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**FIG 1-1** Facial rejuvenation is a term that encompasses esthetic procedures in plastic surgery, nonsurgical procedures such as dermal abrasion and chemical peeling, and minimally invasive procedures such as neurotoxin and dermal fillers.



**FIG 1-2** The effects of neurotoxin and dermal filler treatments are subtle and appear natural, unlike plastic surgery procedures.

**TABLE 1-1** Facial cosmetic procedure trends in the United States since 2000\*

Procedure	2018	2000	Change
Facelift (rhytidectomy)	121,531	133,856	−9%
Nose reshaping (rhinoplasty)	213,780	389,155	−45%
Eyelid surgery (blepharoplasty)	206,529	327,514	−37%
Botulinum toxin type A <sup>†</sup> injection	7,437,378	786,911	+845%
Soft tissue fillers <sup>‡</sup> injection	2,676,970	778,000 <sup>§</sup>	+244%

\*Data from the American Society of Plastic Surgeons.<sup>1</sup>

<sup>†</sup>Includes Botox (Allergan), Dysport (Galderma), and Xeomin (Merz North America).

<sup>‡</sup>Includes all commercial dermal fillers as well as platelet-rich plasma and acellular dermal matrix.

<sup>§</sup>Number of procedures in 2006, the year data was first reported.

\$327 and \$682 per site for neurotoxin and dermal filler (eg, Juvederm, Allergan) injections, respectively, these treatments are comparable to the cost of tooth whitening or a day at the spa. Compare those numbers to the average cost of a simple rhinoplasty (\$5,350) or dermabrasion (\$1,250).<sup>1</sup> The relative affordability of minimally invasive procedures makes them appealing to people at all income levels, including those who likely would never consider seeking surgical treatment to address their age-related esthetic concerns.

Based on popular stereotypes, many readers might assume that middle-aged women are the ones primarily driving this trend. Not so. The “daddy do-over” has been quietly gaining in popularity for several years, and the average age of patients skews younger all the time as more 20- and 30-somethings seek dermal filler treatment for acne scars, nose recontouring, lip augmentation, and other cosmetic enhancements. In 2018, individuals aged 20–39 made up 18% of all neurotoxin injections and 11% of dermal filler treatments.<sup>1</sup>



**FIG 2-12** (a to c) Ring block method for lower lip. The black circles denote the locations where 0.5 mL lidocaine-epinephrine is injected, and the blue circles denote the locations where 1.0 mL lidocaine-epinephrine is injected.

### Lower lip method

As with the upper lip ring block, the patient should be placed in a 60-degree upright position with the chin tilting upward. The lower lip is lifted to expose the gingivobuccal margin slightly lateral to the mandibular first premolar (Fig 2-12a). This time, the needle is directed toward the mental foramen, parallel to the mandible, and the same precautions against superficial injection should be exercised as in the upper lip area. Compression of the lidocaine solution, this time toward the mental foramen, should be applied after the injection. Next, a second injection is made slightly lateral to the frenulum of the lower lip (Figs 2-12b and 2-12c). The tip of the needle is inserted just beneath the mucosa, and 0.1 mL of the solution is injected, followed by compression of the site once the needle is removed.

The clinician then moves to the opposite side of the patient and repeats the injections for the contralateral side of the lower lip. Additional lidocaine can be applied at the mandibular first premolar if needed.

## CONCLUSION

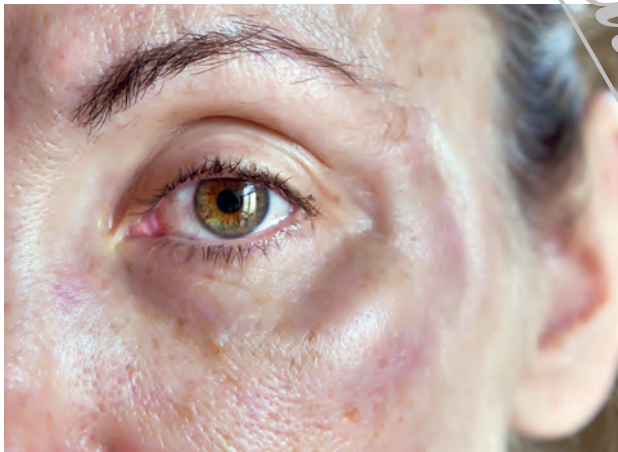
Local anesthesia is a critical component of an esthetic practice just as it is a dental practice. Although they do not receive formal training in esthetic dermal filler treatment in dental school, dentists have extensive experience in pain control and are experts on the musculature and anatomy of the face. Most dentists will find this knowledge invaluable for mastering the various methods of administering anesthesia prior to dermal filler treatment, some of which they perform in their everyday dental practices.

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**FIG 4-2** (a) Allergic edema that developed 1 hour after injection of filler into tear troughs. (b) Clinical appearance after 24 hours.



**FIG 4-3** Hypersensitivity response that developed within 1 hour postinjection.

**TABLE 4-1** Gell and Coombs classification of hypersensitivity reactions

Classification	Mediators	Examples	Onset
Type I	Antibody IgE	Anaphylaxis, angioedema	Immediate
Type II	Antibody IgG and IgM	Neutropenia, hemolytic anemia	Hours to days
Type III	Antibody IgG	Serum sickness	1 to 3 weeks
Type IV	T-cell lymphocytes	Contact dermatitis	Days to weeks

IgE, immunoglobulin E; IgG, immunoglobulin G; IgM, immunoglobulin M.

symptoms can become a medical emergency because of the potential for airway loss. Immediate recognition and attention are critical in such cases.

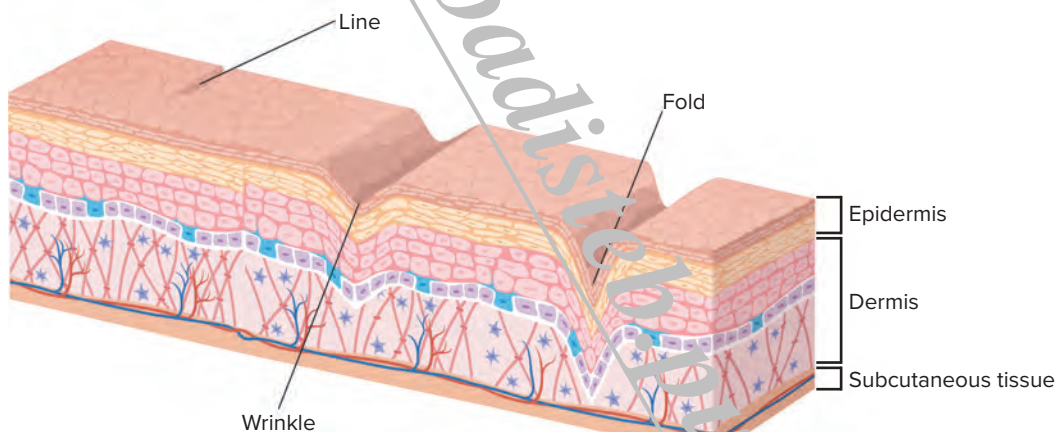
Angioedema is a result of an immunoglobulin E-mediated immune response to the dermal filler or anesthesia used (Table 4-1).<sup>7</sup> It can be severe and can last for

several weeks. However, most cases resolve spontaneously within a few days, and those that do not will usually respond to antihistamines<sup>8</sup> (Fig 4-4). For persistent cases, oral steroids can be prescribed. The patient should be closely monitored to rule out possible infection.





**FIG 5-5** Static wrinkles versus wrinkles in repose. (*a*) Static wrinkles are caused by gravity, the loss of fat and collagen, and the loss of skin elasticity—in other words, the aging process. These types of wrinkles are visible regardless of the muscle action in the face. Dermal fillers are designed to smooth static wrinkles by replacing lost volume in the face and stimulating new collagen production in the body. (*b*) Lines in the forehead, “crow’s feet” around the eyes, and lines or grooves between the eyebrows are types of wrinkles that are visible only during specific facial expressions. These dynamic wrinkles are the result of repetitive movement and generally cannot be smoothed or eliminated with dermal fillers. Instead, botulinum toxin can be used to temporarily paralyze the muscle that animates these types of wrinkles and make them disappear.



**FIG 5-6** Age-related facial changes vary according to the depth of the depression within the mucosa or submucosa of the tissue. The degree of relative change to the skin is described in terms of lines, wrinkles, and folds. A *line* remains completely within the epidermis and does not approach the dermis of the skin. A *wrinkle* proceeds through the epidermis and extends to the dermis of the skin. A *fold* develops when the depression extends through the dermis and approximates the subcutaneous tissues. Factors that can affect the depth of the wrinkle include skin texture, the amount of subcutaneous fat, the water content of the skin, the distribution and ratio of collagen and elastic fibers, and biochemical changes in the connective tissue and interstitial spaces.

options or the targets of treatment. Before beginning the initial esthetic analysis, the clinician should briefly explain the differences between static and dynamic wrinkles (Fig 5-5) and the qualities that distinguish a wrinkle from a fold (Fig 5-6).

During the esthetic analysis, the patient and clinician will sit down together to examine the photographs taken of the patient’s face. The patient is asked to point out any age-related signs that concern them, beginning in the upper third (hairline to eyebrows), then the midface (eyebrows to



To use the SWAT, the clinician shows the reference photos to the patient and asks him or her to select the one that most closely corresponds to their own condition, beginning with nasolabial folds. If the clinician agrees with this assessment, it is noted in the chart. If the clinician disagrees, he or she explains the reasons why, and they move on. The discrepancy is noted in the chart as a potential red flag. The process is repeated for marionette lines

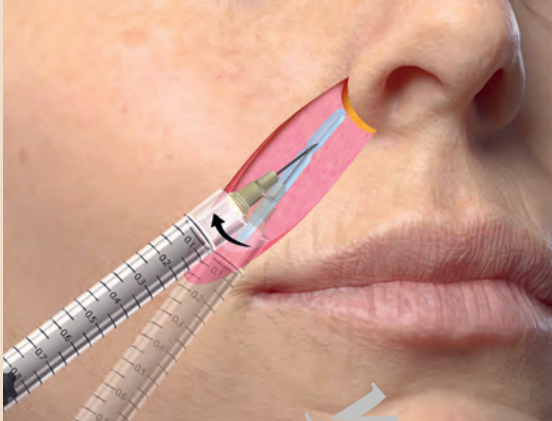
and then for mental crease. While seeking to clinically determine the area and extent of volume loss requiring correction, the clinician should engage in an open dialog with the patient regarding their goals, expectations, and reasons for the cosmetic procedure.

Clinicians with no prior experience in facial augmentation procedures are strongly advised to limit their early practice to treating these three prominent signs of aging,

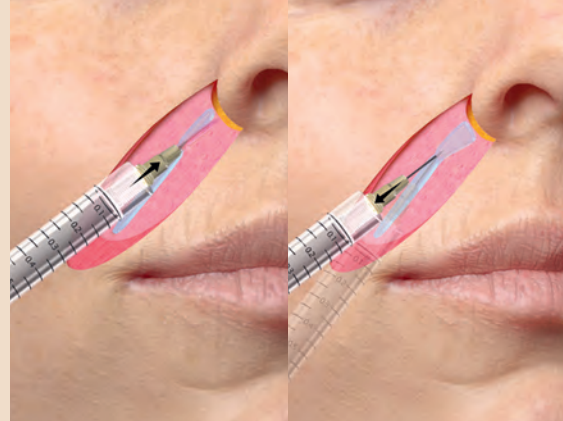


STEP  
8

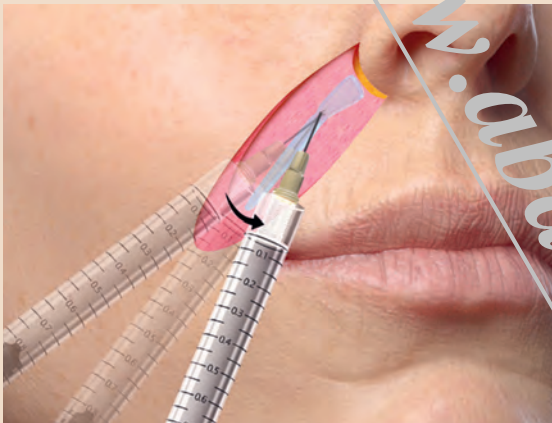
**Make the fanning injections**



- ◆ After the third linear thread injection, redirect the needle inferiorly and medially at a small angle.



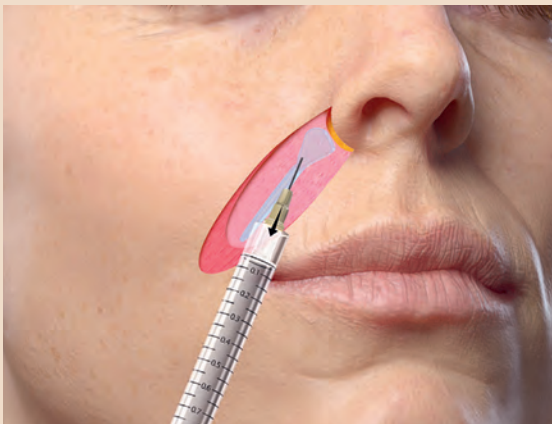
- ◆ Inject dermal filler adjacent to the third linear thread.



- ◆ Without fully removing the needle, redirect it again superiorly and distally at a small angle.



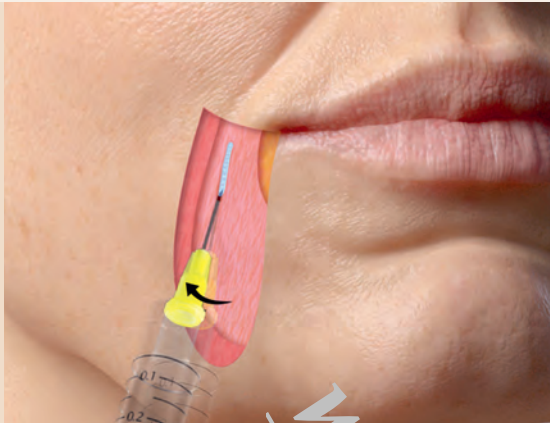
- ◆ Inject dermal filler adjacent to the linear thread.



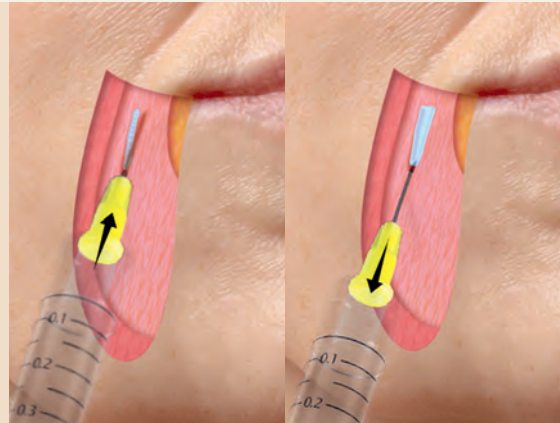
- ◆ Repeat until filler is distributed evenly and the desired correction is achieved.

# STEP 4

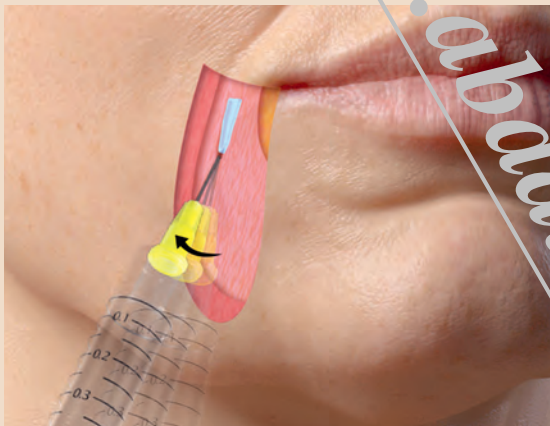
## Apply the fanning technique



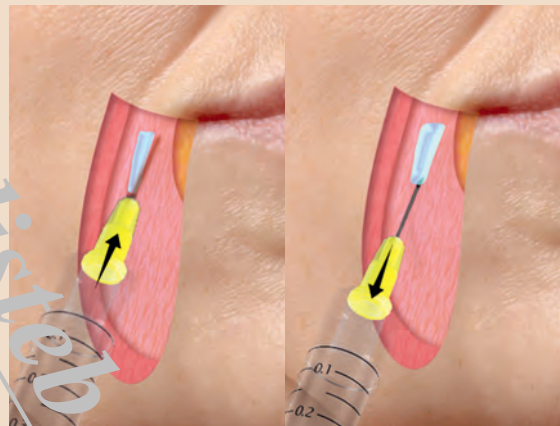
- ◆ Re-angle and redirect the needle medially and advance to the hub.



- ◆ Inject a linear thread in the mid to deep dermis. Continue the fanning injection until the desired correction is achieved.
- ◆ Ensure that the dermal filler placements are contiguous.



- ◆ Re-angle and redirect the needle medially and advance to the hub.



- ◆ Inject a linear thread in the mid to deep dermis. Continue the fanning injection until the desired correction is achieved.
- ◆ Ensure dermal filler placements are contiguous.

# STEP 5

## Locate the second injection site

- ◆ The second injection point is approximately 1 cm inferior to the first injection point.
- ◆ To measure the distance, lay the needle on the skin with the tip on the first injection point.
- ◆ The hub of the needle is the approximate site of the second injection.





**STEP  
1****Administer anesthesia**

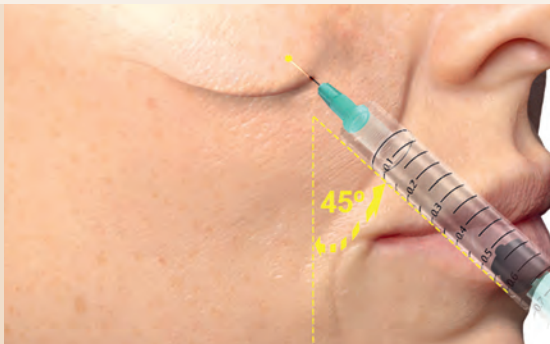
- Use alcohol to clean the skin over and around the malar region.
- Inject 0.1 mL buffered 2% lidocaine-epinephrine solution subcutaneously using a 30-gauge, 0.5-inch needle.
- Allow 10 minutes for the anesthesia to take effect.



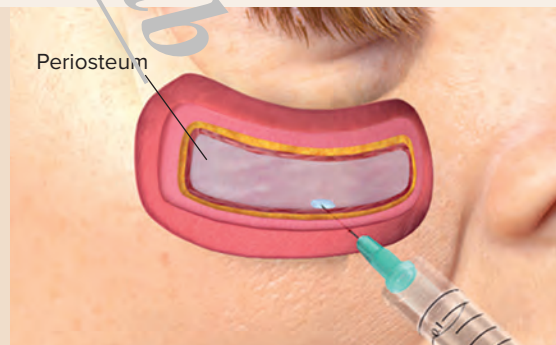
Each dot indicates 0.1 mL anesthesia.

**STEP  
2****Locate the first injection site**

- Use a surgical marker to outline the inferior border of the zygoma bone.
- Find the point where the inferior border of the zygoma bone intersects with the malar groove.

**STEP  
3****Make a depot injection**

- Insert the needle at a 45-degree angle to the skin and advance it until you feel the soft tap of the bone.



- Withdraw the needle 1–2 mm and apply firm pressure on the syringe plunger to inject a bolus of filler.
- Release the plunger pressure before pulling the needle out of the skin to avoid tracking dermal filler in the epidermis.

**STEP  
3**

**Make a linear thread injection**



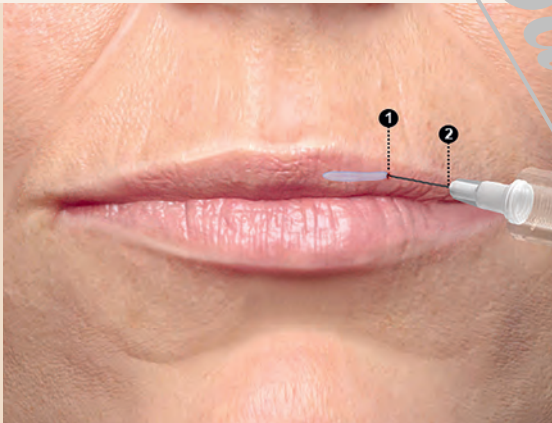
- ◆ Insert the needle into the lip mucosa so that it is parallel to the lip body, directing it medially toward the ipsilateral peak of Cupid's bow, and advance to the hub.



- ◆ Apply firm and constant pressure on the syringe plunger while gradually withdrawing the needle to inject a linear thread of filler into the body of the upper lip.

**STEP  
4**

**Locate the second injection site**



- ◆ The second injection point in the upper body is the needle length lateral to the first injection point.





FIG 10-12 Step-by-step procedure for lip lines (rhytids)

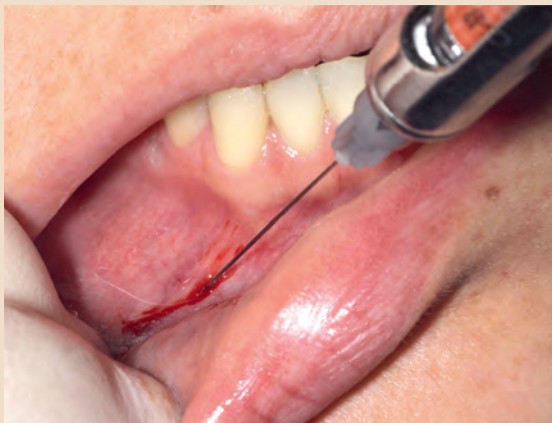


STEP 1

Administer anesthesia via a ring block procedure

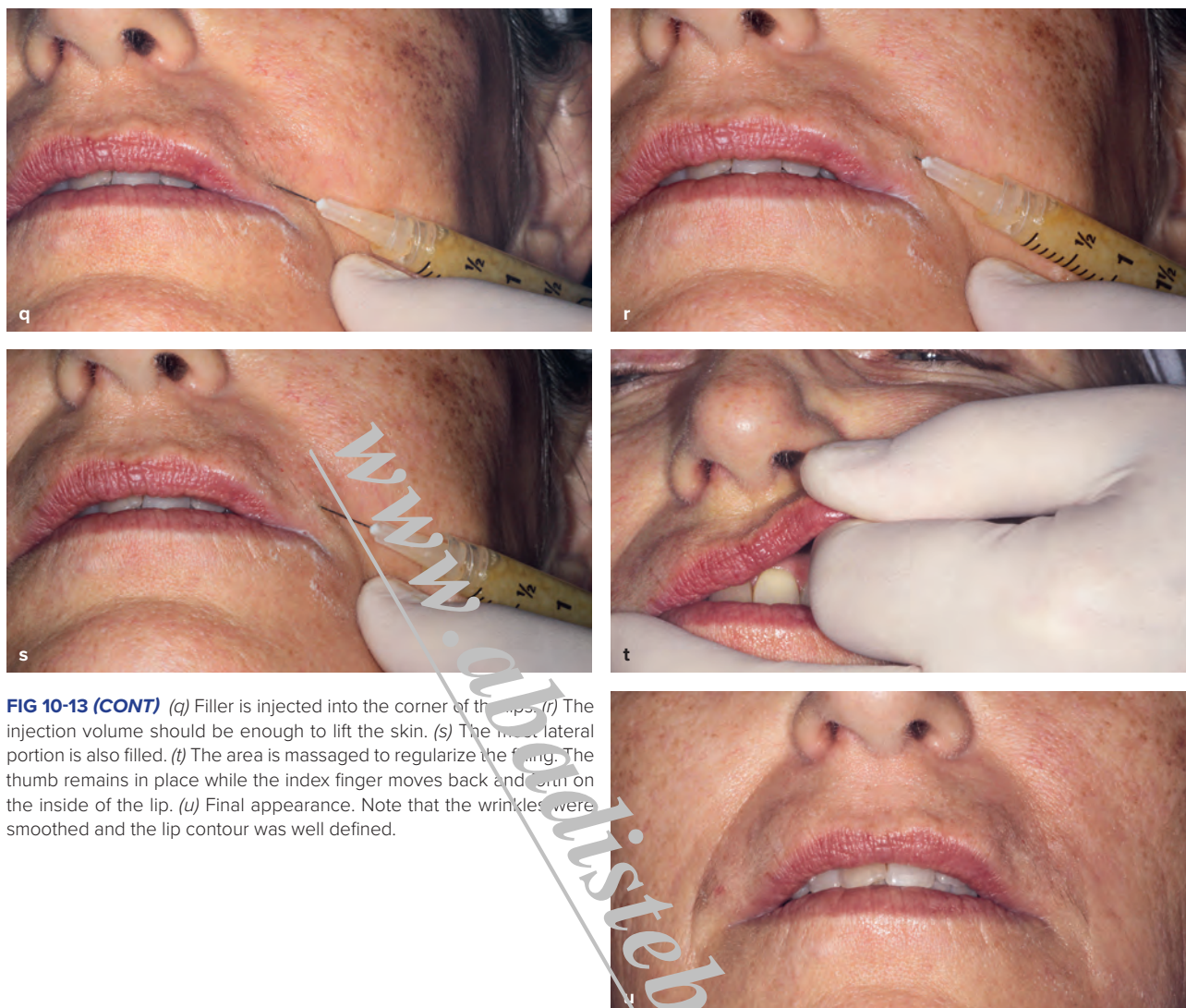


- Infraorbital nerve block for right upper lip anesthesia. The injection is made at the bottom of the lip crease toward the distal of the canine.
- The needle is inserted until it reaches the proximity of the infraorbital foramen. Approximately one quarter of the carpule is injected. The procedure is repeated to block the left side.



- The lower lip is blocked with anesthesia of the mental nerve on both sides.





**FIG 10-13 (CONT)** (q) Filler is injected into the corner of the lips. (r) The injection volume should be enough to lift the skin. (s) The most lateral portion is also filled. (t) The area is massaged to regularize the filling. The thumb remains in place while the index finger moves back and forth on the inside of the lip. (u) Final appearance. Note that the wrinkles were smoothed and the lip contour was well defined.

## TEAR TROUGHS

*Tear troughs* are dark circles below the crease beneath the eye. They often appear as the face ages. This condition can be exacerbated by skeletonization of the infraorbital rim.

### Indications and contraindications

- Dermal fillers can be used to address shadows beneath the eyes as well as to postpone blepharoplasty for patients with mild fat protrusion under the eyes.
- Classically, the tear trough referred to the most medial segment of the under-eye crease; however, with aging, the infraorbital rim becomes more skeletonized, and

filler may be placed at the top of the rim along its entirety.

### Precautions

- Tear trough injections can increase instances of patients becoming faint.
- Tear trough procedures may result in increased bruising if dermal filler is injected superficially or in thin skin. A blue hue known as the *Tyndall effect* also can develop (see chapter 4).
- The periorbital region is surrounded by several major facial vessels. To avoid vascular injury, the use of a microcannula in this region is strongly recommended.