A New Classification of Lip Zones to Customize Injectable Lip Augmentation

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Objectives: To present a new classification of 15 anatomical lip zones used to direct placement of injectable fillers during lip augmentation and to evaluate the new classification’s ability to customize lip contour and size.

Methods: Study participants were consecutive patients presenting to a facial plastic and reconstructive surgery practice for injectable lip augmentation with a nonanimal-sourced stabilized hyaluronic acid (Restylane; Medicis Aesthetic Inc, Scottsdale, Arizona). A nonrandomized, prospective case series.

Results: A total of 137 treatments were performed on lips of 66 patients. The mean (SD) satisfaction score was 4.5 (0.6) on an integral scale of 1 (dissatisfied) to 5 (most satisfied). The mean (SD) persistence until lips returned to preoperative appearance based on patient subjective evaluation was 4.9 (1.5) months. Patients were free of adverse effects.

Conclusions: Using a new classification of lip anatomical zones to direct the injection of a nonanimal-sourced stabilized hyaluronic acid has increased my ability to better control lip shape and size in lip augmentation. This technique was met with high patient satisfaction and no adverse effects. Persistence of injected nonanimal-sourced stabilized hyaluronic acid was similar to that seen in other studies.


The lips are an essential component of facial symmetry and aesthetics. Anthropometric studies have shown that wider and fuller lips in relation to facial width as well as greater vermilion height are a mark of female attractiveness. There has been a dramatic increase in cosmetic surgery in Western culture in the past few decades, with an increasing focus on achieving aesthetic ideals and maintaining a youthful appearance. Full lips have become increasingly desirable as they are considered both youthful and beautiful. Moreover, a trend has been identified toward fuller and more anteriorly positioned lips in models appearing in magazines over the past century. Vermilion lip hypoplasia and thin lips disrupt facial harmony and can result in the perception of nasal tip or mandible overprojection. Such vermilion hypoplasia, when not present in youth, is often present with aging. Gonzalez-Ulloa has described the changes of the lip with aging, including a less exposed vermilion, a relative loss of vermilion bulk, and lengthening of the lip.

It is possible to enlarge, refine, shorten, and reshape the lips with surgical techniques, most of which can offer long-term results. The first few generations of injectable soft-tissue fillers such as bovine collagen (Zyderm and Zyplast; Allergan Inc, Irvine, California) offer patients a nonsurgical, yet short-term, means of improving their appearance. Although injectable collagen offers greater versatility to reshape and augment the lip than any one surgical technique, its short persistence in the mobile lip made it a less desirable choice of treatment.

With the advent of longer-lasting, nonallergic, nonanimal-sourced stabilized hyaluronic acid (NASHA) gel fillers, injection techniques have evolved. What follows is my description of a new classification of 15 anatomical lip zones that I use to direct placement of injectable fillers and to improve my ability to customize lip contour and size to the patient’s desire. The depth of injection also varies from dermal to the deeper mucosal/superficial muscular interface, creating further customized results. I present my experience using an injectable, NASHA gel product (Restylane; Medicis Aesthetic Inc, Scottsdale, Arizona) to augment the lips in this fashion, including persistence data based on patient subjective review.

The upper lip is widely classified as having 3 subunits—the central philtrum and...
2 lateral subunits and the lower lip, 1 subunit. The cutaneous and mucosal portions of the lip meet at the vermilion, which has a variable prominence called the white roll. Lip augmentation is classically performed by inserting a needle along the vermilion-cutaneous junction while stabilizing the skin and lip with the other hand, and injecting into a potential space that exists along this border.

Driven by the desire of patients to achieve specific goals for lip shape, I found that there are 15 separate anatomical zones that I regularly injected with fillers (Figure 1). The major zones are vermilion/white roll, subvermilion, peristomal, philtral column, and commissural. The subvermilion zone corresponds to the dry mucosal lip, and the peristomal zone at the junction of dry and wet mucosal lip. The distance separating the vermilion, subvermilion, and peristomal regions is significant enough so that a 30-gauge needle can easily be directed into each of these zones specifically. Fifteen anatomical zones for injection are the result of further subdividing these zones. The vermilion/white roll can be further subdivided in the upper lip to include lateral, Cupid’s bow apical, and central philtral zones, while the lower lip vermilion is divided into medial and lateral zones. The subvermilion is subdivided into medial and lateral zones, and the peristomal, into medial and lateral zones (Table).

Study participants were consecutive patients presenting to my facial plastic and reconstructive surgery practice. All patients signed an informed consent for the procedure.

The NASHA gel used for tissue augmentation consisted of NASHA, 20 mg/mL, in a physiologic sodium chloride solution buffered to pH 7 in gel form (250-µm gel bead size and 100 000 U/mL) preloaded in a 1.0-mL or 0.4-mL syringe with a Luer-Lok. A 30-gauge, 1.27-cm needle was supplied in the package. The amount injected into the lips depended on the goals of the patient for shape and size, and the anatomical deficiencies present.

The patient’s desire for lip shape and size was then reviewed, using a mirror and pointer, and a treatment plan including the subunits to be treated and the depth of injection was determined. Before treatment, local nerve blocks were administered with 1% lidocaine without epinephrine to minimize tachycardia and to shorten the duration of anesthesia after treatment. Infraorbital nerve blocks were given for the upper lip and mental nerve blocks for the lower lip.

Filler injection depth varied from more superficial dermal/mucosal to the deeper layers at the junction of the orbicularis oris muscle with the cutaneous skin, red lip mucosa, and minor salivary glands, depending on the segment of the lip. Care is taken to inject while withdrawing the needle, and not injecting in the deeper substance of the muscular lip to prevent labial artery embolization. Massaging of the injected area was performed when necessary to attain the desired contour. Immediately after the injections, to minimize the potential for ecchymosis, direct, constant pressure with ice compresses was applied to the injection sites until there was no evidence of bleeding.

After injection, patients were given a follow-up questionnaire that asked them to quantitate in 2-week intervals when their lips returned to pretreatment appearance, and their satisfaction with the results in shape and size with the treatment without consideration for longevity on an integral scale of 1 (dissatisfied) to 5 (most satisfied). A record of adverse reactions and sensitivities was also included. Data were retrieved at routine follow-up visits for another treatment, or by follow-up calls made at 6 months and 9 months.

A total of 137 NASHA treatments were performed on the lips of 66 patients (62 women and 4 men) from January 1, 2004, to January 1, 2006. The mean age was 45.8 years, with a range from 20 to 76 years. Follow-up on questionnaires of 118 NASHA treatments performed on lips of 53 patients was obtained (80% follow-up). The mean (SD) satisfaction score was 4.3 (0.6), with 5 representing most satisfaction. The mean (SD) persistence until lips returned to preoperative appearance based on the patient’s subjective evaluation was 4.9 (1.5) months. Aside from transient ery-
thema at the injection sites and infrequent bruising, these patients were free of adverse effects.

**COMMENT**

It is not necessarily accurate to discuss facial aesthetics in terms of universal ideals, as the characteristics that are valued vary across individuals, cultures, and eras; lip appearance is no different. With the dramatic increase in the number of patients having aesthetic facial treatments, and the diversity of ethnicities represented, the traditional method of augmenting the lips by injecting the vermilion border with the pinch-and-roll method alone limits the ability of the treating physician to shape and augment the lip to the patient’s desires. Lip contours vary widely, from patients with thin lips with a flat Cupid’s bow, to patients lacking lateral lip fullness with an adequately full lip centrally and appropriately curved Cupid’s bow, to patients with a flat philtrum and flat Cupid’s bow with good overall lip fullness, and other combinations.

I described a new classification of 15 anatomical lip zones that I use to direct placement of injectable fillers and to improve my ability to customize lip contour and size during augmentation with the NASHA gel. This approach was developed to better direct injectable filler placement, as traditional methods allowed me to augment the lips in a generalized way, but did not allow me to differentially augment specific patient problem areas, or to customize lip shape. Patient satisfaction was high when using this method, 4.5 on a 5-point scale. These concepts can be applied when using other temporary injectable fillers, but considering the varied locations and depth of injection, I would caution against using this model when using permanent synthetic fillers.

The 5 major zones are vermilion/white roll, subvermilion, peristomal, philtral column, and commissural. The subvermilion corresponds to the dry mucosal lip, and the peristomal at the junction of dry and wet mucosal lip. Fifteen anatomical zones for injection are the result of further subdividing these zones. The vermilion/white roll can be further subdivided in the upper lip to include lateral, Cupid’s bow apical, and central philtral zones, while the lower lip vermilion is divided into medial and lateral zones. The subvermilion is subdivided into medial and lateral zones, and the peristomal, into medial and lateral zones (Figure 1).

In my experience, these zones of injection correspond to specific needs in lip contouring and augmentation. I have found that these zones can easily be separated and injected specifically with a 30-gauge needle (a fraction of a millimeter in width), as the vermilion is separated from the subvermilion by 3 to 4 mm, and the subvermilion similarly is separated from the peristomal zone by 3 to 4 mm. Speaking in generalities, we use subvermilion and peristomal injections (both medial and lateral) to increase the fullness and roundness of the mucosal/red lip in these regions (Figure 2). Obviously, if a patient is deficient only medially or laterally in one of these regions, then only that zone is injected. With an overall thin lip, subvermilion and peristomal injections are given at the same time to achieve the most fullness. There is a subset of patients that I see with adequate lip fullness but a slight concave depression in the mucosal lip in the subvermilion zone; therefore, this depression is injected and no peristomal zone injections are required. I often inject the peristomal zone laterally alone to create a lateral lip pout in patients who request a lip more like the actress Angelina Jolie (a common request).

I inject the vermilion/white roll zones to increase the size of the lip as well as modify the curvature of Cupid’s bow. In the severely thin lip, vermilion zone injections are combined with subvermilion and peristomal injections. To increase the curvature of Cupid’s bow in a flat vermilion, the vermilion lateral and vermilion Cupid’s bow apical zones are injected while the central philtral zone is not. In an overly curved Cupid’s bow, injecting the lateral vermilion and central philtral vermilion subunits and not the Cupid’s bow apical will flatten its curvature.

Philtral column zone injections are used to create more central lip pout and anterior projection, and this effect can be synergized with medial subvermilion zone injection. Commissural zone injections are added when the corner of the mouth turns downward, and injections in this zone, which is immediately below the commissure, elevate the corner of the mouth.

Another degree of complexity is added with injection depth. Superficial injection depth in the dermis is often used
in the senile atrophic lip to efface vermilion notching. Deeper injections are often placed at the junction of the orbicularis oris muscle with the skin in the vermilion/white roll. Deeper injections are also placed in the subvermilion and peristomal zones in the superficial aspects of the orbicularis oris muscle, as more superficial injections in the mucosa alone often leaves visible lumps.

While there are hundreds (511) of subunit injection combinations that can be performed, for demonstrative purposes I will review 2. The combination that might be used for a thin-lipped young patient with the goal of a stylized, full, pouty lip with a more curved Cupid’s bow would include the following: (1) injections in the subvermilion lateral and peristomal lateral zones to add vertical height, roundness, and fullness to the mucosal/red lip at the junction of the mucosa and superficial orbicularis oris muscular layer; (2) injections of the philtral column subunit in the mid dermis and the subvermilion medial subunits in the superficial muscular layer (leaving out the peristomal medial subunit) to pout out the lip creating more anterior projection; and (3) injections of vermilion lateral and vermilion Cupid’s bow apical zones in the potential space deep to the vermilion/white roll (leaving out the vermilion central philtral zone) to create a more curved Cupid’s bow. In my practice I refer to this as French lips as it is often seen in youthful runway models (Figure 3).

Another example is the thin senile lip, with an atrophic vermilion, lip notching/rhytids (lipstick bleed lines), and down-turned oral commissure. The subvermilion region involutes, creating a concavity below the vermilion. Here the patient might desire rejuvenation of the lip and removal of rhytids for a subtle result. The combination of subunit injection would include the following: (1) injections in the medial and lateral subvermilion and medial and lateral peristomal subunits to add height, correct concavities, and add fullness to the mucosal/red lip in the superficial muscular layer; (2) injections of lateral, Cupid’s bow apical, and central philtral vermilion zones equally in the more superficial dermis to minimize lip notching and augment the white roll without overemphasizing curvature that might look unnatural in the aged patient; and (3) injections of the oral commissure subunit in the deep dermis to elevate the corner of the mouth.

In this series, the mean (SD) lip persistence of NASHA gel was 4.9 (1.5) months. This correlates well with other studies.10-18

Aside from transient erythema at the injection sites and infrequent bruising, these patients were free of adverse effects. European studies show satisfactory results with NASHA gel used as a temporary soft-tissue expander.19-22 Erythema and mild induration are the most common adverse effects reported to date and are transient. There is 1 report of arterial embolization23 and 3 reports of granulomatous foreign body reaction24 after injection of hyaluronic acid.25,26 In my study, aside from transient erythema at the injection sites and infrequent bruising, these patients were free of adverse effects.

I presented my experience using a new classification of lip anatomical zones to direct the injection of a NASHA gel to augment and shape lips. This technique was met with high patient satisfaction and no adverse effects.

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