

Social Profilloplasty: A Practical Assessment and Injection Guide

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Facial Plast Surg 2022;38:135–142.

Abstract

The trend of aesthetic medical procedures continues growing every year since decades all over the globe, especially considering minimal invasive treatments since the results are immediate and the downtime minimal. Hence, treatments with hyaluronic acid fillers have become extremely popular and routinely used in common practice. However, numerous areas of treatment were identified and described in the last years clinical training and consciousness of possibly complication remain still under represented. In the following article, we present four key treatment areas for optimal overall facial rejuvenation of what the authors define the social profile. Of each area an assessment, anatomical considerations, danger zones, and the preferred personal technique of the authors are described.

Keywords

- ▶ hyaluronic acid
- ▶ dermal fillers
- ▶ aging
- ▶ aesthetics
- ▶ rejuvenation

Nowadays, aesthetic medical procedures have become of great interest all over the globe. This trend continues growing every year since decades, especially considering minimal invasive treatments since the results are immediate and the downtime minimal. Hence, treatments with hyaluronic acid fillers have become extremely popular and routinely used in common practice. According to The American Society for Aesthetic Plastic Surgery, ~1.3 million dermal fillers have been utilized in 2020 only in the United States.¹

The facial aging process is multifactorial and principally given by tissue atrophy and loss of skin elasticity, causing the comparison of more lines and wrinkles all over the face.² Considering the tissue atrophy reduces volume key in the treatment is the volume replacement, for example, with different types of hyaluronic acid fillers.³ Along the different facial fat compartments described by Rohrich and Pessa, numerous areas of treatment were identified and described

in the last years.^{4–7} Therefore, for an optimal treatment of the facial volume loss, it is necessary to treat multiple areas to restore younger facial appearance without enhancing only one area creating unnatural look.

In the following article, we present four key treatment areas for optimal overall facial rejuvenation of what the authors define the social profile, commonly identified as ¾ profile view (▶ **Fig. 1**). This type of facial visualization shows best the tridimensionality of the face and is therefore taken in consideration for an overall rejuvenation with injectables though our social profilloplasty. Of each area an assessment, anatomical considerations, danger zones, and the preferred personal technique of the authors are described.

Temporal Region

Assessment

The temporal region plays a key role on the aesthetics of the upper face; no matter the gender, it should appear full,

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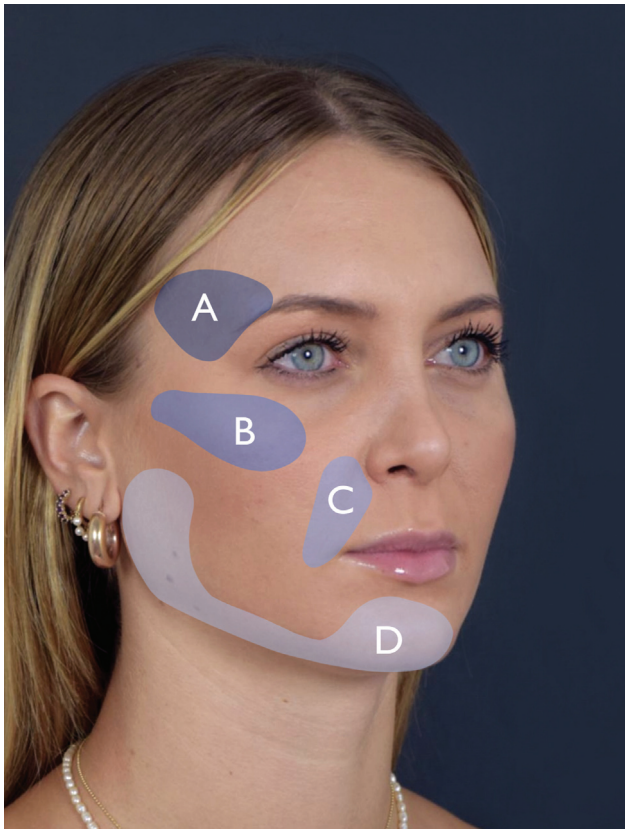


Fig. 1 Social profiloplasty areas: (A) Temporal region, (B) malar region, (C) nasolabial region, and (D) jaw region.

having a slight convex look with no depressions or concavities responsible for an older appearance. Even the eyebrows contribute on the aspect of this region. From an aesthetic point of view, in female patients the eyebrow tail should be at least 6 to 8 mm above the upper bony contour of the orbit, while in men it should not be below. The head of the eyebrow instead should always be at a lower level of the tail in both genders.⁸

In the temporal region, hyaluronic acid fillers represent mostly the second choice since good results especially for the eyebrow can be obtained with botulinum toxin.⁹

Anatomy

Topographically, the temporal region represents the area limited anterosuperiorly by the curved superior temporal line, the periorbital septum and the lateral brow thickening, anteroinferiorly by the frontal process of the zygomatic bone, inferiorly by the zygomatic arch, and posteriorly by the temporal hairline.

The tissue layers, from the more superficial to deeper, are represented by the skin, subcutaneous tissue, superficial temporal fascia, loose areolar tissue and deep fatty layer, superficial layer of the deep temporal fascia, superficial temporal fat pad, deep layer of deep temporal fascia, deep temporal fat pad, temporalis muscle, periosteum, and lastly the bone.¹⁰ Under the skin in the subcutaneous tissue, it is possible to find hair follicles depending on the area; however, no major neurovascular structures are present. The superfi-

cial temporal fascia is the superior extension of the superficial musculoaponeurotic system (SMAS), and, at the level of the temporal crest, continues with the galea. At the level of the superficial temporal fascia, it is possible to identify the superficial temporal artery and the frontal branch of the facial nerve that runs inside or just beneath to the superficial temporal fascia.¹¹ The superficial temporal artery enters into this layer 1 cm anterior and 1 cm superior to the apex of the tragus and exits by this fascia when it crosses the temporal crest to become more superficial to the frontalis muscle before merging with the supraorbital artery. Underneath, it is possible to identify four temporal fat compartments: two superficial, the temporal-cheek, and the lateral orbital fat compartment; this last one is crossed by the frontal branch of the facial nerve; and two deeper compartments, the upper and the lower temporal fat compartments. While the deep temporal fascia represents a direct continuation of the cranial periosteum extended from the temporal crest to the zygomatic arch, within it we can find the middle temporal vessels which, along with the deep temporal artery and vein, supply the temporalis muscle.¹² Above the bone is the temporalis muscle, a large fan-shaped muscle that covers laterally the cranium, it origin from the temporal line and ends, with a large temporalis tendon passing beneath the zygomatic process, on the coronoid process.

Dangerous Zones

The major risk for intravascular injection in the temporal region lies in the intermediate plane; the aim must be avoiding injecting into this plane, placing instead the filler either superficially just below the dermis, or deep on the preperiosteal plane.¹³ Injecting superficially, just under the dermis, permits to avoid the frontal branch of the superficial temporal artery, which lies in this plane. Injecting deep on the preperiosteal plane, staying within one fingerbreadth from the arc, or more than 25 mm above the arch allows avoiding inadvertent cannulation of the middle temporal vein. The frontal branch of the superficial temporal artery and vein must be avoided in the eyebrow region as well; the artery arborizes with the supraorbital vessels at the lateral brow, creating also potential routes for retrograde embolization to the ophthalmic system.¹⁴

Injection Technique

To archive an optimal volume and convexity of the temporal area normally, this region requires ~0.5 to 1 mL of filler per side; however, severe volume loss of the temple region may require multiple session.

For the treatment of this area, we suggest a double approach either with the needle as well as with the cannula. Needle injection (27 gauges, 14 mm length) is used instead for the deep plane where we recommended the use of fillers with higher G' due to the depth and the higher volume effect required. This preperiosteal injection allows further reduction in the temporal depression, reducing the profile of the temporal crest and at the same time helps to slightly elevate the eyebrow's tail.¹⁵ The injection is performed 1 cm superior to the lateral orbital rim and 1 cm lateral to the temporal



Fig. 2 Needle injection performed 1 cm superior to the lateral orbital rim and 1 cm lateral to the temporal crest, right perpendicular to the bone.

crest, right perpendicular to the bone. The needle is inserted perpendicular to the skin until bone contact is established; constant bony contact should be maintained during the procedure; we further suggest stabilizing the syringe with the nondominant hand. The injection has to be performed slowly, avoiding filler's spread, always remembering to suck before injecting minimizing the risk of intravascular injury (► **Fig. 2**).

Afterward with the blunt cannula (25 gauges, 50 mm length), the injections should be placed in the superficial subcutaneous plane, in this case it's preferable use fillers with low G', so that the material isn't going to be visible considering the thin overlying tissue. For the superficial plane treatment, we suggest a single access point above of the zygomatic arch at pretrichial level. The filler is administered via a retrograde fanning technique across the entire area. Tilting the cannula against the skin allows the injector to reach the proper subdermal position, as the sharp contours of the cannula are visible, whereas in an incorrect deep plane the cannula is less appreciable (► **Fig. 3**).

For the brow shaping, we suggest to use a single access point with the needle, inserting it on the lateral end of the eyebrow, just above to the supraorbital rim, always sucking before starting to inject, and injecting very slowly in a preperiosteal plane. Generally, a bolus of 0.3 mL is injected while afterward it is important to massage upward to shape the brow tail. Remember to feel the orbital rim and protect



Fig. 3 Cannula injection performed in the superficial subcutaneous plane with a single access point above of the zygomatic arch at pretrichial level.

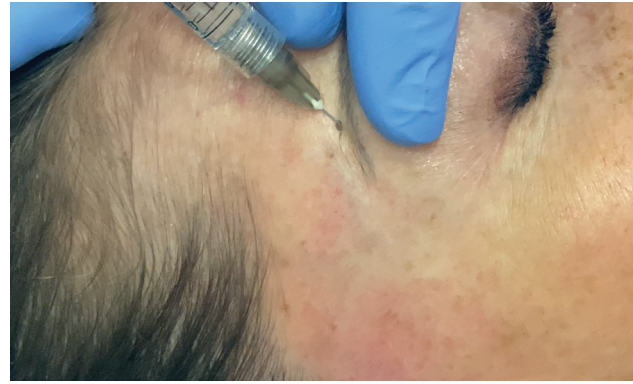


Fig. 4 Needle injection in a preperiosteal plane just above to the supraorbital rim.

it with a finger avoiding migration of the filler to the upper eyelid. We suggest to not to perform an overcorrection of the eyebrow with filler to avoid excessively prominency and possible eyelid edema; if necessary, we suggest to do another session at least 15 days from the first (► **Fig. 4**).¹⁶ In some cases, it is possible to have a postinjection headache and discomfort with mastication, which generally resolves spontaneously within 24 to 48 hours.¹⁷

Malar Region

Assessment

The malar region is responsible for the shape of the lateral segment of the middle third of the face. Ideally it should appear round and full, since a flat hypoplastic malar region makes the face appear dull and contributes to a premature aged look.¹⁸ It is well known that strong cheekbones make the face appear youthful.¹⁹

Anatomy

In this region, five different layers are present: the skin, the subcutaneous fat tissue, the SMAS, the deep fat compartments, and the deep fascia. However, these layers can differ a lot as the skin can be very thin and the subcutaneous tissue almost absent reaching the infraorbital region.²⁰ The subcutaneous fat is represented by seven bilaterally distinct subcutaneous fat compartments that are separated by delicate fibrous septae. The SMAS connects the mimetic muscles in a way that they can act together and represents the cranial prolongation of the platysma it continues in turn superiorly with the temporoparietal fascia. Between the SMAS and the deep fascia is possible to identify the deep fat compartments that include the deep infraorbital fat pad and the medial and lateral suborbicularis fat pad.²¹ The blood supply of this region is principally given by the infraorbital artery, which originates from the infraorbital foramen; this is localized ~6 to 8 mm inferiorly to the arcus marginalis.²²

Dangerous Zone

In this area, the primary danger zone is represented by the infraorbital foramen that should be carefully localized and marked before any treatment. A lateral approach is always

advised when injecting with a needle in the deep plane as the bony hood over the foramen may add protection when using a lateral approach. In addition, particular attention should be paid to not inject too near to the lid–cheek junction because the periorbital area is considered a high-risk area due to multiple communications between the internal and external carotid circulations. The most important complication to be aware of also in this area is embolization of the ophthalmic artery, which can lead also to blindness. Generally, to minimize the risk of intravascular injection, regardless of instrument, filler should only be injected under low pressure, in a discontinuous and retrograde manner.

Technique

For a harmonious result to treat this region, ~0.5 to 1 mL hyaluronic acid fillers are maximal required. Also, for the zygomatic malar region considering the deep injection, plane fillers with a higher G' are preferred.

The first thing to do when treating this region is to identify the maximal projection of the cheekbone. Ideally, this position should be identified 10 mm lateral and 15 mm inferior to the lateral canthus. However, drawing a simple line from the alar base to the tragus and from the mouth angle to the lateral canthus can help identify this area, already elsewhere identified as G Suspension Point (GSP) point.²³ We utilize a needle (27 gauges, 14 mm length) for supraperiosteal injections entering 90 degrees the skin. Inaccurate needle angulation carries high risk of vascular compromise (→ Fig. 5).

Before placing the bolus of filler aspirate for 4 to 6 seconds while stabilizing the needle tip. In addition, slow injection speed and low extrusion force are mandatory. When clinically indicated, place an additional bolus anterior and then posterior to the first point and to add volume the malar eminence. This will also allow a nice and more gentle transition.²⁴

Nasolabial Region

Assessment

The nasolabial region plays a decisive role in the aesthetics of the middle third of the face itself; its characteristics varies



Fig. 5 Needle injection in a supraperiosteal injections in a point of line intersection.

depending on race, gender, age, and weight but usually the nasolabial fold has to be not so marked to have a younger appearance, while a deep nasolabial fold contributes to an older look.²⁵ In young people, this fold is usually observed during smiling, but as we age the nasolabial fold becomes to be deeper, due to tissues ptosis, to the volumetric reduction of the fat compartments and also to regional bony atrophy.

In this region, fillers are generally primarily used. In general, deep nasolabial folds do not disappear after filling but become milder. Therefore, it should always be explained to the patient beforehand that the aim is to soften the groove rather than eliminate it.

Anatomy

The nasolabial fold is a thin and linear depression that extends lateral from the alar cartilage, and descends in a diagonal, to the angle of the mouth. This line does not represent a simple cutaneous fold, but instead a true anatomical border between the cheek and lips; moreover, it represents an anchorage area for the facial expressions muscles that connects to the dermis, resulting in a change of subcutaneous architecture where no clear distinction between muscle fibers, fat, connective tissue, and skin can be seen.²⁶

At the nasolabial sulcus level, beneath the skin, it is possible to identify two distinct fat compartments, which belong to the six fat compartments that characterize the mid-face, the superficial nasolabial, and the deep medial cheek fat compartment. The first one is placed medially to the nasolabial fold and laterally to the mid-cheek groove, and his upper boundary forms the lower edge of the tear trough, while the medial border forms the lateral line of the nasolabial fold. Instead, the deep medial cheek fat compartment is located below and medial to the suborbicularis oculi fat pad and below the mid-cheek groove.⁴ Under the fat compartments, we find a muscular layer; at the nasolabial sulcus, it is possible to identify the malar levator muscle, a tubular muscle placed between the orbicularis oculi muscle and levator labii superioris alaeque nasi muscle.²⁷ The vascularization is provided by the facial artery and its branches: the inferior and superior labial, inferior alar, lateral nasal, and angular arteries. The venous drainage is provided by the facial vein and its tributaries. The nasolabial area has both sensory, provided by the infraorbital nerve, and motor innervation, supplied by the buccal branch of the facial nerve.²⁸

Dangerous Zone

The major risk in the nasolabial region is represented by the injection into the nasolabial artery; which is closely associated with the location of the nasolabial fold. The nasolabial fold is the second most common injection site for tissue necrosis and the third most common site leading to visual loss. To prevent this complication, it is very important to know the depth and course of the artery. The artery travels medial almost parallel to the nasolabial fold. In the lower two-thirds, it tends to be in a deeper plane below the muscle or in the deeper plane above the muscle, while in the upper



Fig. 6 Cannula injection, to treat the inferior and middle third of nasolabial fold, entering at the modiolus; the injection has to be placed at a superficial plane direct under the skin.

third it tends to become more superficial, near the alar base.²⁹ It is important to consider that in a fuller face, the facial artery is more lateral in the upper third of the nasolabial fold and in a face with more periapical hypoplasia, the facial artery is more medial. In consideration of the facial artery that generally travels medial to the nasolabial fold, the key in augmenting the nasolabial fold is to stay slightly lateral to the fold to prevent vascular complication.³⁰

Technique

To archive a harmonious transition between the cheek and lips, not a deep marked nasolabial fold ~1 to 1.5 mL filler per side is required. It is preferable to use a high or medium G' type of hyaluronic acid; however, patient's evaluation is mandatory.

We suggest to use a blunt cannula (25 gauges, 50 mm length) to treat the inferior and middle third of nasolabial fold entering at the modiolus³¹; here, the injection has to be placed at a superficial plane direct under the skin. It is possible to use two different techniques to inject: the linear threading or fanning technique (► Fig. 6).



Fig. 7 Needle injection, to treat the upper third of nasolabial fold; the injection has to be placed deep to the bone because here the vascular component is superficial.

While we recommend to use needles only for the upper portion (27 gauges, 14 mm length), in particular the pyriform fossa filling deep to the bone because here the vascular component is superficial.³² If larger quantities of filler are required, it is advisable to perform the injections in different times to avoid hypercorrections and above all deformities visible during facial expressions (► Fig. 7).

Jaw Region

Assessment

A well-defined jawline starts from the angle of the jaw and ends at the chin, giving a perception of beauty and youth; while the presence of breaks, for example, at the level of the labiomandibular sulcus gives an aging and unattractive aspect.³³ Moreover, the jawline can define and enhance the feminine and masculine characteristics; in a female a softer jaw angle with a more oval shape is preferred, while in a male, it should ideally be square with a pronounced jaw angle.³⁴ Also, the chin plays a role in the jawline and should ideally be sharp, round, and delicate in a female and larger and stronger in male patients. Furthermore, treating the jawline can produce a lifting effect also of the neck.

To correct and define the jawline, hyaluronic acid fillers are primarily used; however, in the chin area combination therapies with botulinum toxin can give also better results.

Anatomy

Anatomically speaking, the chin and jaw line have to be considered as two separate entities, even though these form a closely associated aesthetic unit. The jawline represents the area from the menton (most protruding part of the chin) and the gonion (the angle of the mandible). In this region, we can also identify four different fat compartments: the superior and inferior mandibular fat compartments are over the inferior mandibular border, the submandibular fat compartment, and the last that covers the parotid-masseteric fascia.⁷ The superior and inferior superficial jowl compartments are divided from the more caudal submandibular fat compartment by the platysma mandibular ligament (PML). Cranially to the PML, we can find another important ligament: the mandibular osseocutaneous ligament, which has a role in the aging processes since it contributes to the tissue's stability of the mandibular region. Regarding the muscles in this region, the platysma is situated superficially, while deeper there is the masseter, this last one has anatomical relationship with the buccinator anteriorly and with the parotid gland posteriorly from which departs the Stenson's duct that crosses both the masseter and the buccinator ending in the oral cavity.³⁵ The facial artery, with its vein, lies deep to the platysma, and represents the most important vascular anatomical structure of the jawline region; the anterior boundary of the masseter is a good reference point to identify it, normally to 1 cm anteriorly from it. However, variations in this artery are not so rare, therefore relevant for injections.

In the chin region, following layers are present: the skin, superficial fat compartment, muscles, deep fat compartment, and bone. The skin is thicker and richer in sebaceous

glands when compared with the jawline skin. In this area, we find only one fat compartment that is delimited by the mentolabial groove superiorly, the submental ligaments inferiorly and the labiomandibular grooves laterally; while the muscular component is represented by the orbicularis oris, the depressor labii inferior, the depressor anguli oris, and the mentalis. The mental and submental arteries, which are branches of the inferior alveolar artery and facial artery, respectively, supply the chin.³⁶

Dangerous Zone

The primary danger zone is at the level of the mandible body at a deep plane; generally, 0.3 to 1 cm anterior to the border of the masseter muscle is possible to identify the facial artery and vein, which can also be palpated. To avoid complication, also here, we suggest using a cannula and to remain in a subcutaneous plane avoiding so to go to deep.³⁷ Instead, at the level of the chin we can find the submental artery. This artery originates from the facial artery and can anastomose with the arteria mentalis. Therefore, chin augmentation warrants a deep injection in the midline to avoid the paramedian-located branches of the mental and submental arteries.

Technique

When aiming to define the jawline starting from the chin until the mandible angle, the necessary quantity of hyaluronic acid filler can vary strongly from patient to patient, therefore, starting from 0.5 to 1.5 mL can be utilized per side.

To treat this area, there are different approaches that can be combined with each other using either a needle or/and a blunt cannula. In our experience, to treat the mandible angle, the prejowl area and the chin hyaluronic acid fillers with a high G' give the best results also considering a good resistance to deformation without compromising the volume effect.³⁸ Usually primarily a supraperiosteal bolus of filler is placed with a needle direct over mandibular angle with an injection angle of 90 degrees (► Fig. 8). Here, we prefer to use a needle (27 gauges, 14 mm length) because we want to place a deep bolus and with a needle it's much easier. In female patient caution should be placed to not exaggerate with



Fig. 8 Needle injection in a supraperiosteal plane at the level of mandibular angle with an injection angle of 90 degrees.



Fig. 9 Cannula injection, at the same access level, in a subcutaneous place, to create a smooth mandibular border and to lift and pull the jowl.

this bolus since this tends to masculinize the face. If a greater lifting effect is required, at the same access level, an injection of filler with a blunt cannula (25 G cannula, 50 mm in length) allows to better definite the jaw. In this case, small aliquots are injected with a retrograde and fanning technique in the subcutaneous plane to create a smooth mandibular border and to lift and pull the jowl (► Fig. 9). Furthermore, the cannula offers the advantage of its length and since the area is wide we require a single-access point.³⁹ Considering the prejowl area, it is very important to fill the depressed area; this area has a triangular form and extends from the mental foramen to the midlateral zone of the mandible. Also, here the blunt-tip cannula is suggested, once again with a retrograde fanning technique. In this area, the cannula is very important considering the presence of the mental artery and vein (► Fig. 10).

Regarding the chin if the only objective is to improve the projection, the filler should be placed mainly in the anterior portion, for more length otherwise in the pogonion, in both cases, the product is placed deep supraperiosteal. In most cases, a single injection point with the needle (27 gauges, 14 mm length) is used direct at the level of the midline of the chin; however, from this point two more lateral bolus at the same depth can be placed. In all cases, we suggest using two



Fig. 10 Cannula injection, with a single access point, allows to fill the triangular depressed area extend from the mental foramen to the midlateral zone of the mandible.

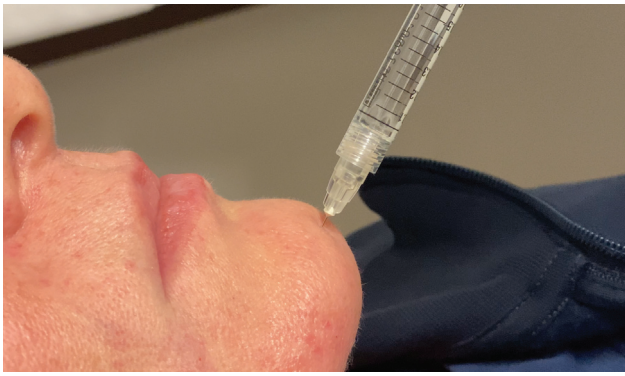


Fig. 11 Needle supraperiosteal injection at the level of the midline of the chin.

fingers to pinch the treated area to avoid not desired displacement of the filler (► **Fig. 11**).

In some cases with very intensive mentalis muscular activity, we suggest to utilize botulinum toxin at least 2 weeks before using hyaluronic acid filler to relax the muscle and avoid displacement of the filler. Lastly, for obtaining a good projection of the chin, it is also important to consider the lower perioral area for the presence of a pronounced labiomental sulcus or marionette lines.

Funding

None.

Conflict of Interest

None declared.

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