

New Lip and Wrinkle Fillers

Joseph Niamtu III, DMD

Oral/Maxillofacial and Cosmetic Facial Surgery, 10230 Cherokee Road, Richmond, VA 23235, USA

One of the most requested cosmetic procedures is enhancement of the lips. Since the beginning of time, humans have adorned their lips in many ways for reasons including courtship, social status, and beauty (Fig. 1).

It has been said that the lips are the only exposed sexual organ in our society. There is no doubt that lips play an important part in sexual attraction and lovemaking. In today's female Hollywood elite, it seems that one's prowess is directly proportional to lip size. Some actresses such as Julia Roberts, Angelina Jolie, and Goldie Hawn are even defined by their lips. Lip accentuation comes and goes with changing fashions. A 1950s picture of Elizabeth Taylor or Marilyn Monroe is sure to show large, red lips, whereas a 1960s picture of Twiggy or Barbara Streisand may show thin, barely colored lips. What is constant is the fact that attractive lips are a mainstay in the esthetic appreciation of female and male beauty.

What makes an esthetic lip is defined differently for different races and cultures. Volume, pout, outline, and vermilion exposure are key elements of beauty. As is true for other anatomy, some people are simply born with beautiful lips. They have larger lips with a wide smile, their lips project more in profile, they have sharply angulated contours, and they show a larger amount of vermilion than the average person (Fig. 2A–C).

In general, the esthetic upper lip is one third of the total lip mass and the lower lip represents a larger structure, with two thirds of the total lip height. The outline of the upper lip is termed *Cupid's bow* and is defined by the angulated mucocutaneous junction. Some individuals exhibit a rounded Cupid's bow,

whereas others have very angulated lines. The outline of the vermilion/cutaneous junction in the upper lip is the shape of an "M" and is curvilinear in the lower lip (Fig. 3).

The "white roll" is described as a linear protrubence that follows Cupid's bow in the upper lip. This subtle but important area produces the light reflex above the vermilion/cutaneous junction, calling attention to the fine outline. In addition, this area outlines the lips and, in the lateral view, adds to the pout of the attractive lip.

Aging causes thinning of the lips. The senescent lip is also reduced in volume by the loss of vertical dimension from occlusal attrition.

The key to enhancing the lips is to give the patient what nature did not or to accentuate the existing anatomy. In the author's practice, only one man has sought lip enhancement with fillers over a 20-year period. Basically, 100% of lip filler injection is performed in Caucasian women between the ages of 30 and 75 years. Although the most common request for fillers is in the lips, fillers can be used in a multitude of other cosmetic facial applications and are discussed in this article.

Facial fillers

Over the millennia, various substances have been injected into the face, including wax, silicone, and animal products [1,2]. Contemporary cosmetic facial surgery includes many options to augment lips, folds, and wrinkles. For decades, bovine collagen has been the "gold standard" for facial filler augmentation in the United States [3]. Our European, Canadian, and Australian neighbors have been more proactive in the use of various fillers [4]; this technology is just reaching our shores and, in part,

E-mail address: niamtu@niamtu.com



Fig. 1. An African native shows the extent that some societies have gone to call attention to the lips.

is responsible for the enormous media coverage of injectable filler substances.

An overview of injectable filler substances can be confusing. There exist many options, many fillers, many substances, many materials, and many claims of superiority. As stated earlier, bovine collagen (Zyplast, Zyderm; Inamed Corp., Santa Barbara,

California) dominated the United States market for over 2 decades. Because these products were of bovine derivation, allergy testing was a prerequisite. Classically, patients were inoculated in the forearm with the material and, if no local allergic response was seen at 30 days, then the material was assumed safe. The need for testing proved to be a great

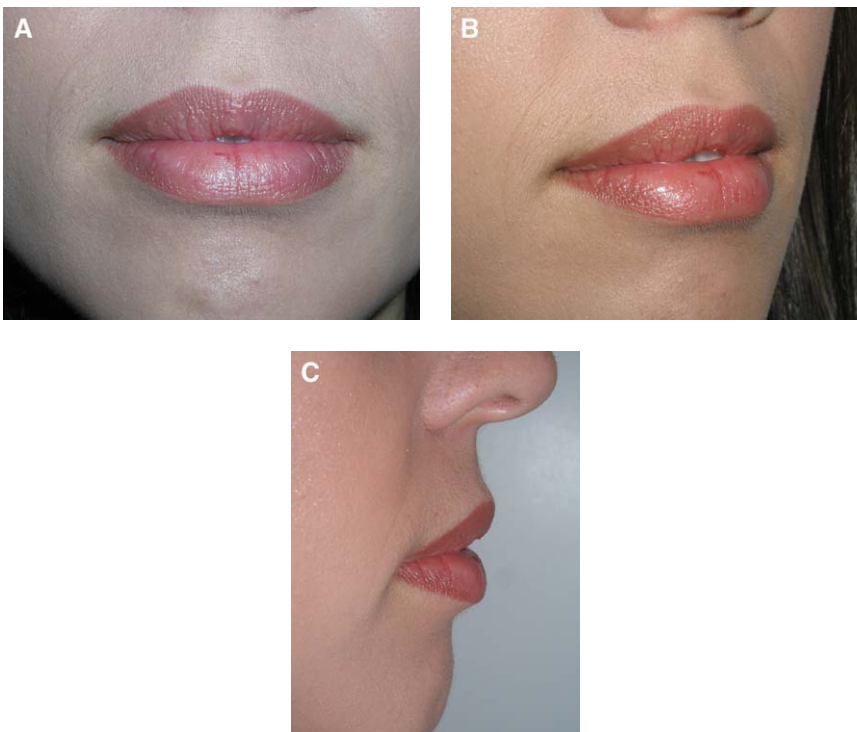


Fig. 2. (A–C) Esthetic lips are a function of volume, projection, contour angulation, and vermilion exposure.

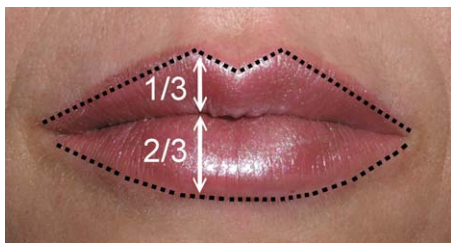


Fig. 3. The M configuration of Cupid's bow and the relative size of the upper and lower lips are shown.

drawback because many cosmetic consumers are spontaneous and want immediate treatment. There has been a foreign invasion of injectable fillers since December 2003. Hyaluronic acid (Restylane; Mediscis, Scottsdale, Arizona), which has been used in many countries for over a decade, received Food and Drug Administration (FDA) approval in the United States (Fig. 4). This marketing release brought an onslaught of media attention that boosted the entire perception of and desire for fillers by the aging baby boomers.

Restylane changed the paradigm for injectable fillers for numerous reasons. First, it is a nonanimal product (hyaluronic acid is a naturally occurring substance in humans [4]), which means that there is no reason for allergy testing, one of the biggest drawbacks of bovine collagen products. Second, studies showed that Restylane lasts longer than Zyplast. The longevity of Zyplast has long been a problem for patients. Although the product was easy to use and produced an excellent result, it lasted only several months in most patients, whereas some studies showed Restylane can last up to 8 months [5,6]. One of the reasons for the extended longevity with Restylane is a process called isovolemic degradation. Normally, collagen fillers are simply phagocytized and degraded, which causes decrease in volume. Hyaluronic acid undergoes isovolemic degradation. In this process, water is drawn into the filler molecule as the filler degrades. By doing this, the filler volume is retained longer as more water is continually drawn into the filler molecule (Fig. 5) [7]. Multiple studies have shown Restylane to be a safe and effective facial filler [8,9].

In 2003, Inamed introduced Cosmoplast and Cosmoderm, which are human collagen derivatives produced from human foreskin. Because these products are of nonanimal origin, allergy testing is not necessary. Although these products are very easy to inject because they have excellent flow properties, the author has found them to possess the same longevity as the bovine collagen predecessors.

Hyaluron (Inamed) gained FDA approval in 2004 and competes with Restylane in the new filler arena. Although the author has little experience with Hyaluron, differences lie in the fact that this hyaluronic acid product is derived from animals (rooster combs) and contains less hyaluronic acid per milliliter than Restylane.

Oral and maxillofacial surgeons have used hydroxyapatite products for augmentation for the past 20 years. Radiance FN (BioForm, Franksville, Wisconsin) is an injectable filler that consists of hydroxyapatite microspheres in a soluble gel vehicle (Fig. 6) [10].

The use of Radiance FN in cosmetic facial augmentation is off-label because the FDA approval for his product is for vocal cord plumping and as a radiopaque soft tissue marker. The author uses Radiance FN when requested by patients, primarily in the nasolabial folds and lips. The flow properties of Radiance FN are different from other fillers. The most noticeable property of Radiance FN is that a little product goes a long way. Because this product is hydroxyapatite based, the longevity is measured in years, not months. For this reason, overfill or asymmetry can be a huge problem because it persists for a long time. The author does not recommend this product for the novice injector. Extreme care must be used to not cause lumpiness, overfill, or asymmetry. In general, the author uses 0.2 mL on each lip quadrant at a single sitting so as to not overfill. The patients are then seen several weeks later to see whether touch-up is necessary. Because Radiance FN is opaque, lip injection is visible on radiographs, and patients and their dentists should be made aware of this.

Autogenous fat, dermis, and fascia can be used as tissue fillers but are beyond the scope of this article [11,12]. In addition, human cell-cultured products are available for injection. A tissue punch biopsy is



Fig. 4. The FDA approval of Restylane has created a new interest for advanced facial filler substances. Restylane comes packaged as 0.7 mL of a clear viscous gel with a supplied 30-gauge needle.

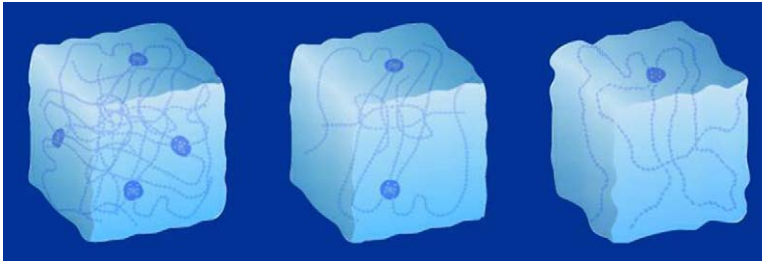


Fig. 5. Isovolemic degradation is a process of drawing water into the degrading filler molecule that maintains molecular volume in the face of degradation. The molecule degrades but draws in water, which maintains volume over time.

taken from behind the ear and cultured to derive an injectable collagen that is originally native to that patient. The process takes a number of weeks and is not seen as a major option by most cosmetic surgeons. Finally, a plethora of new products that have been used in other countries are “knocking at the doors” of the FDA. New Fill (Sculptra) (lactic acid; Advantis Pharmaceuticals, Bridgewater, NJ), Juvederm (nonanimal hyaluronic acid gel; Euro-medical Systems Limited, Nottingham, UK), Artecoll and Artefill (methylmethacrylate microspheres in a hyaluronic acid vehicle; Artes Medical, San Diego, California) are just a few of the products for which approval is being sought in the United States. On the surface, some of the products that boast permanence seem appealing, but permanent fillers can lead to permanent complications. The long-term success of these products remains to be seen. Silicone has seen resurgence as a filler option but past misadventures could pose significant medicolegal problems.



Fig. 6. Radiance FN is a hydroxyapatite paste that is opaque clinically and radiographically.

Injectable fillers: treatment considerations

Currently in the author’s practice, the injection of various lip fillers is a daily occurrence. The default filler used is Restylane; however, many patients present with a specific request for a filler that they desire. Due to this patient preference, the author also injects Cosmoplast, Cosmoderm, Radiance FN, and Hyaluron. The most common requested site is the lips, followed by the nasolabial folds, the perioral region, cheek wrinkles, and “crow’s feet” wrinkles. Due to the marketing hype, some patients confuse fillers with Botox. In addition, some patients desire massive rhytid injection, but because they have such a large amount of wrinkling, this would not be practical. These patients are informed that they would be better treated with lifting or resurfacing procedures. In theory, fillers can be injected anywhere on the face; however, blindness has been reported with the periorbital injection of Zyplast and fat due to intravascular injection [13–15]. This rare but devastating complication calls attention to the care that must be exercised in this area. The surgeon should always inject very superficially, use the smallest-gauge needle possible, and never use extreme plunger pressure on the syringe.

Although the injection of fillers is simple, many problems can result in terms of patient expectations and satisfaction. The main consideration is to accurately explain what the patient can expect as a treatment result. Because many patients have been “media victims,” they present with unrealistic expectations, hoping for a miracle. Showing patients a series of before and after images for specific anatomic areas is one way to provide a reasonable expectation. In addition, the injection of fillers should not be presented as a one-time procedure but as a treatment sequence to approach a result. Especially for some of the newer fillers such as Restylane that

cause immediate swelling in the lips, judging the end point and symmetry can be difficult. Having the patient return in 1 to 2 weeks gives the surgeon and the patient an opportunity to critique the result and to correct any areas of underfill or asymmetry. It should also be stated that any treatment should be conservative because more filler can easily be added. When the treatment area is overfilled or uneven, however, there is not much that can be done. Also paramount to communication is who will pay for the touch up should it be necessary. There are many means to work out this scenario, but the bottom line is that it must be decided in the informed consent before treating. The question of “how much to use” frequently arises. For the novice injector or the novice patient, they may be unaware of what to expect in terms of how much area can be effectively treated with a single syringe. Again, the surgeon must be cognizant of how far a single syringe can go. When in doubt, it is prudent to pay attention to the amount left in the syringe, and when 50% is used, the other side must be treated. Failure to do this will require a second syringe to be opened and, if the patient was not expecting another \$500 fee, then unpleasant discussion may follow. When in doubt, the patient should be told that a single syringe may not be adequate for the given augmentation.

Treating the lips

Every injector has his or her way of injecting fillers, but two recognized techniques are used universally. Linear threading involves inserting the

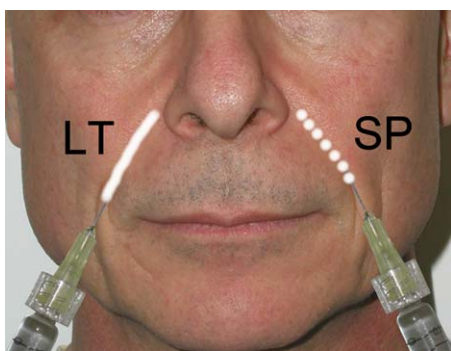


Fig. 7. Linear threading (LT) involves inserting the needle and injecting the filler in a straight line while continuously moving in either a forward or backward direction. The serial puncture (SP) technique involves placing small boluses of filler with multiple punctures along the line or wrinkle. The wrinkle is filled by placing the boluses together using multiple needle sticks.

needle and injection filler as a straight line while continuously moving in either a forward or backward direction (Fig. 7). This process would be analogous to placing a line of toothpaste on one's toothbrush. The other injection method is known as the serial puncture technique. This involves placing small boluses of filler with multiple punctures along the lip or wrinkle. The wrinkle is filled by deposition of the small bolus of filler along the wrinkle and requires multiple needle sticks (see Fig. 7).

Anesthetic considerations

Most of the new fillers do not contain any inherent local anesthesia. The author strongly recommends using local anesthetic techniques when treating the lips. Many patients can tolerate filler injections in the cutaneous areas such as the nasolabial folds or cheeks, but injecting the lips can provide significant discomfort. In addition, new, potent topical anesthetics are available. BLT cream (20% benzocaine, 6% lidocaine, and 4% tetracaine in a cream vehicle; Bayview Pharmacy, Baltimore, Maryland) is applied to the lips and vestibular mucosa. When injecting the upper lip, bilateral infraorbital blocks are administered and bilateral mental blocks are given for the lower lips [16]. Alternately, the upper and lower vestibule can be infiltrated with 3 to 4 equally spaced injections from the cupid area on one side to the cupid area on the other. These infiltrative injections are easier to perform than nerve blocks and usually provide the required level of anesthesia. Proper anesthesia is beneficial not only to the patient but also to the doctor; a doctor who does not inflict pain will receive positive word-of-mouth referrals.

The most common area requested is the lips. Some patients may want only a single lip (usually the upper) treated, whereas most patients desire bilabial treatment. It is important to query the patient on exactly what their expectations are. Do they want more defined lips? Do they want bigger lips? Do they want to show more vermilion? Many patients are not sophisticated enough to know exactly what they want and, therefore, rely on the surgeon to decide. This author begins conservatively with patients who have never had fillers. Generally, the white roll of Cupid's bow is injected in the intradermal or submucosal plane or both. The “M” configuration is augmented with a roll of filler extending from one oral commissure to the other. Care is used to form crisp, angular contours in the “downward legs” of the M in the area of the central lip. Most patients have this basic M pattern but, in some individuals, it must be

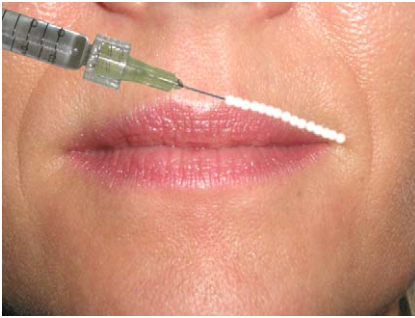


Fig. 8. The lateral lip is initially augmented from the midline to the oral commissure.

recreated. The white roll is also created in the lower lip but is more curvilinear than in the upper lip. In the average patient, the author begins lip augmentation with the upper lip and injects Restylane in the potential space just beneath the lip mucosa. The needle is inserted at the mucocutaneous junction or slightly on the mucosal side and inserted all the way to the hub. As the needle is withdrawn, the filler is evenly injected into this potential space. If the needle is in the correct plane, the filler easily flows forward and sometimes retrograde along the lip. By using the noninjecting hand to pinch the lip with the thumb and forefinger, the surgeon can contain the filler to the desired space laterally along the lip. In general, the author begins by injecting the left side of the upper lip and proceeds laterally to the commissure (Fig. 8). Next, the same procedure is performed on the right side of the lip. Finally, the descending legs of the central M configuration are injected to make sharp angles in the central upper lip (Fig. 9). It is important to be conservative in this area or the patient will have a "ducky" look in the lateral view.

The lower lip is injected in a similar manner but without sharp angles (Fig. 10). The filler is injected in

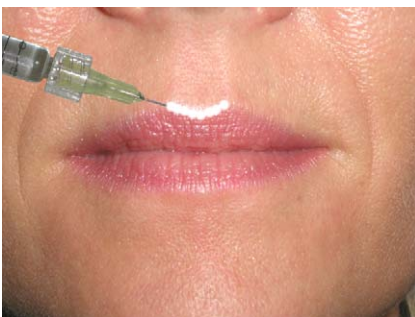


Fig. 9. The next step is to augment the M configuration of the upper lip. Recreating this angular configuration increases the esthetics of the lip.

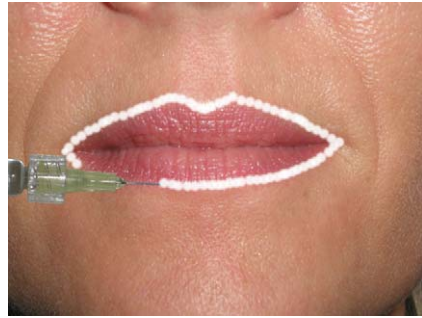


Fig. 10. The white roll is augmented to outline both lips, which generally produces subtle augmentation with increased volume and pout. Frequently, this outline also improves vertical lip rhytids by stretching the skin.

the potential space just beneath the mucosa across the entire lower lip.

Sometimes, a single syringe is sufficient to outline the upper lip but not the entire lower lip. In this case, injecting only the middle third of the lip provides a nice central augmentation, producing a "shine" of light reflex when wearing lipstick or lip gloss that is appreciated by most women. Some patients benefit from this central augmentation only, whereas others require augmentation across the entire lip.

Outlining the white roll around both lips is enough cosmetic enhancement for many patients. Some patients may desire more vermilion volume and want bigger lips as opposed to simply more-defined lips. The author accommodates these patients by injecting more filler in each lip but in a slightly different manner. Instead of injecting at the vermilion/cutaneous junction, the needle is inserted several millimeters below the cutaneous margin and well into the vermilion. Depending on the desired area to be augmented, the needle is sometimes positioned at the wet/dry line. Again, the needle is inserted to the hub



Fig. 11. After the white roll is outlined, the vermilion area can further be augmented if esthetics dictate or the patient desires.

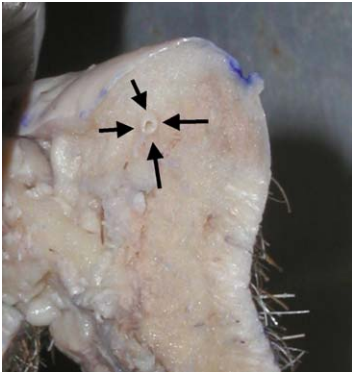


Fig. 12. The labial artery (*arrows*) usually traverses the upper, posterior one third of the lower lip at the level of the incisal edge of the lower anterior teeth.

and slowly withdrawn while continuous, steady injection is performed. In this area, the goal is to spread a thin, flat layer to plump the vermilion (Fig. 11). The needle can also be placed deeper into the lip when greater volume is required.

Other than inadvertent vascular puncture with resultant hematoma, there is no danger in deeper injections in the lip (this obviously excludes intra-vascular injection, which could cause lip necrosis). Fig. 12 shows the relationship of the labial artery to the lip. Notice that the artery lies in the posterior one third of the lip at about the level of the incisal edge of the anterior teeth [17]. This level also corresponds with the vermilion/cutaneous junction on the facial surface of the lip.

Augmenting the lips by using the techniques of outlining the white roll and augmenting the vermilion may be too large of an augmentation for a novice surgeon or a first-time patient. For the inexperienced injector or a first-time augmentation, the author recommends doing only the white roll outline technique and re-evaluating the patient's satisfaction in a week or two. At that follow-up appointment, the secondary vermilion injection may be accomplished. The main reason for this dual-treatment sequence is to prevent overaugmentation of the lips that make take many months to resolve. With experience, the surgeon and the patient can gauge how much and what areas can be done simultaneously.

Injecting oral commissures

Perioral aging frequently causes depressed triangular areas at each oral commissure. Not only are these depressions unaesthetic but they also cause a

“down-turned” smile. This area must be addressed when treating the lips. One problem is that these depressions represent the convergence of multiple tissue planes, and a significant amount of filler can be injected here without significant augmentation. In the author's experience, it takes at least an entire syringe (one half on each side) to make a difference on the oral commissures. Also, if the filler is injected deep, it fails to make much of a difference on the augmentation; it just seems to disappear into the deeper tissues. To combat this situation, some filler is injected deeper to create a base and then the remainder is injected more superficially in the dermis to plump out the depression. In some patients, this area does not improve significantly with fillers and presents a challenge for cosmetic improvement. Face-lift and laser resurfacing can also assist this area.

An encapsulation of the previous augmentation strategy needs to be underlined by the fact that facial augmentation with fillers is a form of artistry and, therefore, no hard rules exist on what is the correct way to do it and what the final desired result should be. What is important is that the patients are happy with the result. By following the presented basic augmentation techniques of white roll outline and vermilion fill, most practitioners can deliver pleasing results to their patients. The true form of artistry comes in to effect with various subtleties, among them, augmentation of the philtral columns. In a well-defined lip, the philtrum is a depression bordered on each side by triangular columns, with the apex at the ala and the base at the vermilion. The columns border an almond-shaped depression, which is the philtrum. Even the most-experienced injectors oftentimes fail to augment this area. Some patients have a somewhat defined philtral area and by augmenting what they have, the result can be very pleasing. In other patients, virtually no philtral column definition exists

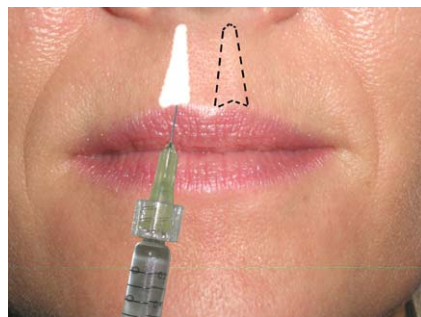


Fig. 13. The philtral columns are injected in a reverse taper from the narrower alar base to the broader vermilion border.



Fig. 14. Lateral view of before (*left image*) and 2 weeks after (*right image*) Restylane injection of the upper and lower lips.

and in these patients, the anatomy must be created. To enhance the philtral columns, the needle is inserted at the vermilion/cutaneous junction in the intradermal plane and directed all the way to the base of the ala. The skin is then pinched with the noninjecting hand in a means to create a triangle. Less filler is injected near the alar base, with more filler injected toward the vermilion border (Fig. 13). By pinching the skin with the noninjecting hand, the injected filler can be formed into the specific shape.

Figs. 14 and 15 show lip augmentation with Restylane.

Augmenting wrinkles, lines, and folds

In addition to structural augmentation of the lips, injectable fillers are used to plump lines, folds, and wrinkles. As mentioned earlier, this process is practical for any given wrinkle, but some patients may



Fig. 15. Oblique view of before (*left image*) and 2 weeks after (*right image*) Restylane injection of the upper and lower lips.

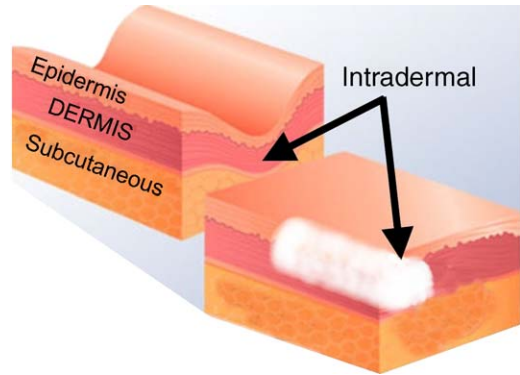


Fig. 16. Most fillers are injected in the intradermal plane.

present with severe rhytidosis and think that hundreds of wrinkles may be treated. Again, these patients must be educated to understand that they are better candidates for rhytidectomy or skin resurfacing. Patients with many wrinkles can be candidates for injectable fillers, however, so long as they understand that selected wrinkles, lines, or folds can be treated.

When injecting the facial skin, most fillers are placed intradermally (Fig. 16). One exception may be Radiance FN, which the author recommends placing somewhat deeper. Because Radiance FN is white and can lump easier than other fillers, using the deep dermis or even the subcutaneous plane is desirable. At the time of this article's publication, Restylane is the only nonanimal hyaluronic acid filler with FDA approval. Medicis offers several other fillers that are available in other countries. Perlane is similar to Restylane but has a larger particle size and is for deep dermal injection. The indication for this product is similar to Restylane, but due to the larger particle size, it must be injected deeper. Restylane Fine Line is another Medicis product. This product has a smaller particle size and is designed for more superficial dermal injection. Fine lines around the lip and

crow's feet areas are common indications. This product corresponds to Cosmoderm, which has a smaller particle size than Cosmoplast. These products are human collagen derivatives. With the many choices of filler types and particle sizes, it is not uncommon for some practitioners to layer different types of fillers to achieve a desired result. Some practitioners may initially inject Perlane deep in the lip or fold and then inject Restylane more superficially. The same technique can be used with Cosmoplast injected deeply and Cosmoderm injected more superficially. The United States' experience is likely to mirror that of other countries, which means that many types and choices of fillers are likely to become available in the next several years.

Injecting perioral rhytids

Among the features of aging that disturb female patients the most are perioral vertical rhytids. These wrinkles are also called lipstick lines because applied lipstick tends to flow through these lines and enhance these telltale signs of aging. When patients present for the treatment of perioral rhytids, they are informed that there are several means to treat these wrinkles. This author oftentimes treats the lip as mentioned earlier by recreating (or augmenting) the white roll around the upper and lower lips. In many cases, simply by doing this, the skin is stretched and many perioral lines are improved. More substantial perioral lines need to be individually injected in the intradermal plane. Restylane Fine Line or Cosmoderm are fillers specifically formulated for superficial rhytids.



Fig. 17. Perioral rhytids may improve with circumferential white roll augmentation, but may also be treated individually by intradermal injection.

The injection technique is performed by injecting the finer particle-sized products more superficially into the dermis. For these wrinkles, the author places the needle at the vermilion/cutaneous border in the superficial dermal plane and inserts the needle to the hub. The needle is then withdrawn while injecting (linear threading technique). This technique is repeated on neighboring wrinkles (Fig. 17). A general concept is that fillers do not last as long in areas of increased movement (such as the lips) as in areas of decreased movement (such as malar augmentation).

Injecting the nasolabial folds

This area is high on many patients' list for filler injection. It is noteworthy to mention that patients with extremely deep nasolabial folds are not the best candidates because they are likely to be disappointed with the result. Many patients desire total ablation of their nasolabial folds and pull back their skin to show their perceived result. It must be explained to the patient that injecting a filler substance does not make these folds go away; furthermore, an adult patient would look unnatural without any nasolabial fold. It is further explained that the purpose of injecting the nasolabial fold is to blunt the area to mitigate the severity. Discussion also needs to be presented about the number of syringes required to receive the result. Many patients read about fillers in a woman's magazine and present to "test the waters." They oftentimes only desire to invest in a single syringe of filler but wish to have both nasolabial folds treated, which presents a treatment dilemma. A single syringe is usually not enough to make much difference bilaterally, especially in advanced aging. By granting the patient's wish of a single syringe, the result is likely to be minimal. If this is the case, the patient will be unhappy and it may reflect on their perception of the doctor. The author explains to the patient that although a single syringe can be used, it is not likely to make a significant difference bilaterally. Some of the author's best results have entailed using a single syringe in each fold and having the patient return several weeks later to repeat injection with another two syringes. This treatment is obviously an expensive one, but to deliver substantial results, substantial amounts of filler are required in this area, unless the patient has minimal folds.

Injecting the nasolabial folds requires practice, and there are a number of caveats involved. The patient should never have the nasolabial fold area injected while in the supine or recumbent position because the gravitational effects distort the nasolabial

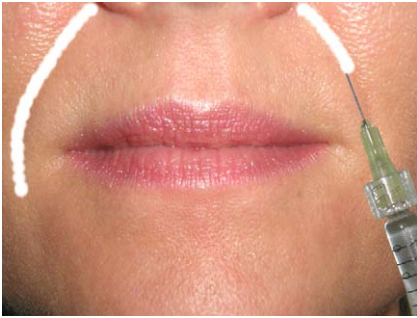


Fig. 18. The nasolabial folds are augmented by filling the valley of the fold with injection slightly medial to the fold. The linear threading technique and serial puncture technique can be used singularly or together to achieve the desired clinical result.

area. The patient should always be seated upright. The most important pitfall to avoid is having the filler migrate laterally in the fold. This situation can happen easily and, if it occurs, can make the nasolabial fold larger because the filler creates a bigger ridge on the lateral cheek. To prevent this problem, it is imperative to observe where the filler is flowing and to err on the medial side of the fold. By staying medial, the filler usually remains in the valley of the fold and, thus, causes the desired blunting effect (Fig. 18).

This area is one where the author uses the linear threading and serial puncture technique concomitantly. The syringe is inserted in the intradermal plane to the hub and filler is injected as the syringe is withdrawn (linear threading). When this process is not sufficient to produce enough augmentation, small boluses of filler are injected along the fold (serial puncture technique). By alternating these two techniques, the fold can be augmented naturally. It should be mentioned that if many punctures are used over a given area, the filler can leak out on injection. If this

occurs in multiple areas along the fold, the session is stopped and continued in 1 to 2 weeks. For significant nasolabial augmentation, it is a good idea to make it a multiple-event procedure. More accurate augmentation can be performed over two appointments. Fig. 19 shows nasolabial fold augmentation with Radiance FN.

The technique for injecting other facial lines and wrinkles is very similar. These injections are intradermal and can be performed by linear threading, serial puncture, or a combination of both. Common areas to inject include lateral canthal (crow's feet) wrinkles, glabellar wrinkles, frontalis wrinkles, mentolabial fold wrinkles, and cheek wrinkles.

Complications

Complications seen with injectable fillers are usually minor [18–23], although as mentioned earlier, blindness has been reported after injecting near the periorbital area. The main complications seen with fillers include the following:

- Intravascular injection
- Tissue necrosis
- Bruising
- Excessive swelling
- Hematoma
- Bruising
- Needle tracks
- Asymmetry
- Overfill
- Underfill
- Contour irregularities (lumpiness)
- Material visible through skin (injection too superficial)
- Herpes simplex activation



Fig. 19. Before (*left image*) and 3 weeks after (*right image*) augmentation of nasolabial folds with Radiance FN.

Most of these complications represent minor or transient problems that self-correct or improve. Intravascular injection can cause tissue necrosis. Necrosis can also be seen from vascular congestion from injections that compromise the dermal plexus. Sometimes, tissue blanching can be seen while injecting, which is usually transient, but in some cases, vascular refill does not happen and areas of tissue slough are seen. This situation can be prevented by paying attention to the plane of injection and not overinjecting or injecting with excessive pressure to produce blanching.

Hematoma and bruising are very disconcerting to the patient and can effect the reputation of the surgeon. Patients who take drugs, medications, or herbal preparations such as ginkgo, garlic, ginseng, or St. John's wort should stop these medications 2 weeks before filler injection. Most swelling resolves within 24 to 48 hours. Occasionally, excessive swelling is seen after filler injection, especially in the lips. These patients usually respond well to heat, elevation, and tapering steroid treatment. Patients should be forewarned that hyaluronic acid products produce more swelling than collagen products.

As with any procedure, a sound preoperative informed consent can mitigate potential post-treatment problems. The consent should not only cover the main complications but also address the need for follow-up treatments and specify how touch-up injections will be handled financially (many patients expect the surgeon to absorb the cost; to avoid miscommunication, this topic should specifically be addressed). The author frequently provides touch-up injections at a significantly reduced rate, especially



Fig. 20. This image illustrates post-treatment asymmetry. Notice that the patient's left side of the upper lip is significantly underfilled compared with the right side. The patient was brought back for touch-up and required 0.3 mL of Restylane to balance the symmetry.

when the cause is due to a problem on the surgeon's part, such as asymmetry. Of all caveats, being a conservative injector and having the patient return for follow-up evaluation is perhaps the most important. It is important to not overfill treated areas because the surgeon can always add more filler; after it is injected, it persists for months (Fig. 20).

It also is important to take a series of preoperative photographs of the frontal, oblique, and lateral views of the area to be treated. This record can assist the surgeon and the patient in many ways. Frequently, patients forget what their lips looked like before injection and can be overly critical of the result. Referring to the preoperative photographs can be helpful in this circumstance. In addition, these images can be used for marketing or, more important, to show prospective patients anticipated results.

Summary

Cosmetic facial surgery is an integral part of the specialty of oral and maxillofacial surgery, and injectable facial fillers fit well into the armamentarium of the contemporary oral and maxillofacial surgeon. These procedures are generally simple to learn, provide high patient and doctor satisfaction, and produce few complications.

References

- [1] Klein AW. Paraffinomas of the scalp. *Arch Dermatol* 1985;121:382–5.
- [2] Palkhivala A. Injected silicone risks. *Dermatology Times* June 2003;69.
- [3] Keefe J, Wauk L, Chu S, et al. Clinical use of injectable bovine collagen: a decade of experience. *Clin Mater* 1992;9(3–4):155–62.
- [4] Olenius M. The first clinical study using a new biodegradable implant for the treatment of lips, wrinkles, and folds. *Aesthetic Plast Surg* 1998;22(2):97–101.
- [5] Narins RS, Brandt F, Leyden J, et al. A randomized, double-blind, multicenter comparison of the efficacy and tolerability of Restylane versus Zylplast for the correction of nasolabial folds. *Dermatol Surg* 2003;29(6):588–95.
- [6] Lemperle G, Morhenn VV, Charrier U. Human histology and persistence of various injectable filler substances for soft tissue augmentation. *Aesthetic Plast Surg* 2003;27(5):354–66.
- [7] Q Med, Inc., Information brochure. Uppsalla, Sweden.
- [8] Duranti F, Salti G, Bovani B, et al. Injectable hyaluronic acid gel for soft tissue augmentation. A clinical and histological study. *Dermatol Surg* 1998;24(12):1317–25.

- [9] Bosniak S, Cantisano-Zilkha M. Restylane and Perlane: a review of safety and effectiveness. *Operat Techn Oculoplast Orbital Reconstr Surg* 2003;4(7): 491–4.
- [10] Sklar JA, Soren M, White MD. Radiance FN: a new soft tissue filler. *Derm Surg* 2004;30(5):764–8.
- [11] Niamtu J. Clinical technique for fat transfer. *Cosmetic facial surgery. Oral Maxillofacial Surg Clin N Am* 2000;12(4):641–7.
- [12] Niamtu J. Fat transfer gun used as a precision injection device for injectable soft tissue fillers. *J Oral Maxillofac Surg* 2002;60(7):838–9.
- [13] Teimourian B. Blindness following fat injections. *Plast Reconstr Surg* 1988;82(2):361.
- [14] Castillo GD. Management of blindness in the practice of cosmetic surgery. *Otolaryngol Head Neck Surg* 1989;100(6):559–62.
- [15] Egido JA, Arroyo R, Marcos A, et al. Middle cerebral artery embolism and unilateral visual loss after autologous fat injection into the glabellar area. *Stroke* 1993; 24:615–6.
- [16] Niamtu J. Local anesthetic blocks of the head and neck for cosmetic facial surgery. Part I. A review of basic sensory neuroanatomy. *Cosmet Dermatol* 2004;17: 515–22.
- [17] Larrabee WF, Makielski KH, editors. *Surgical anatomy of the face*. New York, NY: Raven Press; 1993.
- [18] Hanke CW, Higley HR, Jolivet DM, et al. Abscess formation and local necrosis after treatment with Zyderm or Zyplast collagen implant. *J Am Acad Dermatol* 1991;25:319–26.
- [19] Friedman PM, Mafong EA, Kauvar AN, et al. Safety data of injectable nonanimal stabilized hyaluronic acid gel for soft tissue augmentation. *Dermatol Surg* 2002; 28(6):491–4.
- [20] Lowe NJ, Maxwell CA, Lowe P, et al. Hyaluronic acid skin fillers: adverse reactions and skin testing. *J Am Acad Dermatol* 2001;45(6):930–3.
- [21] Lupton JR, Alster TS. Cutaneous hypersensitivity reaction to injectable hyaluronic acid gel. *Dermatol Surg* 2000;26:135–7.
- [22] Fernandez-Acenero MJ, Zamora E, Borbujo J. Granulomatous foreign body reaction against hyaluronic acid: report of a case after lip augmentation. *Dermatol Surg* 2003;29(12):1225–6.
- [23] Honig JF, Brink U, Korabiowska M. Severe granulomatous allergic tissue reaction after hyaluronic acid injection in the treatment of facial lines and its surgical correction. *J Craniofac Surg* 2003;14(2): 197–200.