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Hyaluronic acid fillers for the male patient

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ABSTRACT: The male cosmetic population has been more timid over the years for procedures for facial rejuvenation. Only with the advent of minimally invasive procedures such as Botox and fillers have men begun to participate in cosmetic treatments. Men come with esthetic needs and areas of treatment different from women and require a different array of injectable fillers for each of these problems. Wrinkle ablation, volumization, and sculpting facial contours are procedures with the various agents available.

KEYWORDS: fillers in men, sculpting, volumizing, wrinkle filling

Introduction

The explosion in popularity of cosmetic procedures over the past three decades may be attributed to three major factors: an aging of the largest population group – the "baby boomers," a change in the cultural acceptance of cosmetic improvement, and the exponential development of a variety of noninvasive cosmetic procedures. These factors have changed the dynamics of cosmetic medicine and surgery from elite, boutique practices catering to a small but wealthy patient base, to an industry that now caters to the general population. Particularly over the past decade, the use of nonsurgical products and devices to correct facial contour defects and signs of skin aging has exploded, with new lasers, toxins for muscle relaxation, and dermal fillers revolutionizing esthetic medicine. Yet of all the nonsurgical modalities employed during this period, the most explosive element has been within the dermal filler industry. In 2006, the worldwide market for dermal fillers increased by 19%, and the U.S. market is expected to increase a further 20–25% (1). This is resulting in large part from new products, particularly the hyaluronic acids (HA) that now promise greater longevity, fewer side effects, a more natural appearance, and easier administration.

Although men have traditionally been more reluctant than women to undergo cosmetic or rejuvenative procedures, over the past few years there has been a significant increase in the number of noninvasive procedures performed in men. During the 2004–2005 period, there was a 22% increase in cosmetic procedures among men, and a 200% increase in botulinum toxin and filler use (1). In fact, according to the American Association of Aesthetic Plastic Surgery, fillers are the second most popular minimally invasive procedure among men after Botox (2). The development of these no-downtime, nonsurgical, office-based procedures has stimulated a fresh interest among men who are unwilling to tolerate invasive surgical procedures because of the inherent postoperative morbidity and downtime. This new paradigm rejects the previous "extreme make over" approach and instead seeks subtle change that is consistent with the busy lifestyle of the working, middle age, "boomer" male. And because a major etiology of the clinical appearance of the aging male face is volume loss, replacement of this lost volume can

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restore the natural characteristics of the youthful face. Fillers have thus become a very desirable component of the nonsurgical cosmetic armamentarium for men, chiefly as a device for the correction of defects associated with the aging face, as well as for the correction of acne scars.

At their inception, fillers were used mainly for wrinkle correction. Indeed, this was collagen's primary use. But as HAs became available, they were used not only for wrinkle correction in the nasolabial folds, the lips, and chin, but also for volume replacement. Now, both HAs and the longer-lasting particulate fillers can be used for sculpting facial characteristics in addition to volumizing.

Hyaluronic acids

Injectable devices currently used for soft tissue augmentation are typically categorized by the substantive composition and source of the product. Collagen, one of the earliest fillers, may be derived from bovine or bioengineered human sources. Hyaluronic acid, now the most popular filler, may be derived from both avian and bacterial sources. Other synthetic products include polylactic acid, for use in subdermal volume replacement, silicone, and the newly approved, combination polymethylmethacrylate/collagen permanent filler. Of these products, by far the most popular are the HA fillers.

At present, there are five HA skin fillers approved in the United States: Hylaform (and Hylaform Plus, Allergan Inc., Irvine, CA), Captique (Allergan Inc.), Restylane (Medicis, Scottsdale, AZ), Juvéderm (Ultra and Ultra Plus, Allergan Inc.), and Perlane (Medicis) (Table 1). The first pair to be approved included the nonanimal-stabilized HA (NASHA) filler Restylane (Medicis Pharmaceutical Company, Scottsdale, AZ) and the avian HA filler Hylaform (Inamed Corporation, Santa Barbara, CA). (Table 1). Both underwent FDA phase 3 clinical trial against bovine collagen (Zyplast, Inamed, Santa Barbara, CA) in double-blind studies for improvement of the nasolabial folds, and both proved safety, efficacy, and noninferiority compared with bovine collagen. Follow-up studies for Restylane also documented a 6-month duration, which clinical practice has also confirmed (3). Restylane has obtained widespread acceptance as the most commonly used dermal filler for facial wrinkles and folds and for volumetric facial contouring. However, it also revealed a higher incidence of local inflammation, erythema, and bruising than the animal-based Hylaform (4). Restylane is a bacterial-derived, cross-linked HA gel produced from cultures of *Streptococcus equi*. Although Hylaform is avian derived and Restylane is derived from a bacterial source, there is no significant allergy or immunogenicity found in either product. Importantly, because HA has no species- or tissue-specific antigenic properties, it has no innate potential for allergic or immunogenic reaction in humans, regardless of its source.

Table 1. Hyaluronic acid fillers

USA
• Restylane
• Hylaform
• Hylaform Plus
• Captique
• Juvéderm Ultra
• Juvéderm Ultra Plus
• Perlane
Europe
• Restylane, FineLine and Perlane
• Hyacel
• Hylaform, Hyladerm
• Juvéderm, Hydrafill
• Surgiderm, Surgilips
• Achyal, Hyal2000, Hylan SES
• Matredur, Rofilan
• Esthelis
• Viscontour

The major U.S. study of Restylane by Narins et al. was a randomized, double-blinded, split-face study comparing Restylane with Zyplast for efficacy and safety (3). At 6 months, Restylane was found to be superior to Zyplast in 60% of patients, and less Restylane was needed to reach full correction as compared with Zyplast (FIG. 1).

Hylaform is derived from the body of rooster combs, purified, and then cross-linked with divinyl sulfone. It has been available worldwide since 1998 and in the United States since 2004 (5). FDA phase 3, double-blinded, randomized studies were completed in the United States in 2002 and demonstrated noninferiority to collagen for the correction of nasolabial folds for up to 4 months. In over 300 patients, there were very few adverse events, with no evidence of immunogenic or allergic reactions and very little inflammatory response. Since then, Hylaform has demonstrated favorable results in the treatment of facial wrinkles, folds and grooves, acne scars, and lip volumizing.

Perlane is a NASHA HA filler related to Restylane, but with larger particles. This creates greater bulk, making it more useful as a deeper dermal filler, providing greater volume and correcting deeper grooves. Perlane is especially useful for deep

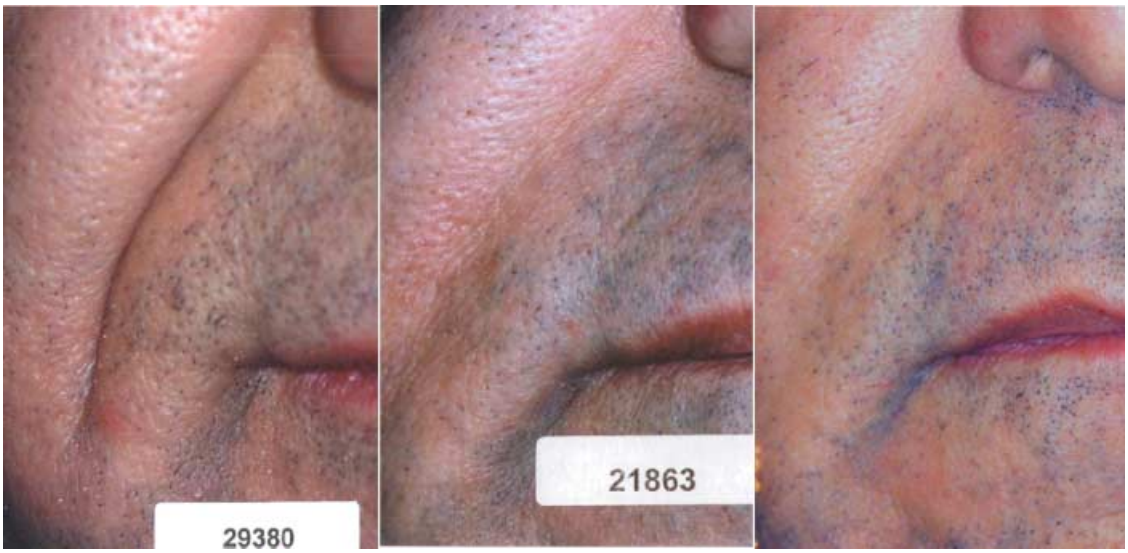

FIG. 1. Artefil treatment of nasolabial folds: pretreatment, short-term improvement, and long-term improvement (Courtesy of R. Narins, MD).

Juvéderm family

JS Clinical Trial

	Juvéderm 18	Juvéderm 24	Juvéderm 30	Juvéderm 24HV	Juvéderm 30HV
Composition	Bacterial base hyaluronic acid + BDDE				
Degree of cross-linking	+	++	+++	+++	++++
Concentration	18 mg/mL	24 mg/mL	24 mg/mL	24 mg/mL	24 mg/mL
Additional uncross-linked HA	No	No	No	Yes	Yes
Volume	2 x 0.8 mL	2 x 0.8 mL	2 x 0.8 mL	2 x 0.8 mL	2 x 0.8 mL
Needle	30G1/2	30G1/2	27G1/2	30G1/2	27G1/2
Storage	2°C–25°C				
Shelf life	24 months	24 months	24 months	24 months	24 months

FIG. 2. The Juvederm family of hyaluronic acid products.

nasolabial folds and for volumizing the middle and lower face.

The most recently approved HA filler is Juvéderm (FIG. 2). It is also a bacterial-derived HA, but with the highest concentration of cross-linking. It has the advantages of smooth flow and minimal trauma. Juvéderm also differs from the other FDA-approved HA products in that it has a more homogeneous consistency rather than particulate consistency seen with other HA fillers. This and other new HA products are referred to as monophasic, as the gel phase predominates rather than particles. It is currently available in two forms: Juvéderm-24, best used in the mid and upper dermis, and Juvéderm-30, which is longer lasting and best for medium and deep dermal injections (6).

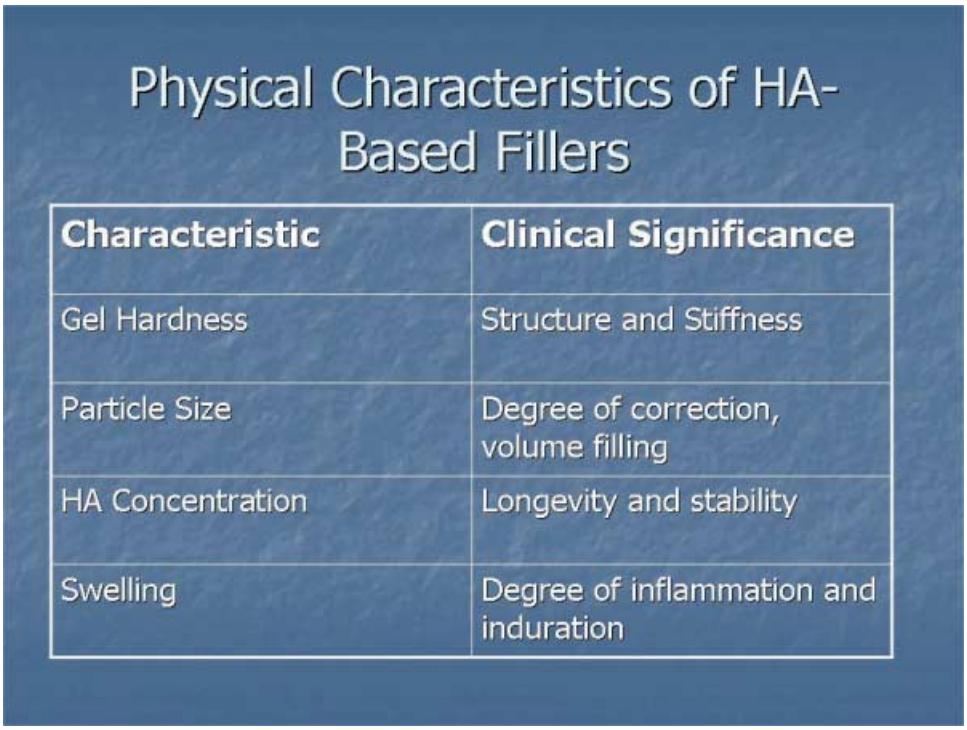

FIG. 3. Physical characteristics of HA-based fillers.

Although all HA fillers are derived from the same HA polymer, all products are not the same. There are differences in particle size, degree of cross-linking, percent cross-linked HA, G′ (elastic modulus) or hardness index, free (soluble) HA present, and degree of hygroscopic equilibrium among the fillers (FIG. 3). Additionally, their clinical performance, i.e., degree of tissue filling, longevity, natural appearance, and adverse event profiles, are dependent on the following physical and chemical properties (FIG. 4):

1 Gel hardness (G′), or rheological (flow) properties, as measured by stored energy deferred upon passage through a syringe and then restored to an expanded viscoelastic state
2 Particle size within the gel
3 Concentration of HA particles per milliliter of gel
4 Swelling, or the gel's ability to resist dilution, and thus a factor in the filler longevity
5 Soluble versus insoluble HA, a function of particulate versus fluid components
6 Cross-linked versus free HA

Each of these factors is a determinant in the clinical effect of an individual HA.

Natural HA has a half-life in tissue of only 1 to 2 days. Yet for use as a dermal filler, a longer residual tissue time is necessary. Cross-linking the HA gives the product greater stability and longevity. As the degree of cross-linking increases, a liquid will become first a gel and then a solid. A higher degree of cross-linking results in a greater degree of resistance to degradation in the body. Too much cross-linking, however, can be problematic by increasing gel viscosity to a point that requires a great extrusion force to expel the product through the needle, creating significant tissue trauma. It can also potentially leave residual, free-floating "cross-linkers," unbound to the HA acid, which may be toxic (7).

The cross-linked macromolecules also transform the product into a more cohesive, hygroscopic gel that swells with absorption of surrounding water. All HA products are hygroscopic in that they have the capacity to bind water. Some (Hylaform and Captique) are saturated with water and are in equilibrium hydration prior to injection. Others (Restylane and Juvéderm) are below equilibrium hydration and thus absorb tissue fluid after injection. Equilibrium hydration can be a desirable property, as it gives back to the tissue fluids that have decayed with aging skin. However, it also causes greater swelling and more inflammation than that seen with initial injection (7).

Particle size is also a factor in tissue response and longevity. Particle dimensions of HA products are determined by a sizing process during the division of the large gel mass. Restylane, Hylaform, and Captique are created in a similar particle sizing

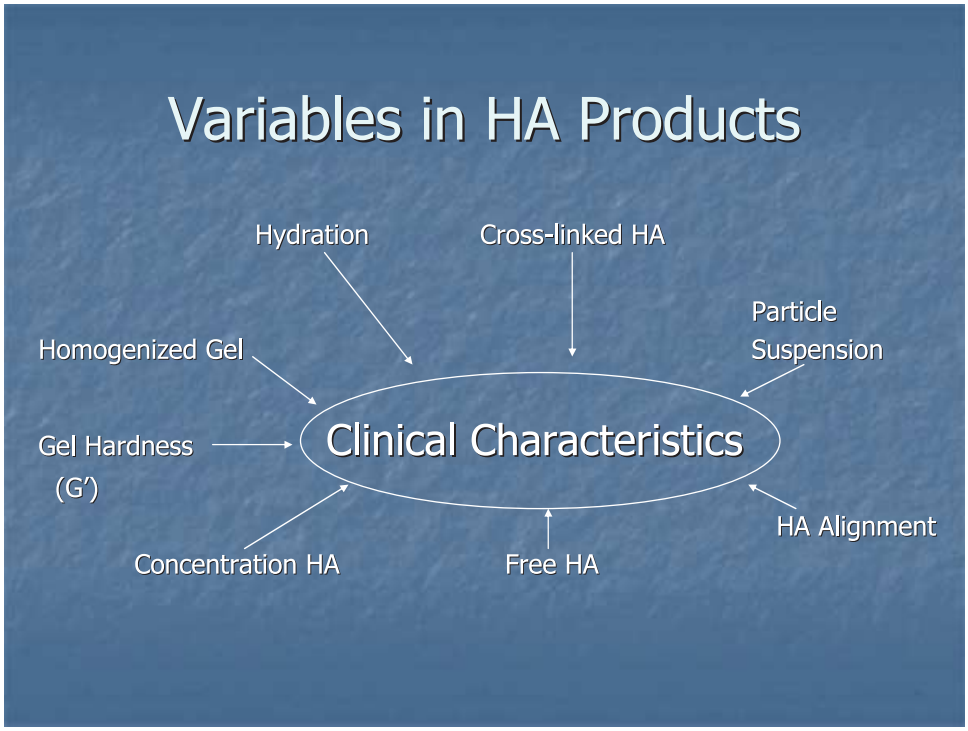

FIG. 4. Variables in HA products.

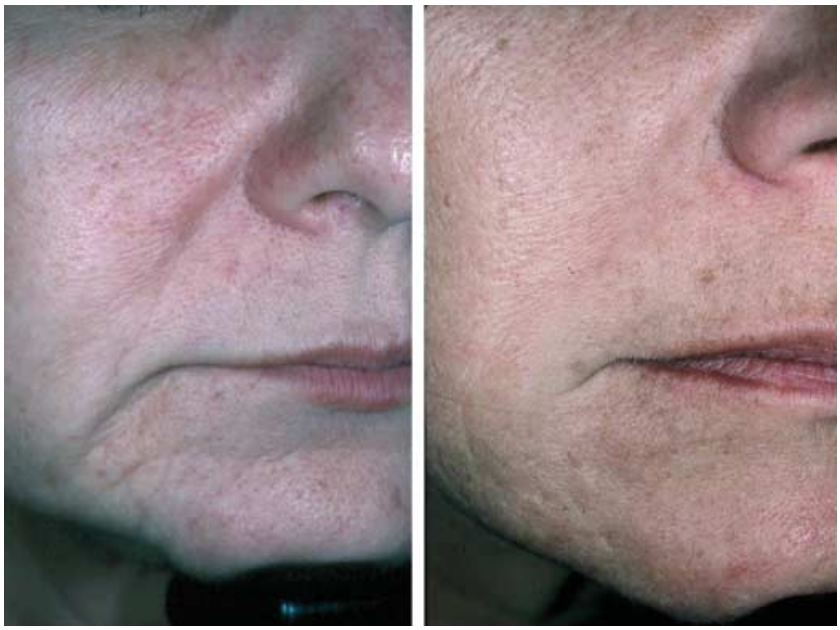

FIG. 5. Hyaluronic acid for the improvement of the nasolabial folds: pretreatment and post-treatment.

process. Juvéderm, however, is produced in a different manner, using Hylacross technology that results in more uniform particles and a smoother consistency (6).

Choosing the appropriate HA filler for the appropriate area is important for natural results. Restylane or Juvéderm Ultra will give natural and biocompatible results when filling the nasolabial folds or for enhancing lip volume (FIGS. 5 and 6), but will not produce good results for the treatment of fine lines in eyelids or for vertical fine lines on lips. Deeper grooves or folds can be treated with the larger particle HAs, Hylaform Plus, Juvéderm Ultra Plus, or Perlane.

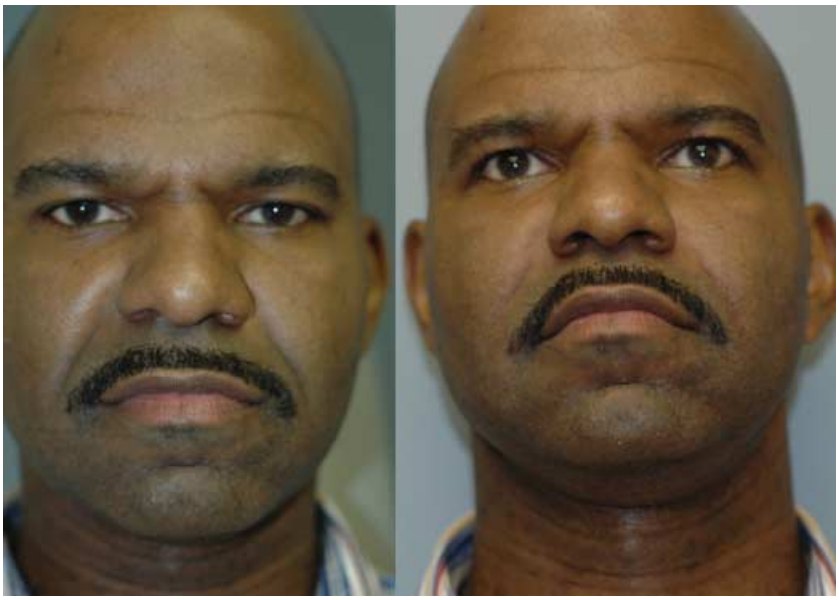

FIG. 6. **Hyaluronic acid (Captique) for the improvement of the nasolabial folds: pretreatment and post-treatment.**

Other fillers

Poly L-lactic acid

Structural filling agents have the capacity to induce collagen formation, and thus add volume to skin and/or deeper tissue. Sculptra (U.S.), or NewFill (outside the United States), is polymerized lactic acid in a powdered lyophilized form. It is resuspended in water and injected diffusely throughout the area to be elevated. Its mechanism of action is to stimulate dermal and subcutaneous macrophages, leading to fibroblast activity and tissue fibroplasia, the deposition of new collagen (8). Polylactic acid (PLA) is not an instantaneous volume filler, as it takes three to five treatment sessions spaced out over months to obtain the volume replacement endpoint. The treatment results, however, can last 1–2 years.

When initially introduced in Europe, it was reconstituted in a concentrated form and incorrectly used as an instantaneous wrinkle filler. This led to the overcorrection of lips, nasolabial folds, and scars and resulted in granuloma formation and nodules. However, upon introduction to the United States, Danny Vleggar, MD, developed the presently used treatment regimen of diluting with 5 or more cc of water, allowing the material to hydrate for over 3 hours, undercorrecting, and repeating treatment sessions three to five times. The results have been predictable volume filling in most areas except the lips, periorbital skin, and eyelids. FDA approval was first obtained for the successful restoration of normal cheek volume in the treatment of AIDS-related facial lipoatrophy. Aging-related volume loss, manifesting as cheek hollows, lower facial lines, nasolabial folds, and nasojugal folds created by volume loss and descent of fat pads loss is now treated with PLA, an off-label manner. Filling of the entire lower face will improve the prejugal sulcus and nasolabial folds, as well as elevate the jowls and correct lower cheek ptosis (9). It is thus a popular treatment for men seeking full correction of the lower face.

Injection technique consists of depositing small aliquots of PLA suspension (0.01–0.02 cc) diffusely into the high subcutaneous tissue in a grid pattern throughout the area to be treated. The injected area is then given a vigorous massage to spread the material diffusely over the injected area, thus avoiding irregularities and nodules. The present authors have also found that the addition of 1 cc of 1% plain lidocaine helps with the injection discomfort, and that ice will relieve some of the post-treatment bruising.

Calcium hydroxylapatite

Radiesse is also a structural filler capable of inducing collagen and acting as a volume filler. It is composed of calcium hydroxylapatite microspheres in an aqueous gel containing sodium carboxymethylcellulose and water. As the milky white suspension is injected into deep dermis and

subcutaneous tissue, the carrier is gradually absorbed, yet the bioceramic spheres remain to serve as scaffolding for new vessels and collagen formation.

Radiesse is indicated in those patients who have already experienced short-acting fillers and are pleased with the augmentation obtained in either the nasolabial folds, marionette lines, or cheeks and chin. It is particularly useful in men with deep nasolabial folds and facial volume depletion. Radiesse is injected through a 27-gauge needle into the deep dermis or subcutaneous tissue by placing small deposits of material in a retrograde tunneling technique. Serial puncture may also be used, but one should under-treat all areas, including marionette lines. The material is also substantive enough to elevate the lip commissures, with correct placement into the corners and lower lip as a triangular wedge. Both of these areas are effectively treated in men, and calcium hydroxylapatite is a longer-lasting treatment alternative for repeat filler patients.

This implant does have a recuperation period, with bruising, inflammation, and a palpable consistency that may remain for months, and in some, for the full 1–2 years' duration of correction. These limitations must be thoroughly discussed with patients. Because calcium hydroxylapatite is similar to the structure of bone, the inductive process can induce radiopacities, which theoretically may interfere with perioral X-ray studies. The material can also migrate with strong massage or manipulation in the early post injection phase, before tissue fibroplasia anchors it in place. The material is inert and nonallergic, although nodules and granulomas have been described in lips and in highly movable facial structures (10). Indeed, the most common complication is persistent nodule formation. It is estimated that 10% of patients will have nodules that require treatment either with incision and drainage or with intralesional steroid injections.

Polymethylmethacrylate

ArteFill is a combination product that acts both as a volume filler and a structural collagen inducer (11). It is a permanent injectable filler composed of 30–40 micron polymethylmethacrylate (PMMA) beads suspended in a 3.5% partially denatured bovine collagen solution. It has been used in Canada since 1998 and was approved in the United States in 2006. The bovine collagen serves as a vehicle and short-term volume filler that degrades in 2–3 months, whereas the nonresorbable PMMA microspheres induce a long-term foreign body reaction consisting of a fibrous collagen capsule that will result in long-lasting augmentation.

Male patients may be good candidates for correction with ArteFill if they have prominent nasolabial folds without overlying flaccid, thin, or porous skin, which may show the implant or encourage migration. ArteFill can produce long-lasting or permanent correction in the nasolabial folds, and has also been used for lip augmentation. The product is injected below the dermis into the subcutaneous fat through a 26-gauge needle. The material should only be injected at the subcutaneous level, thus a horizontal tunneling technique is best to restrict the placement of material deep to the dermis. If placed too superficially, nodules will show through the skin.

The bovine collagen is derived from a separate herd of cattle than Zyderm collagen, and thus requires a different skin test to rule out allergenicity. The PMMA beads are nonallergenic, although reports of late granuloma formation have occurred with both Artecol (the original formulation) and later ArteFill as rare complications (12). The permanent nature of this implant warrants careful patient selection. The debate over permanence as a virtue or detriment is complex, but all of its ramifications must be discussed thoroughly with the patient before its use.

Silicone

The original permanent, collagen-inducing filler is liquid injectable silicone (LIS). Although the product has a lengthy and sensational history as a cosmetic implant, a reliably standardized and purified form has only recently been granted FDA approval. Adatosil 5000 (Bausch and Lomb, Tampa, FL) was approved as an ophthalmic product for the purpose of retinal tamponade in 1994. In 1997, the less viscous and most commonly used product, Silikon 1000 (Alcon, Fort Worth, TX), was also approved for ophthalmic use. Both products are much more viscous than the 1960s Dow Corning 350-centistoke preparation, and both may be used off label, although with certain restrictions, for soft tissue augmentation (13).

Silicone is used as a permanent filler for the nasolabial folds and marionette lines. It is injected deeply at the dermal–subcutaneous junction in small aliquots in a method referred to as the Orentreich microdroplet serial puncture technique. Multiple needle injections at 2–5 mm intervals deposit 0.005–0.01 mL volumes to the depth of the fold at the base of the dermis. Intentional

under-correction at monthly intervals is necessary, as delayed volume enhancement will occur as collagen is produced around the silicone microdroplets (14). The patient should be prepared for a gradual process of augmentation through multiple repeated injections as needed. This permanent filler is only for the well-informed and experienced filler patient who understands the protocol, the expectations, and the potential side effects. These include ecchymosis, erythema, dyschromia, textural changes, and possible granuloma formation.

Esthetic goals

Before choosing an HA filler, the physician must first diagnose the type, location, and cause of the facial aging problem to be corrected. Is the desired treatment goal the reduction of photoaged cutaneous wrinkles, improvement of dynamic wrinkles related to muscle activity, or the reversal of volume loss involving the cutaneous and deeper facial structures? The clinician must evaluate the full face to determine the symmetry and balance among different areas. A full evaluation of what the patient desires and whether the product can fulfil their wishes must be conducted. If the HA class of fillers is being considered, one must evaluate the depth of the fold or wrinkle, the area to be treated (eyelid skin versus nasolabial), the amount needed, prior treatments, allergies, pain tolerance, downtime, and financial impact.

Additionally, the physician must recognize the esthetic goals as they pertain to the male patient. The idealized youthful male and female faces share some common characteristics, but also differ considerably in structure and proportion. Whereas the ideal female face exhibits a smooth forehead with arched eyebrows, the ideal male face has a muscular forehead with an overhanging horizontal brow. The ideal female face has larger, more deeply set eyes that appear closer together than the ideal male face. Women also have more prominent upper facial characteristics, with a gradual taper in facial silhouette from upper to lower. Men, however, have larger mouths, with a squarer facies and equally balanced upper and lower facial proportions. The smaller, feminine mouth has full vermillion lips, with an upturn at the commissures, whereas these characteristics are not noted in the idealized, youthful male face (15).

A useful paradigm for assessment is to divide the face into thirds: the upper one-third spanning from the hairline to the nasion of the glabella, the middle one-third from the glabella to the nasal tip, and the lower one-third from the subnasal columella unit to the chin. In general, fillers are most applicable in the lower two-third of the face, whereas botulinum toxin is used primarily within the upper one-third. Volume loss is greatest in the lower one-third of the face at all tissue levels from intrinsic aging. This is most apparent in the perioral area, resulting in thin, atrophic lips, marionette lines, and nasolabial folds and grooves. Volume loss within the middle third produces pronounced cheek hollowing with sagging jowls. In the periorbital area, tear troughs result from the descending suboccipital fat pads and buccal fat pads. The wrinkles and hollows here are primarily treated by volume replacement at the level of depletion. The atrophic changes of the upper one-third of the face are produced by both volume loss and chronic dynamism of over active muscle activity. This area can be also treated with botulinum toxin, or ideally with a combination of toxin and fillers (16).

The most common indications for HA treatment in men include:

1 nasolabial folds
2 marionette lines
3 mandibular chin reshaping
4 forehead and glabella
5 acne scars
6 volume augmentation, including facial sculpting of cheek bones, and tear troughs

Less common or rarely indicated in men is the use of HA for volume enhancement of lips or for brow elevation.

Nasolabial folds

The nasolabial fold, or the triangle and groove formed between the ala, the nose, and the cheek, is one of the first cosmetic boundaries to be affected by aging. It must be evaluated on a case by case basis, as it may be a superficial line, a deep groove, or a trough directly affected by ptosis of the cheek and superficial muscular aponeurotic system (SMAS). Moreover, the filler to be used is dependent on the nature of the fold. Folds may be superficial and dependent on muscle movement, moderate, deep, or severe with redundant skin. The nasolabial fold may be evaluated by variably stretching and compressing the cheek skin and lip to visualize the fold. This gives an estimation of the amount of filler needed.

The HAs are ideal fillers for the nasolabial fold (FIGS. 7 and 8). The lighter materials – Restylane, Captique or Juvéderm Ultra can be used in the mid dermis for superficial folds with a linear threading or serial puncture technique. Moderate

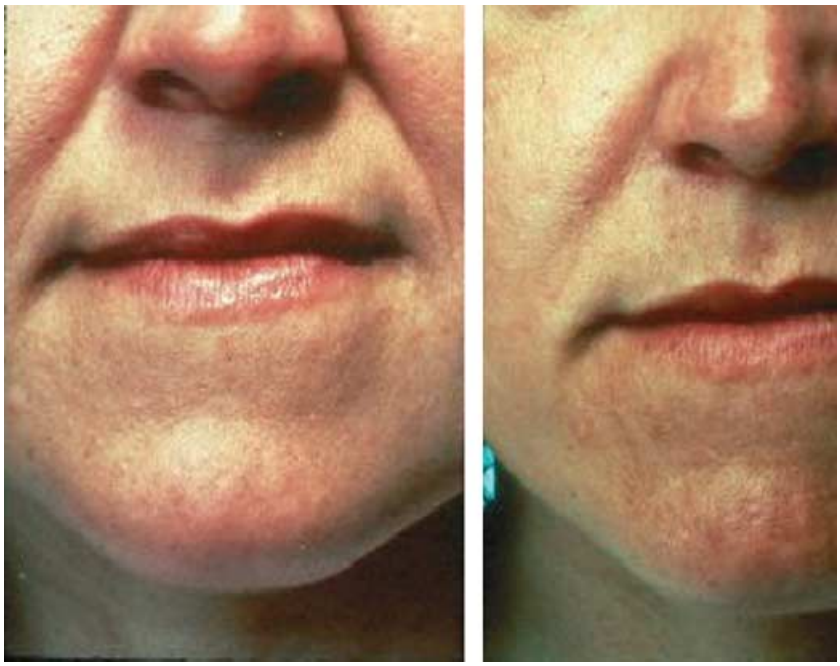

FIG. 7. **Treatment of moderately deep nasolabial folds with Restylane: pretreatment and post-treatment.**

FIG. 8. **Treatment of deep nasolabial folds with hyaluronic acid: pretreatment and post-treatment.**

or deeper folds will respond best to Restylane or Juvéderm Ultra Plus injected into the deeper dermis in a linear threading or fanning technique. Perlane is injected deeply for the more severe folds. The product should be injected medial to fold to avoid further cheek ptosis. It is important not to over-treat, as the HAs are hygroscopic and will increase over the next few days to a point of volume correction slightly greater than that seen at the operating table. However, it is also perilous to greatly under-treat with HA fillers, as patients will then feel the procedure did not work.

Marionette lines

The marionette lines, or the grooves that draw the corners of the mouth downward, are usually treated along with the nasolabial folds. These lines are formed by a loss of volume overlying the depressor anguli oris and platysma muscles. They are most successfully treated with a robust HA product that will lift the corners of the mouth and offset the sad or aging oral appearance. Because a component of muscular dynamism from the depressor angularis oris muscles pulling the mouth corners downward usually contributes to their appearance, treating these muscles and the platysma with botulinum toxin type A will reduce the pull and accentuate the correction with fillers.

The depth of the fold is measured by squeezing the lower cheek to the chin. This maneuver will give the clinician an estimate of volume of product needed. The needle is introduced at the lower angle of the triangular fold and injected with a retrograde tunneling type of linear threading technique, filling the triangles formed by the

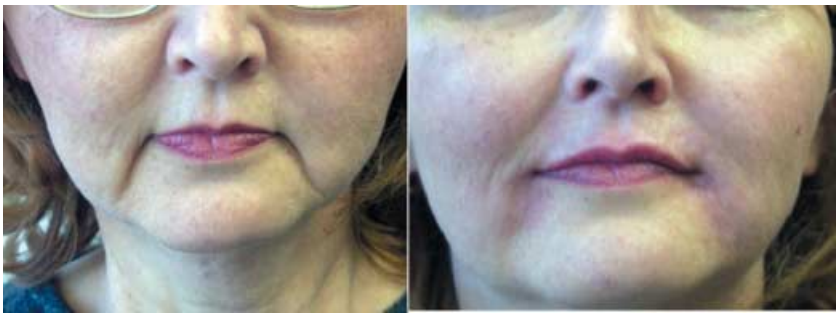

FIG. 9. Treatment of the marionette lines with hyaluronic acid, with injection at multiple layers: pretreatment and post-treatment.

oral commissure and lower lip vermillion. These triangles are feathered with a serial puncture technique or fanning technique to produce volume correction of the groove and lip corners. It is important to keep the injection under and medial to the fold, as a lateral injection will actually increase the appearance of the fold. Additionally, the patient with significant elastosis benefits from injection at multiple layers to give adequate filling and prevent deep lumps (FIG. 9). Post-treatment massage should be performed to ensure the implant is evenly distributed, without nodules or irregularities.

Mandible and chin

Volume replacement around the chin and in the prejugal sulcus may also be performed along with marionette line correction. If there is significant volume loss throughout the entire lower face – chin, prejugal sulcus, and jawline – consideration may be given to diffuse volume augmentation with a non-HA product, such as with Sculptra as a staged procedure.

Forehead and glabella

Although botulinum toxin type A injection is the treatment of choice for forehead and glabellar folds, very deep lines may not respond fully to muscle chemo-deactivation alone. Filling material may then be added to enhance correction. Deep glabellar and forehead lines will respond to well to HA fillers. These are injected into the mid dermis in a threading or serial puncture technique. One should avoid placing HAs of any quantity into the papillary dermis as it can often show a bluish discoloration. Non-HA, collagen fillers such as Zyderm I or Cosmoderm can also be used superficially to HA fillers in order to fill the fine etched lines by injecting via serial puncture technique into the upper dermis. Massage is necessary to avoid nodulation. Additionally, one should remember that the male forehead and glabella should show some residual expression and should not be treated to the same degree as a female forehead.

Care must be taken in treating the glabella, as infarction and embolization have been reported using Zyplast, Cosmoplast, Radiesse, Artecol, and even stiffer HAs injected deeply. The safest filler for this area is Zyderm or Cosmoderm, but HAs may be injected safely if they are placed in the mid to upper dermis.

Facial sculpting

Deeper-volume filling can be used for facial shaping. Although large-volume enhancement is best achieved with fat or Sculptra, HAs can be used for limited areas such as tear troughs and localized cheek defects. The cheeks should be injected in the deep dermis and subcutaneous tissue, whereas tear trough deformities of the lower eyelids are approached with HA injection along the bony orbital rim, below the orbicularis oculis muscle but not penetrating the orbital septum. Injection in this area should be reserved for those with extensive filling experience (FIG. 10).

Brows and lips

The brow can also be shaped with HAs injected deeply over the lateral orbital rim. Although this procedure is usually reserved for women to recreate the arched brow, it can be performed on the male patient with an overhanging medial brow to offset any central prominence. One should seek to recreate a strong horizontal brow and not the more feminine, highly arched lateral brow.

Similarly, lip enhancement with fillers is seldom requested by men. The pouty red show created by a volumized upper and lower lip is a feminine

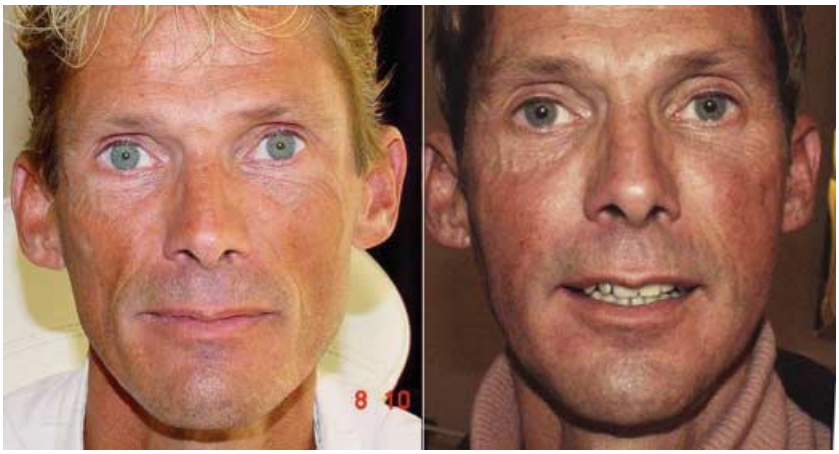

FIG. 10. Facial sculpting with Sculptra: pretreatment and post-treatment (Courtesy of D. Vleggaar, MD).

attribute, and is usually not appreciated by men. Beard hair typically protects men against lip rhytids, so the aging lip is usually not a treatment priority. However, HA lip augmentation is useful in men with asymmetry or unbalanced lip volume. When augmenting lips in the male patient, under-correction is the rule. It must be remembered that HA fillers are hygroscopic and may increase 10–15% in correction volume after injection, unlike collagen, which loses volume. Additionally, multiple punctures should be avoided to reduce the incidence of bruising.

Techniques

After a full pretreatment consultation and a decision for the appropriate HA filler is made, the patient's face is cleaned with disinfectant, and pretreatment photographs are taken. Hyaluronic acid preparations do not contain lidocaine, thus separate anesthesia is necessary. The choices include topical anesthetics, a field block, a peripheral nerve block, or a combination of these. Topical anesthesia provides adequate anesthesia for many patients, especially with limited treatment areas on the nasolabial folds or marionette lines (Table 2). Lip augmentation or coverage of multiple areas in the perioral region invariably requires lidocaine injection for infraorbital and mental nerve blocks. A proper infraorbital nerve block will give excellent anesthesia in the upper lip (FIG. 11). This is supplemented by a lower lip mental block and the extended mucosal miniblock for the lateral commissure and surrounding perioral skin. Using this technique, full anesthesia of the perioral area can be obtained. Anesthesia may also be accompanied by anxiolytics if necessary, as well as "talkesthesia" on the part of the injector (Table 2).

During injection, it is important for the patient to be seated in an upright position in order to visualize the gravitational effect on the wrinkles and folds. It is preferred that the patient's head is

Table 2. Commonly used topical anesthetic agents

Commonly used topical anesthetic agents
• Betacaine enhanced gel, BetaCaine Plus
• L.M. × 4 and L.M. × 5
• EMLA (lidocaine pritocaine) cream
• Ice of other cryoesthetic agents
• Vibratory counter-stimulation

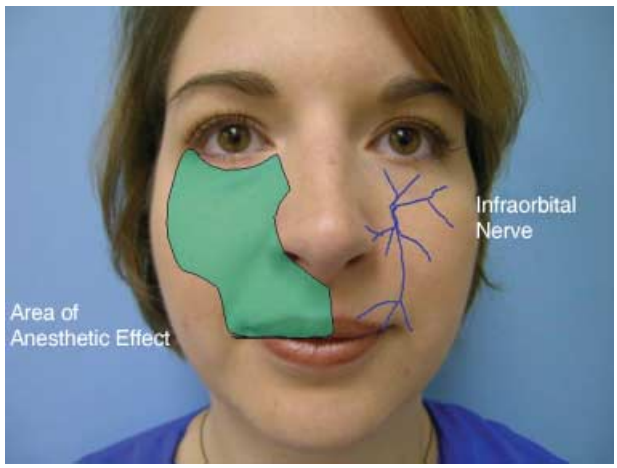

FIG. 11. Anesthetic distribution of an infraorbital nerve block.

supported with a headrest while seated upright for maximal comfort.

Hyaluronic acid gels are generally injected through a 30-gauge needle, although the larger particle materials may require a 27-gauge needle. HAs require more pressure on the plunger of a 1 cc syringe than collagen because of intrinsic rheological properties of the gel as it is deformed and passed through the needle. Each of the HA preparations also has a different feel upon injection for the clinician to adapt to. For example, Restylane requires more pressure to inject than Juvéderm Ultra.

The needle bevel may be either up or down, but the physician must direct the filler into the mid to deep dermis. This can be monitored by the back pressure felt on the plunger. Injecting into the subcutaneous tissue can be recognized by feeling the release of the filler too quickly through the needle, and in this situation the needle should be pulled back until the appropriate positioning is established.

Injection techniques include linear threading, serial puncture and fanning. Although serial puncture is most commonly used for collagen injections, retrograde linear threading is most appropriate for HA injections, especially in nasolabial folds and lips. The needle is placed in the mid to deep dermis at a 30–60 degree angle and then advanced horizontally below the wrinkle or groove. The filler is then released as the needle is withdrawn, monitoring its placement within mid dermis. If placed too high, a blanch or *peau d'orange* will occur. If placed too deep, the filler flows quickly into the subcutaneous tissue. This technique is repeated until the volume defect is fully corrected. One should ensure that full correction is achieved, yet overcorrection is not produced. This retrograde tunneling type of linear threading technique is commonly used for glabellar furrows, forehead wrinkles, nasolabial folds, and lip augmentation (7). The fanning technique is a variation of linear threading in which the needle is redirected back and forth in a triangular or a circular fashion under the defect until it is corrected. It is commonly used for filling the nasolabial triangle at the superior aspect of the nasolabial fold, the oral commissures at the junction of the lower lip and marionette lines, and in deeper lip filling and brow augmentation. Serial puncture, although used less with hylans, is helpful for the deep filling of tear troughs and for touching up lips and nasolabial folds. With all HAs, injecting too superficially will produce nodules and sausage-like deformities on the skin surface and create induration that may last for weeks.

After injection, the clinician can massage the treatment area to smooth irregularities or nodules and move material into the most esthetic position. An ice pack is used after injections to relieve discomfort and reduce swelling.

Summary

With the present filler tools available, more men are candidates for the subtle correction of aging flaws. Hyaluronic acids will continue to grow in popularity in both male and female patients, and the unique ideals of the male face must be recognized as treatment goals. Areas of the male face most amenable to HA fillers include the nasolabial folds, marionette lines, glabella, and pan-facial volumization. Although each cosmetic unit may be approached individually, the physician must still consider the patient's entire face and evaluate the relationship between units to determine which treatments are necessary. Symmetry, balance, and harmony are the ultimate goals for delivering ideal treatment.

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