

# Soft Tissue Augmentation, Part 2: Hand Rejuvenation

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The aging process leads to changes that occur in all layers of the skin and subcutaneous tissue as well as the underlying muscle and bone. The evolution of injectables and development of resurfacing technologies have allowed patients to age gracefully, especially with regard to aesthetic improvement of the face and neck; however, there have been few studies that address changes in the aging hand or ways to correct these changes with minimally invasive procedures. We discuss techniques for successful hand rejuvenation with frequently used injectables (off-label uses).

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**H**ands are among the most noticeable parts of the body next to the face; thus their aesthetic appearance can have a substantial impact on one's perception of an individual.<sup>1</sup> When a patient undergoes consistent cosmetic procedures to the face to preserve a youthful appearance but leaves the hands untouched, there is an obvious discrepancy regarding the perceived age based on the face versus the hands. This inconsistency is one of the reasons hand rejuvenation has become increasingly popular.

As the hands age, they undergo many gradual characteristic changes that can be observed in varying degrees depending on the individual. Chronic actinic damage in addition to inherent aging can yield solar lentigines and

irregular pigmentation; textural roughness, possibly secondary to precancerous lesions; loss of elasticity; and epidermal, dermal, and subcutaneous thinning, which can lead to a crepelike appearance.<sup>2</sup> All of these changes can result in the prominence of the underlying bones, tendons, and rhytides, as well as noticeable intermetacarpal depressions, visible reticular veins, and fragility.<sup>3,4</sup> In comparison, youthful hands appear plump and firm and the skin maintains its elasticity and smoothness. Carruthers et al<sup>5</sup> published a validated grading scale for assessment of the aging hand, while others utilize the Busso hand volume severity scale.<sup>6</sup>

Soft tissue augmentation and additional minimally invasive procedures using laser-based devices have helped to reverse the changes in the hands associated with aging to optimize rejuvenation with minimal downtime. Available options include the off-label use of injectable nonanimal stabilized hyaluronic acid (NASHA) fillers, calcium hydroxylapatite (CaHA), and poly-L-lactic acid (PLLA), as well as autologous fat transfer. These soft tissue augmentation methods are intended to restore the volume loss that occurs with aging and aid in concealing prominent bones, tendons, veins, and hollow spaces while smoothing the texture of the skin.

## CONSULTATION

An important part of a hand rejuvenation consultation is assessment of the patient's specific aesthetic concerns

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(ie, actinic damage, thinness in appearance) so that the physician can discuss potential treatment options and realistic outcomes. Baseline photographs are important for both the patient and the physician to assess the degree of improvement. Informed consent must be obtained after discussing all possible risks, benefits, and alternatives, as well as the off-label use of many of the fillers. A detailed medical history also should be recorded. Documented adverse events following hand rejuvenation procedures include edema, hematoma, redness, and pain, though these effects usually are transient.<sup>4</sup> Lumps and granuloma formation could persist if patients do not follow instructions for postprocedure care or if the injector is inexperienced. Contraindications include a prior hypersensitivity response to filler used or any of its components. Once these preprocedure concerns have been addressed, a suitable plan can be pursued.

### SOFT TISSUE AUGMENTATION

Understanding the anatomy of the hand and identifying its vascular structures is crucial for successful rejuvenation procedures. In addition, it is important to recognize that the epidermis and dermis are thinner in the hands versus the face and there are fewer pilosebaceous units.<sup>7</sup> Dermal fillers have revolutionized the field of cosmetic surgery, as they provide aesthetically appealing results with minimal adverse effects and downtime.

Regardless of which filler material is used, certain treatment approaches should always be utilized. Prior to injection, topical anesthetic can be administered to maximize patient tolerance. Treatment areas also should be prepared with surgical cleansers. Before injecting filler material with needles, the plunger should be pulled back to ensure that intravascular injection does not occur, as the hand has many vascular structures. Injection techniques vary greatly depending on the injector's comfort level, experience, and preference. Needle injections or blunt-tipped cannulas both can be used, depending on the injector's preference. Interestingly, a recent study reported fewer adverse events when using a needle versus a cannula when injecting Juvéderm products (Allergan, Inc) into the hand; however, all events were considered mild or moderate. The most common side effects reported were edema, redness, hematoma, and pain, and none were considered to be severe.<sup>4</sup>

Some physicians inject the hands while the patient is in the Trendelenburg position to reduce venous pressure.<sup>8,9</sup> However, we do not use this technique in our practice for hand rejuvenation procedures. For most fillers, we employ the use of a retrograde injection technique. Ensuring avoidance of any visible or palpable vasculature, an injection is made between the tendons of the hands and is

threaded into place. For NASHA fillers, CaHA, and PLLA, a deep dermal/subcutaneous fat plane of deposition is preferred for the best aesthetic result. After needle aspiration to ensure that there is no inadvertent vessel penetration, the filler is injected in a retrograde fashion and then can be fanned from the one entry point. Some physicians use a bolus of product and then massage it into place; however, it is important to minimize the size of the bolus, as too much product can lead to nodule formation.

In our practice, we utilize blunt-tipped cannulas to inject dermal fillers for hand rejuvenation. We prefer a more proximal site of entry to maximize the surface area filled with a single entry point. At the cannula entry site, we anesthetize using lidocaine with epinephrine and then create an entry point using an 11 blade. Through that opening, the blunt cannula is introduced and the filler is deposited directly above the fascial plane in a parallel fashion between the ligaments. We then manually massage the filler into place to ensure precise contouring. We prefer blunt-tipped cannulas versus needles because they limit the number of entry points needed, minimize local trauma to the treatment area, and prevent intravascular injection. In our experience, we have found that this technique also minimizes adverse events.

### Nonanimal Stabilized Hyaluronic Acid

Nonanimal stabilized hyaluronic acid fillers, which may already contain lidocaine depending on the product, are well-tolerated options for hand rejuvenation, though this application is considered off label.<sup>10</sup> Hyaluronic acid, a polysaccharide that is present in the normal human dermis, attracts and retains water, which can increase turgor and aid in volumizing.<sup>11</sup> These hyaluronic acids can be cross-linked to varying degrees, which determines the particle size and inherent nature of the product. These fillers include Restylane/Perlane (Medicis Aesthetics, Inc), Juvéderm Ultra and Juvéderm Ultra Plus, and the recently approved Belotero Balance (Merz Aesthetics, Inc).

Although there are few published reports on hand rejuvenation with NASHA fillers,<sup>8,10,12</sup> our patients have been satisfied with the results, especially with NASHA fillers that have a larger particle size (eg, Perlane, Juvéderm Ultra Plus), as they provide greater structural support. Nonanimal stabilized hyaluronic acid fillers can be mixed with 1% lidocaine with epinephrine depending on injector preference. When administered via needle injection, the hand should be relaxed and the NASHA filler should be injected into the deep dermis or even subcutaneously using a threading technique with as few injection sites as possible.<sup>8</sup> Superficial injection should be avoided to minimize the theoretical risk for bluish discoloration (Tyndall effect). Following injection, NASHA fillers should be

massaged over the dorsal hand to ensure equal distribution of the product. Results lasting 6 to 9 months have been documented in the literature.<sup>13</sup> Potential adverse effects to be aware of and to discuss with patients include transient swelling, erythema, ecchymosis, and lumps. More severe side effects such as the Tyndall effect from injections that were administered too superficially can be reversed using hyaluronidase or possibly even nicking the overlying skin to attempt to manually remove the filler.

### Calcium Hydroxylapatite

Hand rejuvenation with CaHA (Radiesse, Merz Aesthetics, Inc) is considered an off-label application, though there have been increased reports on its successful use for this indication with residual effects lasting from 12 to 24 months (Figure).<sup>14-18</sup> Busso and Applebaum<sup>14</sup> first described the injection technique for hand rejuvenation with CaHA, utilizing a bolus of CaHA mixed with plain 2% lidocaine that was injected deep between the subcutaneous layer and the superficial fascia midway between the dorsal crease of the wrist and the metacarpophalangeal joints. Following injection, patients were instructed to clench their fists while the physician massaged the treatment area.<sup>13</sup> Treatment protocols for the addition of lidocaine to CaHA vary in clinical practice. Some studies describe the mixture of 0.1 to 0.2 mL of plain 2% lidocaine into a 1.3-mL syringe of Radiesse using a Luer-Lok connector with the mixture passing back and forth approximately 10 times until it appears homogeneous.<sup>14,19</sup> Alternatively, anesthetic does not need to be mixed with CaHA if a large bolus of lidocaine (eg, 2 mL of 1% lidocaine) is first injected at the injection site.<sup>18</sup> In our practice, we dilute 1.5 mL of Radiesse with 1.5 mL of plain 2% lidocaine. This 3-mL dilution of equal parts Radiesse and 2% lidocaine is injected via cannula into each dorsal hand in between the ligaments on top of the fascia. Optimal results have been achieved in our patients by injecting 3 mL of this dilution into each hand.

Published reports of CaHA used for hand rejuvenation have demonstrated high patient satisfaction with essentially immediate results and minimal downtime.<sup>15,16</sup> Postprocedure care includes cleansing and massaging the treatment area as well as applying ice packs to minimize edema. Elevation of the hands for 24 hours also may help minimize postprocedure edema. Adverse events that have been documented for hand rejuvenation with CaHA include transient, mild to moderate erythema; ecchymosis; edema lasting for days to weeks; and 1 case of nodule formation.<sup>15</sup>

### Poly-L-lactic Acid

Poly-L-lactic acid (Sculptra Aesthetic, sanofi-aventis US LLC) is a well-established dermal filler and is well



Hand before (A) and 6 weeks following volumization with calcium hydroxylapatite (Radiesse, Merz Aesthetics, Inc)(B).

known for its longevity, lasting up to 2 years.<sup>20</sup> Although PLLA can be a good option for volume restoration of the dorsal hands, this usage is considered to be off label.<sup>9,13,20,21</sup> One of the benefits of using PLLA for hand rejuvenation is the gradual improvement that can be noted, even after the last injection, with sustained long-term effects resulting from its ability to stimulate collagen formation.<sup>9,21</sup> In our practice, we reconstitute injectable PLLA with 9 mL of bacteriostatic sterile water plus 1 mL of local anesthetic (1% lidocaine without epinephrine), which differs from the use of 5 mL of sterile water that is stated in the package insert.<sup>22</sup>

Although we prefer the use of blunt-tipped cannulas for hand rejuvenation with PLLA, a 25- or 27-gauge needle can be used with an injection depth right above the fascial plane using the fanning technique, with actual injection of the PLLA occurring while the needle is being removed in a retrograde fashion. Massaging the product to ensure equal distribution is extremely important with PLLA, especially to prevent nodule and granuloma formation, which is known to occur with this product. In addition, the patient must be educated to massage similarly for 5 minutes, 5 times a day, for the next 5 days. Multiple PLLA treatments usually are needed for optimal results, with injections typically administered 4 to 6 weeks apart; however, to our knowledge, there have been no prospective studies documenting the optimal protocol for PLLA injection for hand rejuvenation. An average of 2.5 treatments has been reported in the literature to achieve cosmetically acceptable results.<sup>23</sup> Lower physician and patient satisfaction rates have been reported for PLLA, which has been attributed to the number of sessions required to achieve optimal results.<sup>24</sup>

Because nodule formation in the bilateral hands following treatment with PLLA has been reported,<sup>23</sup> techniques to minimize this risk include injecting the product in a deeper plane, using dilutions greater than 5 mL of bacteriostatic sterile water, limiting the product volume injected at each visit, reconstituting PLLA longer than the 2 hours advised in the package insert,<sup>22</sup> massaging aggressively postprocedure, and ensuring injections are not performed at less than 4-week intervals.<sup>3,25</sup> The risk for nodule formation must be thoroughly discussed with the patient prior to injection, especially in elderly patients who may have more notable atrophy.

### Autologous Fat Transfer

Autologous fat transfer, one of the earliest hand rejuvenation techniques, can be time consuming and expensive, with the potential for greater morbidity given the risks associated with fat harvesting.<sup>26</sup> It also is more invasive than injectable fillers; however, the durability of autologous fat transfer likely is one of the best, with results that can last for 10 years. Fournier<sup>27</sup> was one of the first to describe hand rejuvenation with autologous fat. There is no standardized technique but rather various approaches to fat transfer in the hands. Some physicians utilize the bolus technique, while others recommend more of a threading technique. Similarly, some physicians recommend smaller volumes of centrifuged fat (10–12 mL) to minimize postprocedural edema, while others prefer greater volumes (20–30 mL) to maximize longevity of rejuvenation, even though edema may be present for up to 16 weeks postprocedure.<sup>26–28</sup> Centrifuged fat is

thought to have greater longevity and aesthetic outcome compared to noncentrifuged fat.<sup>29</sup> Fat augmentation is an excellent option for patients desiring an increase in firmness and plumpness of the hands, especially if they are already considering a liposuction procedure during which fat can be harvested for augmentation purposes.

### ADDITIONAL TREATMENT CONSIDERATIONS

In addition to soft tissue augmentation, other treatment options for optimal hand rejuvenation include topical therapies; cryotherapy; and laser and light therapies such as the Q-switched laser, intense pulsed light, photodynamic therapy, and ablative and nonablative fractional lasers. Although volume restoration in the hands can be achieved with soft tissue augmentation using dermal fillers and autologous fat transfer, these interventions do not address other possible presentations of aging in this area. Photodamage and precancerous lesions can be addressed using chemical peels, photodynamic therapy, topical agents (eg, imiquimod, 5-fluorouracil), liquid nitrogen, the Q-switched laser, and various ablative and nonablative lasers.<sup>28</sup> Daily use and frequent reapplication of a broad-spectrum sunscreen on the hands is recommended for the prevention of further actinic damage. It is important to consider which treatment options may potentiate postinflammatory pigment alteration and to choose an option that would be best tolerated by each individual patient. Ablative resurfacing should be used cautiously, as nonfacial skin has fewer adnexal structures to promote healing.<sup>28</sup> We have used the 2790-nm yttrium-scandium-gallium-garnet (YSGG) laser (Pearl, Cutera, Inc) to treat superficial solar lentigines and dyschromia of the hands. For patients with prominent veins, sclerotherapy and/or vein stripping can be considered when appropriate.<sup>30,31</sup>

### CONCLUSION

Global assessment of the hands is imperative when determining the optimal method for patients desiring rejuvenation of aging hands. Dermal fillers or autologous fat transfer can provide structural support to correct the volume loss that is seen in the aging hand; however, often times a combination of treatment modalities will yield the most optimal results.

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