

*Review Article***Lip Rejuvenation- An Overview of Various Filler Materials and Techniques.**

Kumar V, Thapliyal GK, Singh N, Raj A, Choube A, Mehta KA

Abstract: The lips enhance facial beauty and functionally they act in coordination with other anatomical structures for speech and display of emotions. Various procedures have been advised for improving its aesthetic appearance. Minimally invasive procedures for rejuvenating the lips with fillers are a common preferred procedure, but require expertise. The objective of this review is to describe the procedures in detail and cover the practical aspects of injecting lips with fillers. Composition of the various fillers is discussed in conjunction with their respective outcomes and duration of effect.

Keywords: Cosmetic surgery; Dermal fillers; Flow analysis; Hyaluronic acid; Minimally invasive surgeries; Restylane.

INTRODUCTION

Over the millennia, women have been accentuating their lips to enhance their beauty, also a pleasant smile is an universal expression of happiness. With the advent of minimally invasive techniques and patients opting for, nonsurgical options for anti-ageing, topical therapies and lasers or energy-based devices are not the first choice of treatment and also due to their insufficiency in creating volumetric rejuvenation. Fillers have thus gained popularity as an ideal treatment modality for lip augmentation. To create a harmonious smile, the dentist must have a thorough knowledge of lip anatomy, in order to maintain or create the normal curvature of the lips, proper exposure of the red zone of the lips, an undistorted philtrum, and undisturbed nasolabial grooves.

The consideration of the appearance of the lips within the context of the face as a whole is crucial. The lips should be in balance with surrounding soft tissue and skeleton of the midface. Excessive augmentation in an individual with relative midface hypoplasia, for example, may appear very unnatural and unattractive. It is now possible to change the appearance of the lips in several ways, whether to enlarge, reduce, or reconstruct after trauma or surgical resection. There are a growing number of techniques available, including both implantable and injectable materials, utilizing biomaterials, autogenous grafts, and alloplasts. This review was based on 3 electronic databases (MEDLINE, EMBASE, Cochrane) for articles published from 1997 onwards. In addition, selected

journals were searched by hand for relevant articles on lip augmentation with filler materials.

Lip anatomy: Statistically, the upper lip consists of one-third of the total lip volume, and the lower lip, being larger, consists of two-thirds of the lip mass (Fig 1).¹ The esthetic upper lip has a “lazy M” configuration at the vermilion–cutaneous junction, commonly referred to as “Cupid’s bow” (Fig 2). This junction has a “white roll,” which is a defining outline and the result of light reflection from this area. The lower lip is more curvilinear and also frequently has a similar white roll. The other defining feature of the upper lip is the philtral complex, which consists of the philtrum and the philtral columns. This area is frequently overlooked when performing esthetic lip augmentation. In youth, the perioral skin is smooth, and nasolabial folds are minimal until the third decade. Females frequently develop “lipstick lines” that manifest as vertical rhytids radiating outwards from the vermilion–cutaneous junction.

As people age, the lips undergo atrophy for multiple reasons. The effects of gravity and actinic damage coupled with the decreased vertical dimension resulting from enamel tooth wear often produce changes in the lips that make them seem to disappear. The skin at the commissure begins to sag, and the formation of mandibulo-labial folds causes depressions at the corners of the mouth, which are often referred to as marionette lines.

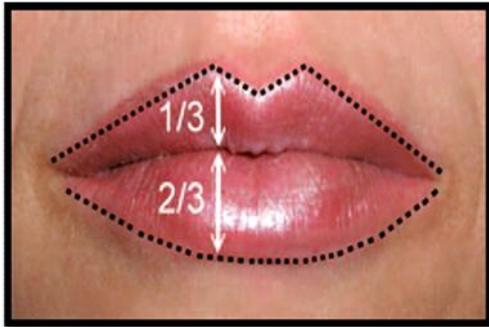


Figure 1: The upper lip is smaller than the lower lip and represents one-third of the total lip volume.

(Courtesy- Niamtu J, *Compendium*¹)

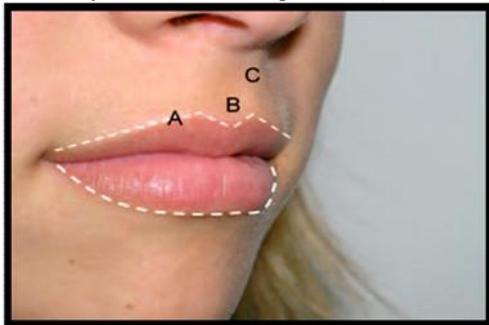


Figure 2: Defining features of esthetic lips. The “lazy M” of the upper lip and the curvilinear line of the lower lip are shown by the broken lines.

A = white roll; B = philtrum; C = philtral column.

(Courtesy- Niamtu J, *Compendium*¹)

Treatment options available: For decades, bovine collagen was the standard of care for facial and lip fillers. It is a product that was generally well suited for augmentation but presented significant drawbacks. First and foremost is the fact that it is an animal-derived substance and can cause allergy reactions, thus preinjection testing is a necessity. Second, it does not last long, frequently being resorbed within 4 to 6 weeks.

In December 2002, the hyaluronic acid-based filler Restylane gained FDA approval and began the revolution in new fillers. Restylane is hyaluronic acid and is derived from bacterial fermentation. Since it is a natural resident of many body tissues, allergic reaction is quite rare and is usually related to protein loads from the bacterial processing. The other huge advantage is the fact that studies have shown Restylane to last as long as 8 months.² This longevity is related to a process termed as isovolumic degradation. As the hyaluronic acid

molecules become phagocytized, water is drawn into the molecule from the surrounding tissue, thus replacing the lost molecular volume. For this reason, the hyalurons last longer in vivo and have become the filler of choice for most practitioners.

Antiretroviral medications have greatly improved the survival of HIV patients but cause atrophy of facial fat, especially in the midface and temporal regions. Sculptra (poly-L-lactic acid; Dermik Aesthetics, Bridgewater, NJ) has received FDA approval for the treatment of lipoatrophy in human immunodeficiency virus (HIV) patients. Unlike most other fillers, Sculptra does not provide immediate augmentation. When the poly-L-lactic acid particles are injected, an inflammatory response is initiated and results in the formation of new collagen in the area. This process usually takes 3 to 4 weeks and the effects can last 1 to 2 years.

Radiesse (Bioform Biomedical, San Mateo, CA) contains HA particles of 25 to 125 microns in an aqueous gel and is FDA approved as a radiographic marker and filler for vocal cord abnormalities. It is used off-label to augment facial wrinkles, folds, and lips. Because of the calcific nature of HA, the product can last for 12 to 18 months. But it is a technique sensitive procedure and improper injection techniques can result in lumpy areas.

Fat has been used as an injectable filler for the past 100 years. but in recent years techniques popularized by Coleman have initiated renewed interest in fat use.³ Fat injection has multiple advantages. It is readily available for most patients, is a natural tissue, and has the feel of native tissue when injected. Since the fat will invariably resorb, overcorrection is usually performed in multiple sessions of injection. This produces a relative cosmetic deformity and may take up to several weeks to look normal.

Silicone filler that has also fallen in and out of favor for facial and lip augmentations. It is a thick gel and feels extremely soft and natural when injected. It is a permanent filler

and when used correctly provides excellent results. Microdroplets (0.01 cc) of liquid injectable silicone are placed in the subdermal plane. Small amounts of silicone (0.1 cc per lip quadrant) are injected in these tiny microdroplets. The body will form reactive collagen around the microdroplets and wall them off, which produces the augmentation and keeps the silicone at the injection site. These small amounts of silicone are injected on a monthly basis until the desired results are obtained, the treatment is stopped short of the desired result, as collagen will continue to form. This treatment is not an immediate phenomenon and may take 3 to 9 months to achieve good results

Isolagen (Isolagen Inc, Houston, TX) is a filler made from cultured autologous fibroblasts. A punch biopsy is harvested from the posterior auricular area and sent to the company for fibroblast tissue culture. Again, this product is not significant in the filler marketplace. Although the product came from the actual patient, the need to harvest, send off, culture, resend, and inject appears to be too much of a tedious process for the surgeon and doctor.

Artecoll (Artes Inc, San Diego, CA) is filler consisting of 30 to 42 micron polymethyl methacrylate (PMMA) beads in a bovine collagen vehicle. This product has been used in Europe since 1994 and is currently under FDA investigation. Dermalive and Dermadeep (Euromedical Systems, Ltd., Nottingham, UK) are fillers that have been used in Europe since 1998. These products are semi-permanent biphasic implants that consist of a fluid carrier and a solid phase in a 60% (hyaluronic acid) and 40% (nonresorbable acrylic hydrogel) volume, respectively. After injection, the hyaluronic acid resorbs first, and then the hydrogel particles become encased in new collagen and endure for up to 12 months. This product is currently not FDA approved.

Techniques of Filler Injection- Before commencing the treatment, the surgeon should determine what exactly the patient wants and select the appropriate filler. The patient should be instructed about the positive and negative effects of the filler,

and the recovery and longevity should also be discussed. Any unrealistic expectation, should be counseled, as overselling a result or longevity can cause problems, so it is always preferable to be realistic. All patients are rescheduled for a 2-week follow-up. For lip injection, infraorbital and mental nerve blocks are commonly administered or local anesthetic infiltration in the upper or lower anterior vestibule from cupid to cupid region can also be given, this usually provides adequate local anesthesia for treating the lips.⁴⁻⁹

Several common injection techniques exist. Linear threading is a method of injecting a continual line of filler while keeping the syringe moving forward or backwards. This is the same mechanism used when putting a line of toothpaste on a tooth brush. Serial puncture is another technique and involves injecting separate beads or boluses of fillers. This technique puts down small beads of filler. In reality, most injectors use a combination of both these techniques. Linear threading is good for generalized injecting and serial puncture techniques are good for filling in gaps or fine-tuning small areas. When using serial puncture techniques, it is important to keep the filler beads close together so as not to have a bumpy appearance (Fig 3).

Injections are given in the white roll area or the deep portion (parenchyma) of the lip or both. Some patients may also get separate injections in the vertical lip rhytids or at the oral commissures, and occasionally in the mentolabial region and marionette lines. The goal is to accentuate the white roll and Cupid's bow area to provide definition, especially in the "lazy M" region. Since the lip does not have an organized epidermis-dermis complex, the filler is actually being injected into the potential space just under the mucosa. This pertains more to the "outlining of the lazy M," while augmenting the white roll. In this space, the filler should flow freely with little syringe resistance. When in the correct space, the filler will flow and not "well up" as a lump. If the filler is too superficial, there will be considerable pressure on the syringe plunger, the tissue will "well up" as a lump of filler, and there will be no forward flow.

On the other hand, if the filler is placed too deeply, it spreads out and does not provide the desired “roll” effect (Fig 4).

If volume is to be added to the lips, then a deeper injection is warranted to provide pout and to generally make the lip larger from within. This can be done in addition to white roll augmentation or as an isolated procedure. To increase the general lip volume, the needle is inserted deeper into the lip, in about the outerone-third to one-half of the lip thickness and filler material is injected at the wet–dry line using the linear threading technique (Fig 5).

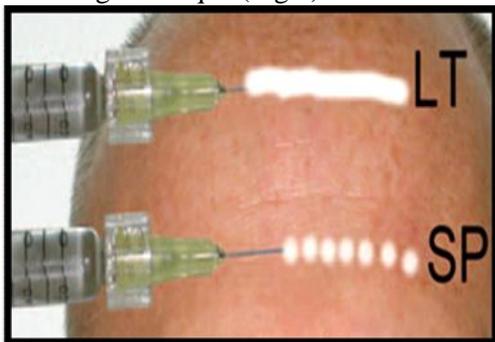


Figure 3: Shows a diagram of linear threading and serial puncture.(courtesy Euromedical Systems, Ltd., Nottingham, UK)



Figure 4: injection plane at the vermilion–cutaneous(Courtesy- Niamtu J, Compendium¹)



Figure 5: Deeper lip injection junction for white roll augmentation.(Courtesy- Niamtu J, Compendium¹)

Complications: There does not exist a cosmetic procedure that is complication free. Fillers are no different. Most complications seen with fillers concern treatment problems such as the following:1. Overcorrection, 2. Under correction, 3. Allergic reaction, 4. Bruising, swelling, 5. Unmet patient expectations, 6. Lumpiness, 7. Asymmetry. Many of these problems are consistent with a learning curve and become less common with experience.

CONCLUSION: Perioral aging eventually affects all individuals and no specialist is more trained to treat this area than oral and maxillofacial surgeons. By starting with conservative and low-risk procedures, doctors from other specialties of dentistry can learn these techniques and add them to their ever-expanding armamentarium.

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