



Remodeling of the middle third of the face with fillers

Remodelamento do terço médio da face com preenchedores

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■ ABSTRACT

Facial aging is a consequence of multiple intrinsic and extrinsic interactive factors, leading to loss of volume and repositioning of facial fat and bone remodeling. Breakthroughs have been seen in recent decades in the ability to reduce the signs of aging. Filling techniques and numerous products available on the market have generated new interest in the study of facial anatomy. Fillers are able to restore volume in limited areas and are suitable for treating facial wrinkles and loss of subcutaneous volume. The gold standard remains hyaluronic acid because it is more biocompatible and has greater permanence in the skin, without being definitive. The objective of this report is to review the anatomy of the middle third of the face and the main indications for filling and the techniques used for rejuvenation.

Keywords: Hyaluronic acid; Rejuvenation; Face; Skin aging.

■ RESUMO

O envelhecimento facial é consequência de múltiplos fatores intrínsecos e extrínsecos que interagem entre si, levando à perda de volume e reposicionamento da gordura facial, assim como o remodelamento ósseo. Nas últimas décadas, houve um grande avanço na Medicina em reduzir os sinais do envelhecimento. As técnicas de preenchimento e os inúmeros produtos disponíveis no mercado trouxeram novo interesse no estudo da anatomia da face. Os preenchedores têm como função restaurar o volume de áreas restritas, portanto, são adequados para tratar rugas faciais e perda de volume subcutâneo. O padrão ouro atualmente é o ácido hialurônico, por ser mais biocompatível e ter uma permanência maior na pele, sem ser definitivo. O objetivo desse artigo é revisar a anatomia do terço médio da face, assim como as principais indicações de preenchimento e técnicas utilizadas para o rejuvenescimento.

Descritores: Ácido hialurônico; Rejuvenescimento; Face; Envelhecimento da pele.

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INTRODUCTION

Human identity is determined primarily by facial structure, appearance, and expressions. Changes that occur over time cause the facial contour and volume to be lost. These changes can occur in the upper, middle, and lower regions of the face; however, they are visually perceived more easily in the middle third—this area has more fat, and sagging skin and the action of gravity cause it to lose support.

Filling techniques in the middle third aim to correct this loss of volume: when used naturally, these techniques can reverse characteristic signs of aging and restore balance and harmony to facial features.

ANATOMY OF THE MIDDLE THIRD OF THE FACE

The middle third of the face lies between the supraorbital margin and the base of the nose¹. It contains two of the three main areas of concentration of facial volume and mass: the nose and the zygomatic-malar projection, leaving the mandibular line in the lower third^{1,2}. The eyes and much of the periorbital region, which are of great importance when we look at another individual, also belong to the middle third³.

These tissue volume concentrations lie on the skull, and determine the lateral and anterior projections of the middle third of the face^{3,4}. The lateral projections essentially determine the greater width of the face. This width should be in harmony with the upper and lower thirds when we analyze the face from a frontal view. The anterior projection may present constitutive or acquired deficits, with mouth breathing and aging being good examples of the two conditions. This is best observed in an oblique view of the face.

The area from the eyes to the lower limit of the middle third varies for fat; however, it usually presents a rounded malar projection in the zygomatic-maxillary region. From the rostral side, the malar fatty pad is triangular, with the apex facing the zygomatic eminence and base along the nasolabial groove, where the dermis is adherent to the superficial subcutaneous fascia⁴.

In the continuation of the lower eyelid with the malar region over the infraorbital margin, there is an abrupt transition between thin palpebral skin without subcutaneous tissue and the cephalic limit of the malar pad. Medially, from the inner corner of the eye, this transition coincides with the transition from the palpebral to the orbital portion of the orbicularis oculi muscle. At this location, which extends inferolaterally for about 2 to 3 cm, and ends about 4 mm below the orbital margin, there is virtually no subcutaneous tissue and no plane below the muscle owing to firm adhesion

to the periosteum. The formation of the tear trough arises from this anatomical feature⁴.

From this point, the transition between the two portions of the orbicularis oculi muscle will be 4–6 mm below the bottom edge of the orbit, connecting the muscle to the periosteum by ligaments, and defining the orbitomalar septum. Therefore, at this point, there is weaker adhesion and a plane of dissection below the muscle. This connection will accompany the orbital margin toward the outer corner, overtaking it, and will determine the so-called eyelid-malar junction⁵.

The orbitomalar septum is important in sustaining the infraorbital structures, besides dividing the lymphatic drainage of the eyelid from the malar region. Its lateral projection, beyond the outer corner, delineates an elliptical portion of fat, which may become more evident in some individuals, presumably by lymphatic stasis. This “malar pad” can atrophy with time, resulting in localized sagging called *festoons*.

In the young face, the cephalic margin of the malar fat pad is covered by the caudal portion of the orbicularis oculi, reaching the orbitomalar septum, which separates it from the suborbicular ocular fat (SOOF). The malar pad and the SOOF combine and shape the transition from the lower eyelid to the malar area.

Caudally, the malar fat pad is held in place by multiple fibroelastic fascial septa, which connect the fascia immediately above the facial muscles to the dermis. The superficial musculoaponeurotic system will support the malar skin preferentially over the levator muscles.

The nose, the second point of volume concentration of the face, is a structure of skin, cartilage and bone, supported by connective tissue and ligaments that unite them. Its skin is thicker and more adhesive in the lower third, and thinner and mobile in the upper two thirds⁵.

The plane of the nasal dorsum determines an angle with the frontal region. This establishes the origin of the nose, called the nasofrontal angle, and gives the impression of a longer or shorter nose, depending on how it is defined. The nasal dorsum begins on the nasal bones, continuing with the lateral nasal processes on the side of the septal cartilage, which articulate medially with the nasal septum, and caudally with the alar cartilages⁵. The shape of the nasal dorsum can be determined by two slightly curved and divergent lines, which connect to each side, with the location being the maximum projection of the nasal tip to the medial portions of the eyebrows.

The nasal tip can begin with a gentle anterior (“supratip break”) curvature, and its contour, position, and projection are determined by the positioning of the alar cartilages, the nasal septum, and the type of

skin that covers it. When well defined, it has a point of maximum projection toward each side, which is not observed in bulbous tips. The width of the nasal base, determined by the distance between the alar bases, should coincide with the distance between the inner corners of the eyes.

In profile, we can perceive imperfections in the nasal dorsum and analyze the angle between the nasal tip and upper lip, specifically between the nasal columella and the lip. The nasolabial angle in women should vary between 95° and 105°, and between 90° and 95° in men.

INDICATIONS

Indications for filling of the middle third have increased considerably in the last decade. These were prompted by the development of long-lasting resorbable substances and by the perception that established deformities were not required for their indication. Admittedly, interventions prior to the onset of the dreaded stigmas have led to better aging^{6,7}.

Any intervention in the middle third, regardless of deformity, must begin with the assessment of the malar region. If the palpebromalar groove is pronounced or the nasolabial fold is deep, the patient must be considered for malar filling. After malar treatment, the reassessment of initially apparent deformities will show a decrease in severity or complete resolution⁸.

In the transition from the periorbital region to the malar region, the objective is to create a continuous contour from the lower eyelid to the malar region. The separation of these regions by a concavity and the exposure of the lower margin of the orbit are the areas to be addressed. Patients with deepening of the palpebromalar region are candidates for malar filling, with eventual consolidation directly under the groove. Those with a lacrimal groove are candidates for direct intervention below the deformity.

The malar region is the cornerstone of all volumetric repositioning of the middle third of the face^{8,9}. Patients with a thin and elongated face with little sagging are the most easily identified candidates for this treatment. The greater the sagging, the more complex the treatment and the greater quantity of product will be required. Very thin faces should be evaluated for volume in the submalar region.

Oval or rounded faces may be candidates for filling of the medial portions of the malar region, but never of the zygomatic projections, which would further widen the middle third. Severe lack of bone volume in the middle third may make it impossible to treat with fillers alone, and evaluation for surgical advancement should be considered. Square faces may allow some

volume over the zygomatic projections to highlight this region from the rest of the face; this is the most commonly used option in women.

The direct approach to the nasolabial sulcus has been losing ground as an option, since this often resolves after malar treatment^{9,10}. However, the remaining sulcus or skin print should be treated directly with dermal fillers.

The use of fillers in the nasal region is quite varied. In noses without previous surgical treatment, fillers can be used in the dorsum for the definition of a new higher nasal origin, a smooth and discrete nasal dorsal hump, or a very marked supratip break. Attention should be given to nasal deviations, as smoother ones can benefit from filling.

Fillers can be used to define the nasal tip or project it, increasing the nasolabial angle. Patients with bulbous tips and thick skin are not candidates for the procedure, unlike those with sharply falling tips. Broad nasal bases can be narrowed by application of fillers to the canine fossa.

TECHNIQUE

The filling of the middle third of the face should always begin with the malar region¹¹. The lower margin of the orbit should be marked as the upper limit, the transition from the malar region to the nose as the medial border, and the zygomatic projection as the lateral border. For those less familiar with the procedure, a triangle in which the base is the lower margin of the orbit and its vertex is formed by the meeting of the other two sides may be the initial marking. For experienced surgeons, respecting these limits and directly marking the area to be filled is also an option, as is assessing the need for volume in the zygomatic and submalar regions.

Anesthesia is optional, and an infraorbital nerve block or topical anesthesia can be performed. The filler can be applied with a needle or cannula; if the latter is an option, a cutaneous lidocaine button with vasoconstrictor is recommended at the site of the inlet. The entry point should allow as much access as possible to the demarcated area without withdrawing the needle, reducing the number of new punctures; in the case of the cannula, the entire application should be carried out without the need for another inlet. In the case of hyaluronic acid fillers, these can be placed in the superficial or deep subcutaneous plane.

The filling should start with the central malar region, with placement of 0.3 to 0.5 ml, spread in the shape of a fan. Retrograde injection is a good alternative. Hyaluronic acid must have a high lifting capacity and must be immediately molded with massage, thereby allowing for evaluation of the need for greater volume.

Having reached the appropriate volume for the malar region, the reevaluation of the zygomatic, submalar, periorbital, and nasolabial fold regions is performed. Proximal involvement with the infraorbital foramen should be avoided.

The orbitomalar groove can be approached directly with subcutaneous injection. The plane here is restricted and the skin thin, which is an indication for hyaluronic acid fillers with little cross-linking and small volumes, ranging from 0.1 to 0.4 ml.

The lacrimal sulcus is more difficult to correct; there is no dissection plane below the skin or muscle, and there is complete absence of subcutaneous tissue¹¹. Thus, the filler is supraperiosteal in this region, and even more restricted injected volumes should be used to avoid visualization (0.1 to 0.4 ml).

Both the orbitomalar and lacrimal sulcus should always be undercorrected. Treatment in two sessions will minimize the possibility of local complications. Topical anesthesia, prepared as filler combined with lidocaine, may avoid blockade in both cases.

The nasolabial sulcus can be treated only with a hyaluronic acid filler combined with lidocaine, and the choice of product depends on the residual deformity¹². Skin imprints should be treated with more malleable products, using superficial dermal fillers. Deeper grooves require products with higher lifting capacity and should be applied more deeply into the dermis. The application is performed towards the groove, with the needle parallel to the skin and with retrograde injections.

For the treatment of the nose, we do not recommend any filler other than hyaluronic acid due to the possibility of local complications¹². For the less experienced, less cross-linked fillers should be used, providing greater tissue accommodation. Because of its high sensitivity in other regions of the face, anesthetic blockade with lidocaine is recommended.

The opening of the nasolabial angle can be achieved by filling next to the nasal spine, which will expand the distal portion of the septum. In some cases, filling near the distal portion of the medial branches of the ala may aid in the projection of the tip^{12,13}.

For definition of the nasal tip with increased projection, one must establish whether the patient needs an increase in the dome or if its deficiency is located more inferiorly, next to the cranial portions of the medial branches of the ala. The former should be done with direct injection into the dome, with the needle entering discretely posterior and between the alar cartilages.

The latter is performed with the needle entering between the cranial portions of the medial branches of the ala. The nasal tip should always be secured by the

free hand of the injector in order to direct the product. The application is performed in the subdermal plane and the injected volumes should always be low - 0.1 to 0.3 ml. Excessive volumes can deform the nasal tip.

Filling the upper portions of the tip or distal end of the nasal dorsum should preserve the *supratip break*. *The placing of volume in this region can promote a drop of the nasal tip.*

When the nasal tip is well defined, however, the dorsum is low and the nasofrontal angle is very open; nasal filling is initiated at the nasal origin in order to reduce this angle. Afterwards, the dorsum is filled until it promotes a line slightly posterior to that established by the connection of the tip to the nasofrontal angle. The injections should be performed by means of retrograde technique and any irregularity should be treated with massage. When the nasal tip is not defined, it is necessary to proceed with its treatment, with later observation of the dorsum and the nasal origin.

The presence of a bony or osteocartilaginous hump, the result of surgical treatment, may be disguised with fillers placed proximally and distally. The greater projection of the hump should be carefully evaluated, as its height will determine the new height of the nasal dorsum, which may result in an improper nose.

COMPLICATIONS

In the periorbital region, the most frequent complications are ecchymosis and hematoma. The most feared complications are the accumulation of product and persistent edema. Nodules can be avoided with the use of low viscosity products, with application in an adequate plane and small volumes, always followed by massage. If a change persists, the injection of hyaluronidase into the nodule is an alternative.

In the case of persistent post-filled eyelid edema, there is much speculation about its etiology. It may represent the association between lymphatic drainage in this region and the "barrier" effect caused by filling with hydrophilic hyaluronic acid. This can be avoided with the use of small volumes, treatments in more than one session and use of less hydrophilic products. When placed, lymphatic drainage may be an alternative, but hyaluronidase seems to be the only method capable of resolving persistent cases^{11,12}.

Complications from filling the malar region are less frequent, possibly due to the deeper location of the products. Hematoma is possible, but infrequent. Nodules or foreign body reactions are more frequent with nonabsorbable products, and may present a broad spectrum of complications¹³.

In the nasolabial groove, post-application "strings" can be avoided with proper technique (application plane,

product choice, and quantity), followed by massage. Patients treated with hyaluronic acid should receive the exact amount needed to resolve the deformity without overcorrection. One must be sure that the patient leaves the clinic without any irregularity. Skin necrosis caused by compression of the dermal vessels may occur, but it is very rare.

In the nasal region, the most serious complication is necrosis. As the nose allows limited volume accommodation because of sparse subcutaneous tissue, attention to the chosen product and to volume injected is mandatory. Necrosis can be caused by compression or vascular injury. Due to thin skin cover, small product nodules are easily noticeable and palpable, and are also more frequent with the use of nonabsorbable fillers. Edema, mild pain, ecchymosis, and redness may occur.

CONCLUSION

The mastery of facial proportions and anatomical structures involved in the changes in this region will allow a precise and individualized diagnosis. The middle third of the face is a very important segment in relation to the beauty and perception of an attractive face. Thus, defining which areas could benefit from adding volume is as important as defining those that should not be filled and which products are suitable to be used for every situation. These criteria may prevent deformities and exaggerated results.

The most feared complications are unaesthetic results, mainly at the expense of inadequate enlargement of the middle third of the face and use of excess malar and submalar volumes.

COLLABORATIONS

IOM Conception and design of the study; performance of operations and/or experiments; drafting the manuscript or critical review of its contents.

MM Final approval of the manuscript; conception and design of the study; drafting the manuscript or critical review of its contents.

REFERENCES

1. Gamboa GM, de La Torre JI, Vasconez LO. Surgical anatomy of the midface as applied to facial rejuvenation. *Ann Plast Surg.* 2004;52(3):240-5.
2. Owsley JQ, Roberts CL. Some anatomical observations on midface aging and long-term results of surgical treatment. *Plast Reconstr Surg.* 2008;121(1):258-68.
3. Terrino EO, Flowers RS. *The Art of Alloplastic Facial Contouring.* 1st ed. St. Louis: Mosby; 2000. 333 p.
4. Haddock NT, Saadeh PB, Boutros S, Thorne CH. The tear trough and lid/cheek junction: anatomy and implications for surgical correction. *Plast Reconstr Surg.* 2009;123(4):1332-40.
5. Humphrey CD, Arkins JP, Dayan SH. Soft tissue fillers in the nose. *Aesthet Surg J.* 2009;29(6):477-84.
6. Raspaldo H, Gassia V, Niforos FR, Michaud T. Global, 3-dimensional approach to natural rejuvenation: part 1 - recommendations for volume restoration and the periocular area. *J Cosmet Dermatol.* 2012;11(4):279-89.
7. Swift A, Remington K. BeautiPHication™: a global approach to facial beauty. *Clin Plast Surg.* 2011;38(3):347-77.
8. Rohrich RJ, Pessa JE. The fat compartments of the face: anatomy and clinical implications for cosmetic surgery. *Plast Reconstr Surg.* 2007;119(7):2219-27.
9. Gierloff M, Stöhring C, Buder T, Gassling V, Açil Y, Wiltfang J. Aging changes of the midfacial fat compartments: a computed tomographic study. *Plast Reconstr Surg.* 2012;129(1):263-73.
10. Mathes SJ, ed. *Plastic Surgery.* Volume 2. 2nd ed. Philadelphia: Elsevier; 2006.
11. Goldstein SA, Goldstein SM. Anatomic and aesthetic considerations in midfacial rejuvenation. *Facial Plast Surg.* 2006;22(2):105-11.
12. Raspaldo H. Volumizing effect of a new hyaluronic acid sub-dermal facial filler: a retrospective analysis based on 102 cases. *J Cosmet Laser Ther.* 2008;10(3):134-42.
13. De Maio M, Rzyany B. *Substâncias de Preenchimento em Medicina Estética.* 1a ed. São Paulo: Santos; 2007.

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