

# Evolution in Techniques: Lip Augmentation

Mark A. Clymer, M.D., F.A.C.S.<sup>1,2</sup>

## ABSTRACT

Lip augmentation is an increasingly popular procedure. With increasing demand from patients comes an increasing challenge to surgeons to evolve techniques that are suited to the particular concerns, desires, and anatomy of each patient. In the past, options were limited to only a few filler substances and relatively few surgical options. Today new filler products continue to rapidly evolve and become available to surgeons and are often directly marketed to patients via various media formats. Tissue grafts and autologous fat grafting are also giving surgeons options for lip enhancement that were limited in the past. Options for permanent lip augmentation with newly advanced alloplastic implants are now available to help patients achieve a more natural look and feel. The challenge for surgeons of any level of experience is to weigh the advantages and disadvantages of each newly emerging technique and incorporate these into his or her armamentarium. I will outline the evolution of my lip augmentation techniques, emphasizing the use of Advanta<sup>TM</sup> for permanent lip augmentation, and the rationale behind this evolution.

**KEYWORDS:** Lip augmentation, e-PTFE (expanded polytetrafluoroethylene) Gortex<sup>TM</sup>, Advanta<sup>TM</sup>, hyaluronic acid, fat transfer, dermal fat grafting

*I have no commercial interest in any of the products or material discussed in this publication.*

In my practice I am seeing an increasing number of patients who desire more full lips. This is possibly due to the popularity of many models and actresses. Julia Roberts and Angelina Jolie are among the celebrities many of my patients name during lip augmentation consultation. Paralleling this growth in popularity is an evolution in lip augmentation techniques. The development of new techniques poses both opportunities and challenges—opportunities to help our patients achieve better and more long-lasting benefits, but also challenges for us as surgeons to sort through the vast array of the “latest and greatest” techniques and new products. It is this challenge that continually drives our evolution as surgeons. This evolution is generally slow at first, as we

vary minimally from the techniques we learn as residents and fellows. After the first few years of practice, we begin to evolve our own strategies, building on the foundation we have established from our training.

With any evolution, there must be a starting point. For all of us, the beginning of our evolution as surgeons in all aspects of patient care really begins at the conclusion of our formal training, either residency or fellowship. Therefore, I will begin my evolutionary timeline with those techniques I learned in my fellowship and trace it through to the present, as I enter my tenth year in practice. It is the continued pursuit of the best techniques possible for our patients that should drive all of us as we progress through our careers.

The goals of lip augmentation are generally to give the lips a more full and youthful look. Attractive lips are smooth, with good definition of the vermilion

<sup>1</sup>Clymer Facial Plastic Surgery, <sup>2</sup>Clinical Assistant Professor, Department of Otolaryngology, Vanderbilt University Medical Center, Nashville, Tennessee.

Address for correspondence and reprint requests: Mark A. Clymer, M.D., F.A.C.S., 1800 Mallory Lane, Suite A-3, Brentwood, TN 37027. Evolution in Techniques: Personal Perspectives; Editors in Chief,

Anthony P. Sclafani, M.D., F.A.C.S., Gilbert J. Nolst Trenité, M.D., Ph.D.; Guest Editor, Mark A. Clymer, M.D., F.A.C.S.

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border, have adequate volume or fullness, and have a neutral or slightly upturned corner. The youthful lip has been described as forming a triangular shape.<sup>1</sup> A senile or aging lip loses volume and will drop, giving a ratio of greater cutaneous lip show to mucosal lip show. Perioral rhytids also develop over time and with environmental factors, such as sun exposure and smoking. Some patients lack adequate definition of Cupid's bow, the vermilion border in the central lip between the two philtral ridges, and request improvement in this area. As with all surgical procedures, preoperative assessment and patient education are critical. Once the patient's goals are identified, the appropriate procedure, or combination of procedures, is recommended.

Conceptually, lip augmentation can be broken down by the duration of the result of the particular option the patient is considering. I define these options as short duration, 6 to 12 months, intermediate duration, 12 months to a period of a few years, and long term, or truly permanent. Practically, patient's goals and desires often dictate which of these options they choose. If a patient desires a fuller look but does not initially want a permanent option, then short duration techniques are best. If a patient has been treated in the past with a short duration option and they now want to "graduate" to a permanent solution, the long-term options are indicated. If a patient does not want an alloplastic material, then the intermediate options will be indicated.

Most injectable fillers fall into the category of short-term lip augmentation techniques. Radiesse<sup>TM</sup> (Bioform Medical, Franksville, WI) and Sculptra<sup>TM</sup> (Dermik Aesthetics, Berwyn, PA) have been touted to last 18 months or longer, but I do not use these fillers in lip augmentation. Therefore, when I counsel a patient on their options, a nonsurgical although short-duration option would be a filler. The evolution of filler use in my practice has likely paralleled that of most surgeons but for the sake of completeness will be briefly mentioned.

The only temporary option for lip correction at the time of my fellowship was collagen replacement with either Zyplast<sup>TM</sup> or Zyderm<sup>TM</sup> (Inamed Aesthetics/Allergan, Irvine, CA). My evolution has been from collagen to the newer hyaluronic acid fillers (Restylane<sup>TM</sup> [Medicis Aesthetics, Inc., Scottsdale, AZ], Hylaform Plus<sup>TM</sup>, and Captique<sup>TM</sup> [Inamed Aesthetics/Allergan, Irvine, CA]). These are approved for use as a facial filler for lines and folds, such as the melolabial folds. Therefore, lip volume augmentation is technically an off-label use. Hyaluronic acid has a very high patient satisfaction rate, low incidence of lumps or bumps, and my experience has been that it has better duration than collagen when used in the lips. The hyaluronic acid products may also be injected in more of the submucosal area, whereas collagen injections were best confined to the vermilion-cutaneous junction. Probably the most substantial evolution in the use of fillers in my practice is the use of nerve blocks.

Collagen syringes were mixed with lidocaine and therefore were touted as being used without supplementary anesthetic. The hyaluronic acid products do not contain lidocaine, and therefore I began performing infraorbital and mental nerve blocks on all my patients having hyaluronic acid lip augmentation. I have found the patient satisfaction to be extremely high, as the lip area is very sensitive and the product elicits a burning sensation upon injection. My experience has been that topical anesthesia will not be sufficient.

Intermediate duration options for lip augmentation include tissue grafting, such as fat transfer (e.g., fat grafting, fat injection) and the dermal fat graft. During my fellowship we performed dermal fat grafts but did not perform fat transfer to the lips. At the time I completed my fellowship, my concerns for fat transfer were that the harvest techniques would yield fat that was either somewhat lumpy but had good longevity or fat that was very smooth but did not last longer than other short-term options that had no donor site (i.e., collagen). Therefore, I used fat transfer to deeper areas, such as the cheeks and inframalar hollows and the melolabial folds but did not perform fat transfer to the lips.

Advances in instrumentation now have given surgeons options to provide smoother, longer-lasting fat transfer results. The small harvest cannulas available that are less traumatic to the harvested fat have led me to incorporate fat transfer into my lip augmentation armamentarium. My experience is limited as I have recently begun to implement this technique, and I would refer the reader to other publications regarding the longevity of this technique.

An important distinction between fat transfer and a dermal fat graft is that the dermal fat graft is harvested as a single entity. The graft is harvested from the suprapubic region, or from a previous abdominal scar. The thickness of the graft desired determines the amount of subcutaneous fat harvested in continuity with the dermis. The graft is then de-epithelialized, divided for use in upper and lower lips, then inserted in the same fashion described below for expanded polytetrafluoroethylene (e-PTFE) placement. The theoretical advantage is the preservation of the subdermal plexus, which will help increase the survivability of the fat and the dermal tissue. Other advantages are that it is autologous tissue, has minimal donor site morbidity, and can be tailored to essentially any length and thickness. Its disadvantages include that it left a donor site scar, it could not be used in women with hair extending from the pubic hairline to the umbilicus, and its longevity was not completely predictable. This technique gives a soft, natural look that will last for years but over time will lose some of its benefit.

My experience in the first 3 to 4 years after my fellowship was that there were young patients who did not want the donor site scar of the dermal fat technique,

did not want an alloplastic material, but wanted more longevity that the short-term options would offer. In these patients, I began to utilize the newly available acellular dermal matrices that had been developed (Alloderm<sup>TM</sup> [Lifecell Corporation, Branchburg, NJ]). The advantage of this technique was that it gave the patient a natural look and feel and could be tailored to the fullness they desired, depending on the graft used. However, the duration of many of these grafts in my practice was only 1 to 3 years (personal observation) and therefore I was searching for a longer-term, or “permanent,” option. Today, I would continue to offer this technique as an option but would also discuss fat transfer with these patients, as an intermediate and potentially a long-term alternative.

Long-term or truly permanent options include V to Y grafting, lip lifting, and placement of implants. During my fellowship year we performed 17 lip augmentation procedures, all of them being dermal fat grafts, indicating that at that time, the dermal fat graft was Dr. Quatela's preferred technique. Since that time Dr. Quatela and Dr. Jocono have published their experience with V-Y lip augmentation.<sup>2</sup> I also have incorporated the V to Y advancement technique since the conclusion of my fellowship in patients who desire a long-term benefit, are accepting of longer postoperative edema than with an implant, and who refuse an implant. This technique is also useful in patients with very thin lips with little mucosal lip showing. It can be used in combination with an implant in these patients to increase the amount of mucosal lip show and add volume to the lip. My experience has been that this technique has a greater incidence of minor “touch-up” procedures to achieve an extremely smooth lip border than occurs with the e-PTFE implants.

My preferred long-term option is that of e-PTFE implants, specifically, Advanta<sup>TM</sup> (Atrium Medical Corporation, Hudson, NH). e-PTFE is approved for a variety of medical uses including facial reconstruction and augmentation.<sup>3</sup> At the time of my fellowship, Dr. Quatela did not use e-PTFE, although it was clinically available. The e-PTFE available at that time was being used in strands or cords placed in melolabial folds and lips. Concerns for long-term migration, palpability, and extrusion conveyed to me during my fellowship were borne out in long-term follow-up with these initial implants.<sup>4</sup>

Not long after the completion of my fellowship, the Softform<sup>TM</sup> (Collagen Corp., Palo Alto, CA) implant became available. The proposed advancement in product was based on a tubular design that allowed tissue integration down the “barrel” of the implant. With its proposed improvement seeming to answer the above-described issues as well as a concern for migration, I offered this as a long-term option for patients who desired more fullness to the lips but who did have

adequate mucosal lip show. However, as documented elsewhere,<sup>3</sup> I also found these implants to undergo hardening and shortening with time. The ends became palpable, and patients complained of hardness of the implant. The advantage of this technique is in its reversibility, and I removed the Softform<sup>TM</sup> from all patients who had undergone lip augmentation with this technique. Subsequently, the Advanta<sup>TM</sup> implant became available. The touted advantage of Advanta<sup>TM</sup> and its advance over Softform<sup>TM</sup> are in its dual porosity implant design.<sup>4,5</sup> Essentially, the outer portion is e-PTFE with a porosity of 50  $\mu\text{m}$ . The inner core is a high or open porosity of 100  $\mu\text{m}$ . This allows tissue interaction and some integration of the implant while avoiding the inflammation and encapsulation seen with the low (20  $\mu\text{m}$ ) porosity implants or the hollow implants. After carefully considering the science presented by the company and talking with leaders in our field of facial plastic surgery who had experience with the Advanta<sup>TM</sup> implants, I began to offer these to patients in 2001, shortly after the Food and Drug Administration approval. This is now the primary long-term option for lip augmentation in my practice.

The techniques for Advanta<sup>TM</sup> implant use in the lips have been described by Truswell<sup>4</sup> and Hanke.<sup>6</sup> I will outline my technique, including one minor modification that has in my experience led to improved results.

During the initial consultation for lip augmentation, I will outline all options for the patient. Short-term, intermediate, and long-term options are presented with a discussion of the benefits and risks of each procedure. If the patient is interested in long-term options, I will encourage them to have one treatment session with hyaluronic acid. This will allow them to “test-drive” the look of fuller lips. If they like it, then they can move to the more permanent Advanta<sup>TM</sup> option. If they have previously had hyaluronic acid or do not wish to postpone the permanent benefit, they may proceed with Advanta<sup>TM</sup> implant after fully considering all risks and benefits.

Preoperative evaluation proceeds as with all procedures, with a complete medical history. Specific evaluation of the lip anatomy focuses on the degree of mucosal lip show. If the patient has adequate mucosal lip show, then Advanta<sup>TM</sup> alone will be sufficient. If the lip lacks mucosal show, usually the upper lip, then a lip lift is used in combination with the Advanta<sup>TM</sup> implant. This technique has been described by various authors.<sup>7,8</sup> I have incorporated the technique described by Waldman.<sup>7</sup> If there is significant downturn of the corner of the mouth, then a corner of mouth lift as described by Cheng, Perkins, and Hamilton<sup>1</sup> may be incorporated. When this technique is utilized, the incisions for the corner of mouth lift are used as the access incision to develop the pocket for the Advanta<sup>TM</sup>. Computer imaging is helpful in assessing the degree of enhancement the

patient desires, and the above-described use of hyaluronic acid preoperatively is an excellent way to determine the degree of lip fullness the patient is seeking.

## TECHNIQUE

The procedure is usually performed in the office surgical suite, with local anesthetic, topical anesthetic, and oral sedation if the patient desires (5 to 10 mg of valium). Patients undergoing other concomitant procedures such as facial rejuvenation or rhinoplasty may elect to have the procedure done in the outpatient surgery center with intravenous sedation or general anesthesia.

Supra- and infraorbital nerve blocks are performed with 1% xylocaine with epinephrine, and topical benzocaine is applied via a  $2 \times 2$  gauze placed in the gingivobuccal sulcus. The face is prepped and draped in standard sterile fashion. A minor amount of local anesthetic is placed in the upper lip (performed first) to assist in hemostasis and reduce postoperative bruising. The lower lip is also injected with a small amount of local anesthetic just prior to creating the pocket. An incision is made ~3 to 4 mm medial to the oral commissure. This placement has been one of the evolutions in my technique, as initially I attempted to place both top and bottom implants through a single oral commissure incision, in the same fashion I placed dermal fat grafts. Early in my experience (in the third and fifth case performed), two patients developed infections, both following exposure of the implant. I have since modified the incision placement as described above and also have carried the initial incision deep to the orbicularis oris muscle. This allows a two-layer closure of the incisions. Since these two modifications, one infection has occurred in the past 4 years (56 implants) performing Advanta<sup>TM</sup> lip augmentation. After making the incision, a spreading motion separates the muscle fibers, and a lateral pocket deep to the muscle is created. Dissection is then carried medially, initially deep to the muscle layer, and then becoming more superficial medially, being in the deep submucosal layer. The dissection pocket is performed to the midline, then a contralateral incision is made, again 3 to 4 mm from the oral commissure, and identical dissection is carried to the midline, connecting the two pockets. This is done bluntly with a small tenotomy scissor. I prefer to use a tendon passer to pass the implant. This is placed through the pocket and is held briefly by the assistant. Wet gauze soaked in antibiotic solution is placed on the cheeks (Fig. 1). Because dissecting the pocket necessitates handling the lip and potential contamination of gloves with oral flora, I change my gloves to a new pair prior to passing the implant. The implant has been soaking in antibiotic solution and is grasped with forceps and held suspended above the field. I do not allow the implant to touch the skin or even the antibiotic gauze. One end of the implant is grasped by the tendon passer, and the

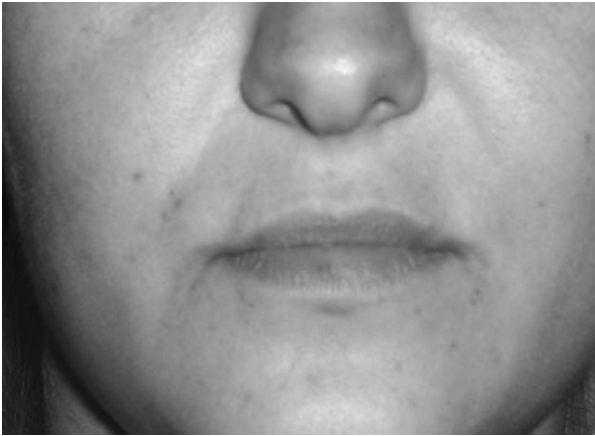


**Figure 1** Tendon passer placed through the upper lip pocket.

implant is gently passed through the pocket. I use one implant for the upper lip and a separate implant for the lower lip. One implant is not long enough for both lips, and attempting to use only one implant increases the likelihood of the implant ending before the oral commissure and being palpable by or visible to the patient. I place one implant across the entire upper lip to fill the full substance of the lip, in contrast to two pieces, which has been recommended.<sup>9</sup> I believe the full implant gives a more complete and smooth augmentation. The lip is then gently massaged over the implant laterally and with a forward-pulling motion to ensure enough length is in the pocket. The ends are trimmed, beveling them at ~45 degrees, and each end is placed laterally in the lateral pocket. The implant should extend slightly beyond the oral commissure, ~4 mm. This allows for the minimal contraction and helps prevent palpable ends at the oral commissure. The orbicularis oris muscle is then closed with 5-0 vicryl and the mucosa is closed with 5-0 silk. The identical sequence is then repeated for the lower lip. When performing Advanta<sup>TM</sup> augmentation with a subnasal lip lift, I perform the lift first, then place the Advanta<sup>TM</sup>. The technique for the subnasal lip lift is described well by Waldman.<sup>7</sup> Soft cold compresses are recommended for 24 to 48 hours, and oral antibiotics are given for 7 days. Pain management is usually with acetaminophen or hydrocodone. Sutures are removed between 5 and 7 days depending on swelling.

## RESULTS

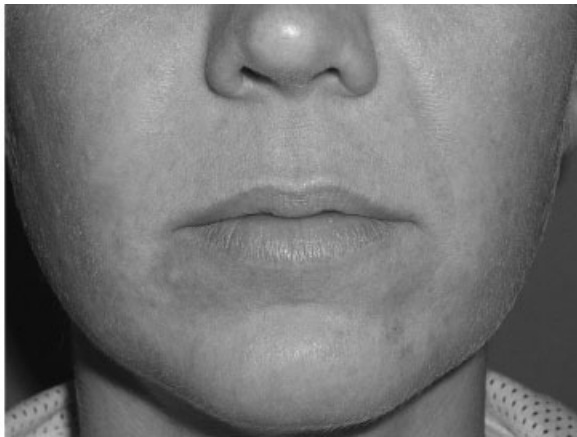
A total of 58 implants have been used in 27 patients. This includes two revisions for increased size and two replacements after infection. Patient satisfaction has been very high. All patients questioned at their final visit (shortest 6 months and longest 3 years 9 months) were please with two exceptions. One patient did not like the look but stated the implant felt very natural. Her implants were removed with no further treatment.



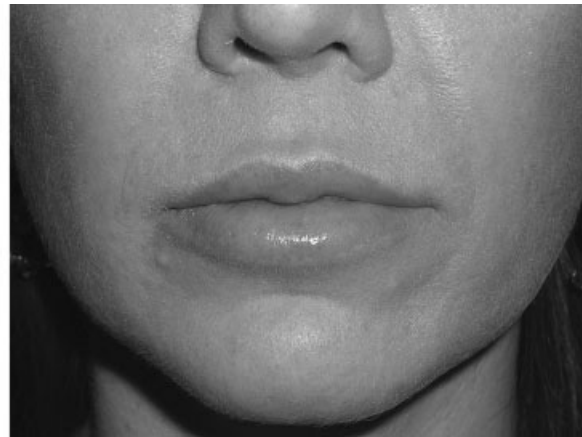
**Figure 2** Before Advanta™ implant in upper and lower lips.



**Figure 3** After Advanta™ implant in upper and lower lips.



**A**



**B**

**Figure 4** (A) Before and (B) after subnasal lip lift and Advanta™ implant.

The second patient had a contour abnormality of the upper lip when pursing her lips. The implant was smooth and symmetric at rest, with smiling, and with talking, but when pursing her lips as if to whistle or blow a kiss, one side of Cupid's bow was raised above the other. This was thought to be due to muscle adherence to the implant, since an asymmetric pocket should lead to asymmetry at rest. The implant was removed at her request and she is now happy with hyaluronic acid treatment for the upper lip. The three infections mentioned above give an overall rate of 5%, comparable to the 4% reported in a multicenter study.<sup>9</sup> In addition, the same study reported a 90% satisfaction rate. Out of 26 patients, two requested removal. Follow-up of the remaining 24 revealed they were very satisfied, giving an overall satisfaction rate of 92% (Figs. 2–4).

## CONCLUSIONS

Lip augmentation in my practice has evolved in the past 9 years. I currently discuss options with patients in terms of short-, intermediate-, and long-term

options. I currently prefer hyaluronic acid for short-term augmentation, fat transfer, dermal fat grafts, or allografts for intermediate duration options and Advanta™ implants with or without subnasal lip lift for permanent lip augmentation. This method will continue to evolve, using as its foundation the techniques learned during my training, and as its driving force the desire to offer the best options available to my patients.

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