

Section IV

Introduction to Fillers

34	Fillers Overview	92
35	Anesthesia Techniques	95
36	Filler Injection Methods	98
37	Choosing the Right Filler	101

IV

34

Fillers Overview

The use of injectable fillers has become one of the most requested minimally invasive treatment options to re-volumize the aging face. Bovine collagen use was limited both by its short duration of effect and its potential for allergic reaction. In 2003, the introduction of hyaluronic acid (HA) as a facial filling agent revolutionized the world of fillers. Currently the FDA has approved various types of HAs, biostimulatory products like calcium hydroxylapatite and poly-L-lactic acid, as well as polymethylmethacrylate, a permanent filler. Although these fillers are FDA approved only for certain indications, their “off-label” use has become the mainstay for facial rejuvenation in the United States.

Hyaluronic Acid

Composition

Hyaluronic acid is a polysaccharide normally found in the connective tissues of the body. Original HA products were made from animals (e.g., rooster combs); however, newer products are synthetic.

Injection

Some of these products are premixed with lidocaine. Injection is performed using 27- or 30-gauge needles. Cannulas may be used, but we prefer needles for accurate placement of this product. Topical anesthetics or regional blocks may be required.

Uses

This class of fillers is used to improve mild to moderate folds and wrinkles. These fillers may be used anywhere on the face, including the lips, nose, and around the mouth.

Precautions

These products should be placed in the deep dermis, superficial subcutaneous tissue, or pre-periosteal planes. When injected too superficially, the product can be seen through the skin and has a blue appearance. This is due to the particles scattering blue light, referred to in physics as the Tyndall effect. Because of more uniform particle size, Belotero may be placed more superficially and is less likely to produce a Tyndall effect. When injecting HAs, care must be taken not to cause vascular injury by occlusion or compression.

Calcium Hydroxylapatite

Composition

Calcium hydroxylapatite (CaHA) is a biostimulatory filler of CaHA spheres suspended in an aqueous gel.

Injection

Injection is performed using a 27-gauge needle. Cannulas can also be used to inject this product, and may decrease the chances

of vascular injury. Topical anesthetics or regional blocks may be required.

Uses

This thicker paste is used to improve moderate to severe folds and wrinkles. It should not be used around the eyes or in the lips.

Precautions

This product should be placed in the subdermal or preperiosteal plane. When injecting this product, care must be taken not to cause vascular injury by occlusion or compression. This product is radiopaque and can be seen on X-rays and computed tomography (CT) scans.

Polymethyl Methacrylate

Composition

Polymethyl methacrylate (PMMA) is a permanent filler composed of PMMA microspheres (20%) suspended in a bovine collagen gel.

Properties

This thick gel must be kept refrigerated. Allow the syringe to come to room temperature prior to injection. A 26-gauge needle or cannula may be used for injection. Topical anesthetics or regional blocks may be required.

Uses

Due to the permanence of this product, it should be injected only for improvement of the nasolabial folds, cheeks/midface, and marionette lines. Fill to 80% correction at the first injection and place 20% more at second treatment approximately 4 to 6 weeks later. Do not overcorrect with this product.

Precautions

A skin test is required 1 month prior to injection of this product to rule out allergy to bovine collagen. This product is a permanent filler and should not be used around the eyes and lips. Injection should be placed in the subdermal or pre-periosteal plane. When injecting this product, care must be taken not to cause vascular injury by occlusion or compression.

Poly-L-Lactic Acid

Composition

Poly-L-lactic acid (PLLA) is a biostimulatory filler composed of lyophilized crystals of PLLA resuspended in water.

Injection

PLLA must be resuspended with water prior to use. We recommend using 5 to 8 mL of preserved water. At the time of injection, 1 to 2 mL of lidocaine (1 or 2%) is added to the vial. Avoid shaking this product in the vial because foam in the bottle increases needle clogging. Multiple treatments are needed at 4- to 8-week intervals until sufficient collagen has been produced. The patient may require three to five treatment sessions for adequate correction. A maintenance “boost” of one to two vials will be required every 1 to 3 years. Injection may be performed with 25- or 26-gauge needles or cannulas. Topical anesthetics or regional blocks may be required.

Uses

This product is FDA approved to restore volume to faces that have developed lipodystrophy from aging or HIV medications. It also can be used to improve deep folds and lines. More recent off-label uses include firming of the wrinkles in the décolleté and

injection into stretch marks and cellulite depressions. Of note, injection into the back of the hands is no longer recommended by most key opinion leaders.

Precautions

This product should be injected in the subdermal or pre-periosteal planes. Nodules

or granulomas can form if the product is injected too superficially (dermis) or if too concentrated. The patient should be advised to massage the injected areas for 5 minutes, 5 times a day, for 5 consecutive days. When injecting this product, care must be taken not to cause vascular injury by occlusion or compression.

Table 34.1 Facial Fillers Currently FDA-Approved in the United States.

Year FDA Approved	Product Name	Composition
1981	Zyderm 1	Bovine collagen
1983	Zyderm 2	Bovine collagen
1985	Zyplast	Bovine collagen
2003	CosmoDerm 1 CosmoPlast Restylane	Human collagen Human collagen Hyaluronic acid (HA)
2004	Hylaform Hylaform Plus Captique Sculptra (HIV)	HA HA HA Poly-L-lactic acid (PLLA)
2005	CosmoDerm 2	Human collagen
2006	Juvéderm Ultra/Ultra Plus Artefill (now Bellafill) Radiesse	HA Polymethyl methacrylate (PMMA) Calcium hydroxylapatite (CaHA)
2007	Perlane Eleveess	HA HA
2008	Prevelle Silk Evolve	HA + lidocaine Porcine collagen
2009	Hydrelle (formerly Eleveess) Sculptra Aesthetic	HA PLLA
2010	Juvéderm XC Ultra, Ultra Plus Restylane-L Perlane-L (now Restylane Lyft)	HA + lidocaine HA + lidocaine HA + lidocaine
2011	Belotero Balance	HA
2013	Juvéderm Voluma XC	HA + lidocaine
2014	Restylane Silk	HA + lidocaine
2015	Radiesse Plus	CaHA + lidocaine
2016	Juvéderm Volbella XC	HA + lidocaine
2017	Restylane Refyne Restylane Defyne Juvéderm Vollure	HA + lidocaine HA + lidocaine HA + lidocaine

35

Anesthesia Techniques

Indications

Needle injections to the face are painful, especially in certain facial areas. The injector can shake the lip, use numbing cream, or tap the cheek to “fool the brain,” but patients will tell you (and everybody else) that these injections hurt! Although some injectables now have lidocaine pre-added to the product or can have lidocaine mixed into the product at the time of injection, it is the needle that is painful. In addition, the lidocaine does not take effect for several minutes after injection. In sensitive areas like the lip or when broad areas are being treated, most patients will require some form of anesthesia. Options include topical anesthesia, ice, or regional blocks.

Even some of the most stoic patients who dislike the feeling of regional blocks have eventually succumbed to accepting a numbing block because, when done correctly, it is much more comfortable during the injection process. By using such blocks, not only is the patient made more comfortable but the injector is more at liberty to inject where necessary to provide a better overall outcome. The keys to well-executed anesthesia are knowledge of the anatomy, practice, and having a routine.

Anatomic Considerations

An intimate knowledge of the anatomy of the trigeminal nerve (fifth cranial nerve)

is essential because its branches (V1, V2, and V3) provide cutaneous sensory innervation to the face. The injector should also understand how and why anesthetics work to relieve pain. The most commonly used blocks are the infraorbital and mental blocks, though mini-mucosal blocks have been described and can be useful adjuncts for treating areas around the mouth.

Topical Anesthetics

Topical numbing creams are available to lessen the feeling of the needle insertion. These can be obtained as pre-compounded products, such as EMLA (eutectic mixture of local anesthetics) or Ela-Max (AstraZeneca, London, England). EMLA contains 2.5% lidocaine and 2.5% prilocaine. It is obtained only by prescription and must be applied for 1 hour with or without occlusion. Occlusion with plastic wrap can be used to increase absorption, if desired. Ela-Max (4 or 5% lidocaine) (AstraZeneca) is available without a prescription, has a 30-minute onset of analgesia and can be used with or without occlusion. In addition, a cream can be compounded per the physician's specifications and may include benzocaine (20%), lidocaine (6%), and tetracaine (4%) (BLT; Bayview Pharmacy, Baltimore, Maryland). BLT has a quicker onset of action of approximately 20 minutes.

Injection Technique

Regional or “dental” blocks can be performed for the midface (V2), lower face (V3), or both. The injection technique should be directed at the base of the nerve as it exits the bone, which will provide the most effective and broadest area of anesthesia. This technique also permits the least use of lidocaine (with or without epinephrine) and the least distortion of surrounding soft tissues. As such, to adequately reach the desired target areas it is often necessary to use at least a 1-inch (2.5-cm) or longer needle. If a finger is placed over the infra-orbital foramen, then the needle can be directed percutaneously toward the foramen, and approximately 0.5 mL of local injection placed on the periosteum near the nerve, but not in the opening. Similarly, if the mental foramen can be palpated in its position near the first molar, then the needle can be angled to land near its location on the face of the mandible. A second injection is done with the needle in the submucosal plane along the gingival-buccal sulcus. This is performed in a retrograde fashion, as the needle that has been passed from the first premolar posteriorly to the back molar is withdrawn.

Mini-blocks are a series of 0.1-mL aliquots of local anesthesia injected just submucosally in the sulcus approximately 1 cm apart to anesthetize the lips and nasolabial folds. These blocks tend to be more variable in effect and shorter acting in duration. One major benefit is that they are very useful in numbing the center of the upper lip when the regional blocks fail in this area.

Alternate Technique

Dental block may be performed intra-orally only via a buccal sulcus injection into the canine fossa and inferiorly at the mental

foramen. The areas not anesthetized by these blocks are treated with topical anesthetics, which may be placed at the philtrum and lateral oral commissures.

Precautions

Especially with the use of epinephrine, the patient may experience some mild tachycardia and some rarer cases of lightheadedness and occasional fainting. In those patients who are particularly sensitive, a note should be placed in the chart noting epinephrine sensitivity. Alternately, 1 or 2% plain lidocaine can be utilized, but the anesthesia result may not be as dense or as long acting.

Post-Injection Instructions

The duration of effect of the injection typically is 1.5 to 2 hours.

Risks

Minimal to none unless bupivacaine is used. (Intravascular bupivacaine injections have been known to cause irreversible cardiac arrhythmias.) *Lidocaine can be toxic, and overdose may be fatal.* Patients should be observed when topical applications are used on large areas of the body.

Pearls of Injection

- Caffeine intake, lack of sleep, hormonal variations, and stress can all make a painful experience more so.
- Shaking the lip when the needle enters the mucosa, or actually pulling the mucosa onto the tip of the needle, can minimize the discomfort of the initial numbing injection.
- Use of topical intraoral lidocaine can also make the entrance of the needle easier in the most sensitive patients.

- In areas where a regional or local block is not possible, distraction using the gate theory of pain can help to decrease discomfort. Use of tapping or vibration at the site or an adjacent site can flood and then downregulate the perception of painful stimuli felt by the central nervous system.

Additional Resources

Dentists can provide valuable assistance when one is learning to perform regional blocks. Ask a dentist to show you how to provide regional anesthesia or “dental blocks.”

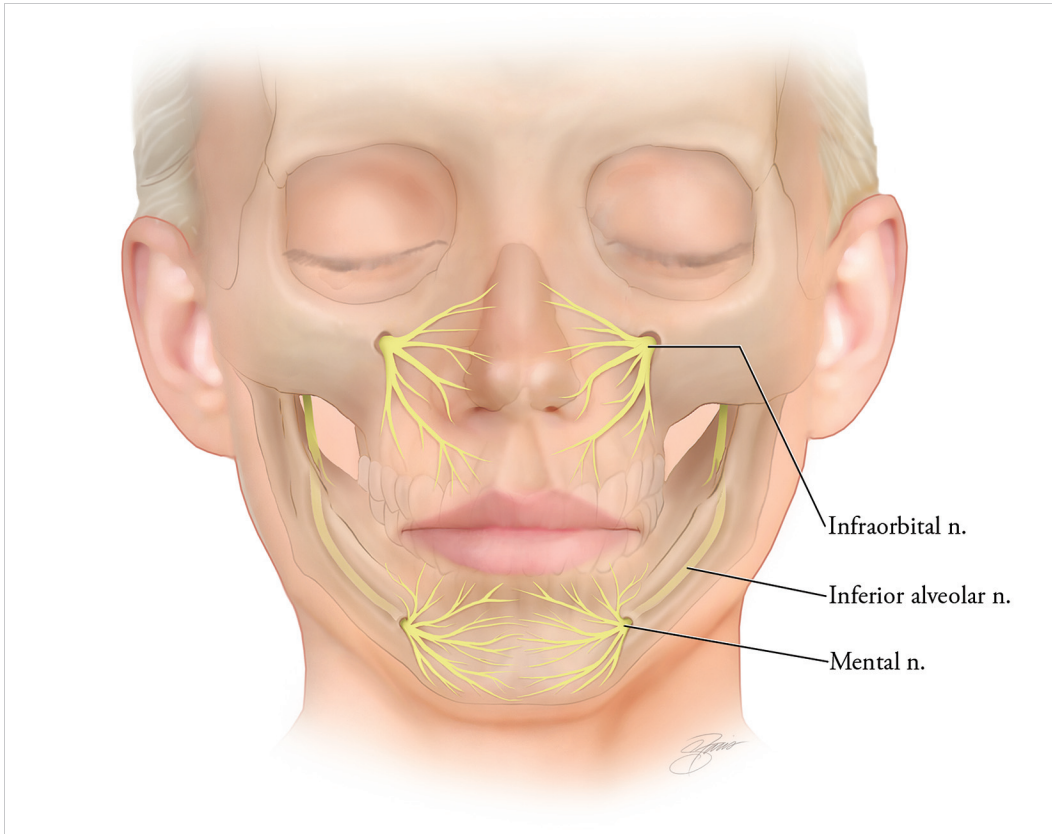


Fig. 35.1 Maxillary (V2) and mandibular (V3) divisions of the trigeminal nerve supply sensation to the middle and lower face.

Additional Reading

- [1] Dillane D, Finucane BT. Local anesthetic systemic toxicity. *Can J Anaesth*. 2010; 57(4):368–380

- [2] Niamtu J , III. Simple technique for lip and nasolabial fold anesthesia for injectable fillers. *Dermatol Surg*. 2005; 31 (10):1330–1332

36

Filler Injection Methods

Linear Threading

Product is injected in a line or “thread” as the needle is moving.

Anterograde Injection

The needle is advanced as product is being injected ahead of the needle. The injector can usually visualize the product tracking in front of the needle. This technique may be used for the vermillion border or the tear trough.

Retrograde Injection

The needle is fully advanced without injection, and injection commences as the needle is withdrawn, filling the tract with product.

Depot

Small aliquots of product are deposited in the desired plane. When depot injections of HA are placed into the dermis in a grid-like pattern, they provide a hydrating, plumping effect in addition to filling in fine lines. This technique has been called “skin boosting.”

Peaking or Deep Depot

The needle is inserted perpendicular to the skin, and product is injected retrograde as the needle is withdrawn. The depot is often placed deep along the periosteum, and tissue is lifted. This is an excellent

technique for lifting the cheek. Generally, there is less swelling, bruising, and risk of surface irregularity.

Serial Puncture

Also called a “string of pearls” injection, multiple closely spaced depot injections are placed in a linear fashion along a wrinkle or fold.

Fanning

From a single entry point, the needle is fanned in multiple directions, and product is placed by retrograde injection. In this technique, it is important to stop injecting as the needle nears the insertion site to prevent buildup of product at the point of entry. In addition, the needle must be almost completely removed from the patient before redirecting to create a new tunnel. Often fanning tracts are overlapped by using several sites of insertion.

Cross-Hatching

Multiple linear threads placed in an X-shaped fashion.

Grid

Linear threads intersecting at right angles.

Ferning

The needle is fully inserted, and injection is performed in a retrograde fashion. The

needle is then directed to each side of the central tract, and product is placed in small quantities, like the branches of a fern. This technique is useful when treating fine lines with filler.

Cannulas

The choice of needles or cannulas for injection of fillers is based on the personal

preference of the injector. Cannula use lessens the chances of intravascular injury and may diminish bruising; however, the trade-off is precise control of the product. We have found that cannulas may be used for large-volume injections of product placed pre-periosteally or subcutaneously, but we prefer needles for fine, controlled injections placed more superficially.

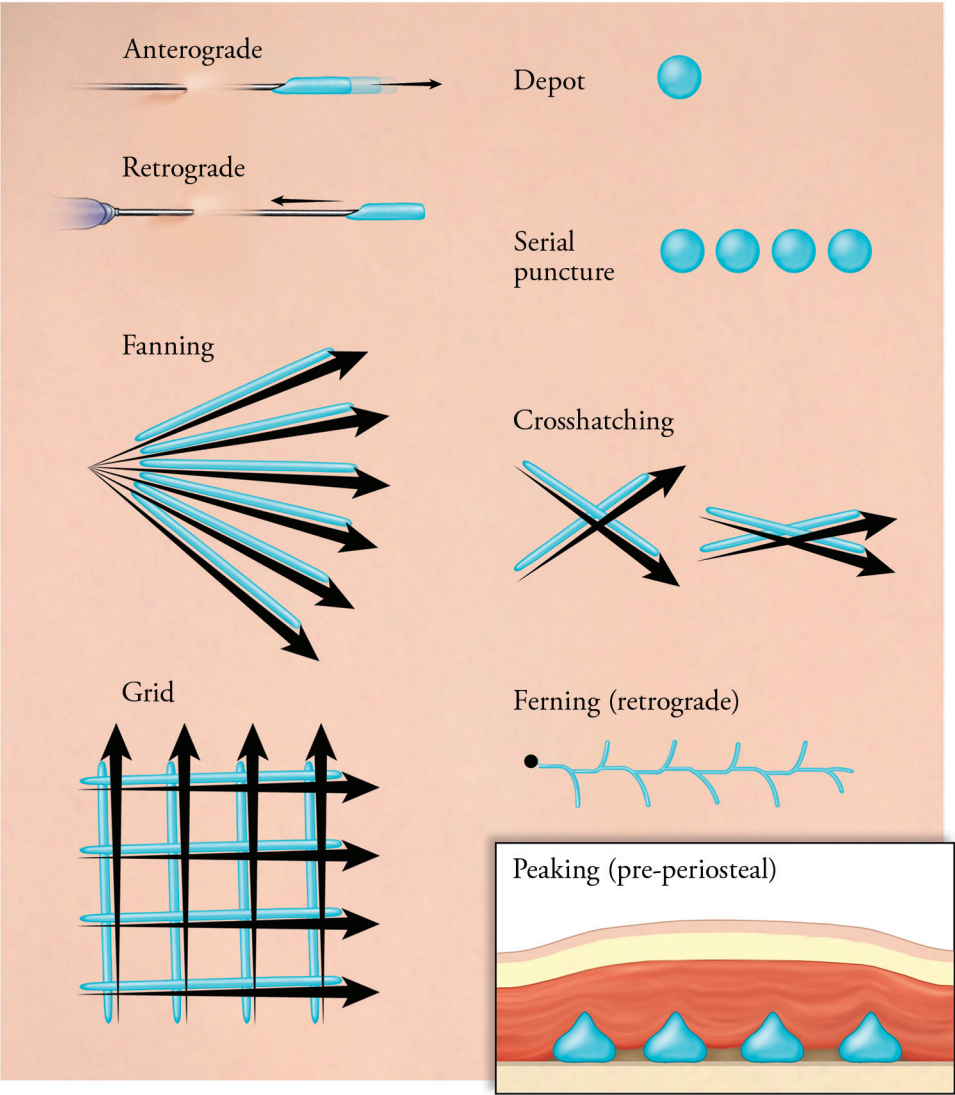


Fig. 36.1 Injection techniques.

37

Choosing the Right Filler

Initial Approach

A combination of different types of fillers is desirable for an active filler practice. With the growing variety of choices available from many different companies, it can often be a bewildering and expensive task to understand, master, stock, and be comfortable recommending all of the products on the market that are perfectly suited to each area in each patient. For high-volume, experienced injectors with patients willing to do multiple syringes, often over multiple sessions, using up to eight different fillers can be appropriate and even common in the course of a busy day. For the inexperienced injector, however, a wholly different approach is needed. ► Table 37.1 can aid in selection of appropriate soft-tissue fillers.

Gel Properties

A provider must have an understanding of the basic concepts of G prime (G'), which is more or less analogous to hardness or firmness when compressed. Products with higher G' also tend to have greater lift capacity, which is useful when trying to elevate thicker skin and deeper rhytids, or to sharply define a lip border. The original Restylane-L and Restylane Lyft-L products tend to have higher G' than Juvéderm Ultra XC and Ultra Plus XC.

Cohesivity is another characteristic of the HA gels that determines flow through the syringe and how the gel performs once injected into the skin. A product with high cohesivity will stretch further and bounce back together before separating. Clinically it

Table 37.1 Soft-Tissue Filler Options.

Product	Uses/comments	Areas to avoid/comments
Restylane-L Juvéderm Ultra /Ultra Plus Vollure Belotero	Good all-around fillers that provide moderate lift	Avoid Juvéderm in the tear trough
Juvéderm Voluma Restylane Lyft	High capacity for lifting, especially in the cheeks	Cleanse the skin well prior to injecting long-lasting products
Volbella Restylane Silk	Lips and fine lines, lip hydration	Post-injection edema can be seen
Refyne Defyne	More elastic and pliable, less likely to form palpable lumps; designed for circumoral region	Will not provide any lift or support
Radiesse	Thickest filler, good for deep folds	Avoid lips, tear trough
Sculptra	Natural full facial volumization	Avoid lips

is described as smoothness and pliability in the skin and somewhat softer and more forgiving.

Hyaluronic acids are very good products to integrate into a new filler practice as they provide immediate gratification and little downtime, and have little to no risk or commitment as they are reversible with hyaluronidases as opposed to some of the collagen-stimulating fillers. The newer types of HAs offer thinner versions and longer-lasting varieties for all types of applications.

Longevity

One determination in choosing a filler that is made in discussion with the patient and often with regard to the cost, has to do with the desired length of time a filler will last. Certainly, longevity will vary depending on location of injection, but a choice can be made between a filler with an FDA indication and clinical experience of approximately 6 months for Restylane Silk in the perioral area and lips versus up to a year in the same area with Volbella XC. Though there can be differences in the degree of initial swelling, which can be overcome, there is a significant price differential in our practice based on the difference in proven longevity.

Consultation

Often during the consultation, patients are not able to adequately choose which product they want or need, and wisely leave the choice to the provider's judgment and experience. The choice will then fall to either staying with the loyalty points products have accumulated, usually at the provider's office, or choosing between a shorter- or longer-lasting option.

The provider then chooses whether the thinner/softer products or the firmer/harder products are more appropriate depending on what is being treated and where. Pricing should be clearly spelled out ahead of time to avoid surprises at the end.

Post-Injection Consult

As some products are more hydrophilic than others and thus swell more, different post-injection instructions will be necessary. Under the eyes, Juvéderm Ultra and Ultra Plus tend to swell more than other products and will require more ice and elevation. Voluma tends to swell slightly less than Restylane Lyft. All swell less than Juvéderm. Restylane Silk and Volbella feel very natural and soft in the lip. Silk, moreso than Volbella, can cause significant swelling in some people.

Stocking the Toolbox

Whether one fills the injection cupboard with two fillers or a dozen, knowing when and where to use them appropriately is the most important factor in achieving good outcomes. Having a versatile filler that can be used for deep and superficial applications as well as one that is either of greater longevity or specific for fine lines would be a good complement to a new filler practice. An example could be Restylane-L and Restylane Silk, or Juvéderm Ultra XC and Volbella. Alternatively, one could use Restylane and Sculptra, or Juvéderm Ultra XC and Voluma as a versatile and long-term pairing. As one's practice and expertise expand, more products can be added to the portfolio to suit the wide variety of patients' needs.

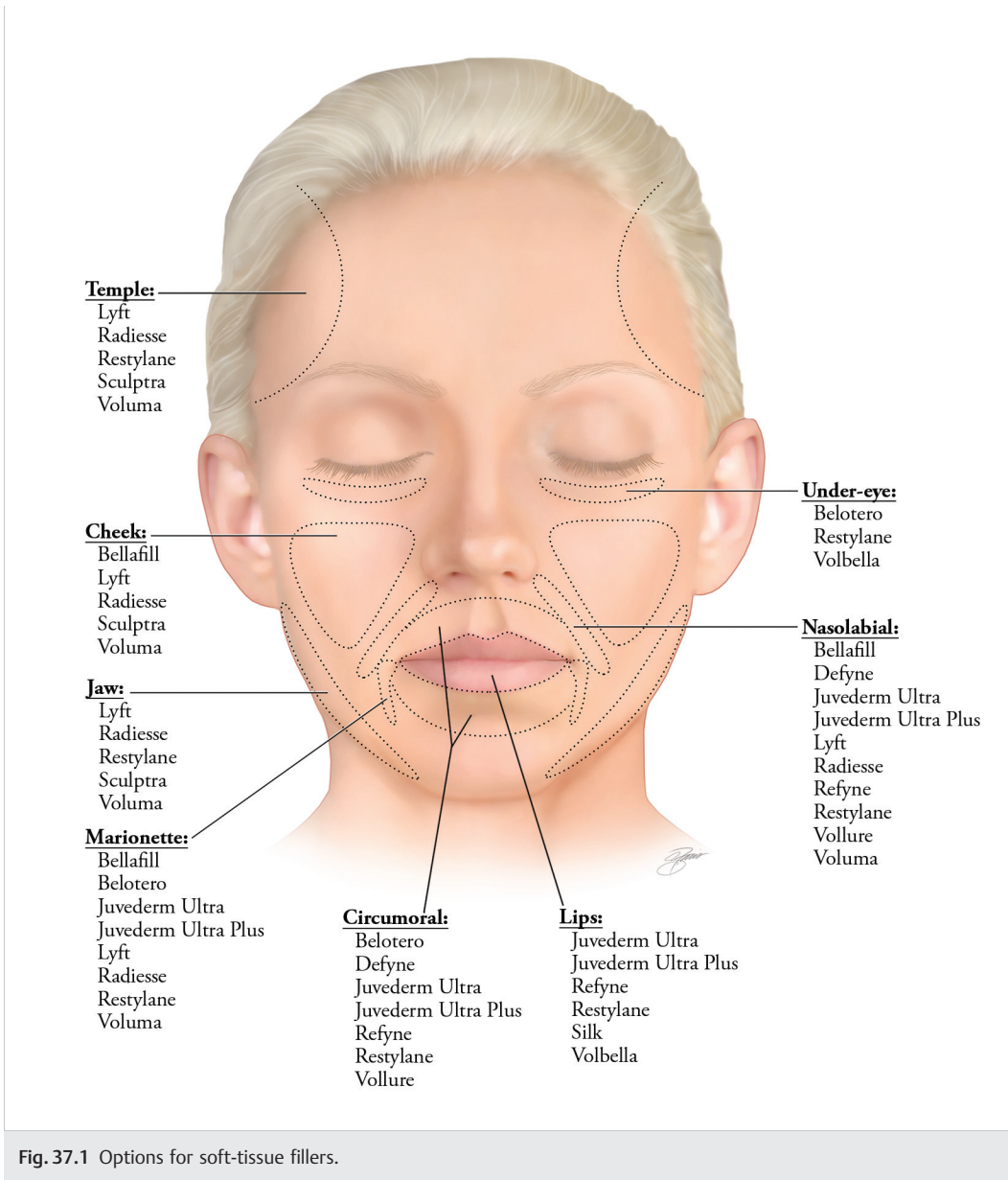


Fig. 37.1 Options for soft-tissue fillers.

