modern search for the ideal soft-tissue filler for cosmetic and reconstructive purposes began in earnest at the end of the 19th century with Gersuny’s reported use of injectable paraffin fillers. Materials for soft-tissue augmentation are numerous and can be organic or inorganic, implantable or injectable. The ideal filler material would be inert, neither transmit nor induce disease, match the surrounding tissue’s color and consistency, be easily placed, and maintain its position, bulk, and physical characteristics indefinitely. Despite the many types of materials used to date, the ideal soft-tissue filler has not yet been found.

During the first half of the 20th century, little progress was made beyond paraffin. In the postwar period, injectable silicone was introduced, but imprudent use led to chronic foreign body reactions and silicone granulomas. Injectable collagen (Zyderm/Zyplast, Collagen Corporation, Palo Alto, CA) was introduced in the 1980s and has become the standard by which all other injectable filler materials are judged. Injectable collagen is easily placed and associated with few complications, and its application is well tolerated by most patients. As a xenograft, the material requires processing to remove the most immunogenic portions of the molecule; unfortunately, this enhances the rate of resorption. Histologically, bovine collagen implants form small collections in the dermis, and these become surrounded by a low-grade inflammatory reaction at the periphery. Clinically, bovine collagen can be used for the treatment of depressed scars, facial rhytids and folds, and lip augmentation. Clinical results generally last from 2 to 6 months, and follow-up treatments are usually necessary every 3 to 4 months.

Acellular dermal tissue (AlloDerm, LifeCell Corporation, Branchburg, NJ) was introduced in the early 1990s for the treatment of burns. In 1996, Jones et al described the use of rolled AlloDerm for lip augmentation, nasal augmentation, and correction of nasolabial folds and scars. Since that time, several other uses of AlloDerm sheets have been described. Clinically, some loss of volume to a variable degree can be seen after AlloDerm implantation, usually stabilizing within 4 to 6 months. Histologically, AlloDerm tissue explanted 1 month postoperatively exhibits a meshlike network of human dermal proteins, only a minimal inflammatory response being noted. Fibroblasts and blood vessels can be seen to repopulate and revascularize the graft in these 1-month explants. One drawback to using AlloDerm for tissue replacement in certain applications is the need for a surgical incision.

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LifeCell Corporation has developed a less invasive form of this tissue replacement matrix; it is the newly released Cymetra, or Micronized Acellular Tissue (LifeCell Corporation), a micronized form of AlloDerm that is created by mechanically fracturing portions of AlloDerm sheets. In this process, the ultrastructure of the dermal extracellular matrix is maintained and damage to the intact collagen and elastin fibers may be avoided. Cymetra is supplied as a freeze-dried powder that is reconstituted with 0.5% lidocaine to form a pastelike material that can be injected with a 26-gauge needle. Cymetra particles range in size from 185 to 250 µm, with an average size of 200 µm; the vast majority of injectable particles are thus too large to be phagocytosed by macrophages. Unlike intradermal fillers such as bovine collagen, Cymetra is placed subdermally through use of a 26-gauge needle. A needle smaller than a 26-gauge can theoretically fragment the injectable particles and lead to frequent needle clogging. Skin testing is not required, and treatment-associated side effects, except for occasional minor bruising, have not been reported. In clinical trials, Micronized Acellular Tissue has shown a greater degree of clinical persistence than Zyplast. Histologically, individual deposits of Cymetra appeared to integrate in a manner similar to that seen with AlloDerm sheets, with fibrovascular ingrowth and a negligible inflammatory response.
In our experience with approximately 75 patients treated over 1 year with Micronized Acellular Tissue for lip augmentation, a roughly 50% overcorrection is needed, and once the acute swelling has subsided, the patient can elect to receive additional tissue to achieve the final desired result and maximal benefit. Furthermore, in our experience, the results of serial injections appear to be additive and produce a cumulative effect of tissue replacement. Cymetra is injected subdermally either at the vermilion border or along the philtral columns after a 20- to 30-minute application of a topical anesthetic. The lips are iced for 20 minutes immediately after injection. The sensation and discomfort associated with Cymetra application are described as similar to those associated with Zyplast by patients who have received both, and fewer than 10% of my patients describe the pain as severe. Cymetra patients whom I have treated note that the initial overcorrection caused by swelling tends to resolve between 6 and 48 hours. Clinically, a firm but supple ridge is noted at the vermilion border within 48 hours after injection. In contrast to what is occasionally seen in patients who undergo grafting with AlloDerm sheets in the lip area, none of my patients have complained about restriction of mouth movements after Cymetra treatment.

We are currently completing a 12-month prospective comparison of Micronized Acellular Tissue and Zyplast for the correction of atrophic lips and hope to determine the long-term effect of Micronized Acellular Tissue in the lips. Although the price of Cymetra is slightly higher than that of collagen fillers, superior clinical persistence should support this cost differential.

Cymetra represents a promising new approach to the correction of defects in facial contour with tissue replacement rather than intradermal filling, and it may be considered superior to bovine collagen fillers because sensitivity testing is not required and the incidence of adverse reactions is less. In contrast to what is seen with most intradermal fillers, it appears that some portion of the injected Cymetra persists indefinitely or resorbs slowly, allowing for cumulative tissue replacement and leading to a clinical effect that lasts up to 6 months and possibly beyond.

LifeCell Corporation is sponsor of Dr. Sclafani’s research in Cymetra. Dr. Sclafani has no financial interest in LifeCell Corporation

References

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