

# Neck Contouring and Rejuvenation in Male Patients Through Dual-Plane Reduction Neck Lift



Francisco G. Bravo, MD, PhD

## KEYWORDS

- Neck lift • Face lift • Facial rejuvenation • Cervicofacial rejuvenation • Jawline definition
- Male plastic surgery • Male aesthetics • Submentoplasty

## KEY POINTS

- Surgeons seeking successful outcomes in male facial rejuvenation must be able to achieve balanced and natural results in the neck and submental region.
- A thorough understanding of male jawline and neck surface aesthetics and its relevance to perceived age, attractiveness, and body mass index is necessary to plan the best treatment option for cervical enhancement.
- Neck and submental surgical procedures provide better and longer-lasting results when the deep structures of the neck are contoured independently from the redraping maneuvers performed on the superficial layers.
- A dual-plane approach to the neck divides it into a submandibular and a cervical segment, which is managed differently, allowing for more defined and natural outcomes with lower revision rates.
- Indications for neck lift surgery as well as complications arising from it, should be fully understood by specialists providing facial rejuvenation procedures.

## INTRODUCTION

With the latest advances and rapid growth in minimally invasive procedures for facial rejuvenation, male patients are showing an increased interest in such techniques.<sup>1</sup> Due to the success of these treatments, patients will often visit the plastic surgeon at a later age when the neck is often the major concern.<sup>2</sup> Although much effort has been devoted to improving the neck and jawline nonsurgically<sup>3</sup> and despite the fact that in general, male patients are often hesitant to undergoing surgical cosmetic procedures for fear of looking unnatural or overdone, surgery is often the best option to obtain significant and long-lasting results in the neck and submental region. Specialists seeking successful outcomes in facial rejuvenation should

recognize the importance of the neck to provide their patients with balanced and natural results and avoid an overdone face-underdone neck deformity.<sup>4</sup>

Many patients who are candidates for facelift surgery worry more about the physical changes in the neck than about those in the face and specialists performing facial rejuvenation surgery should use all their ingenuity and skill to obtain optimum results in the neck.<sup>5</sup>

In this regard, the neck is not only an important element to achieve harmony when undertaking any facial rejuvenation procedure but it is also on itself, an important component of both facial aesthetics and youthfulness, and also plays an important role in the perceived body mass appearance of an individual.

The author has no commercial or financial conflict of interest and have received no funding for the preparation and writing of this article.

Clinica Gomez Bravo, Claudio Coello 76, Madrid 28001, Spain

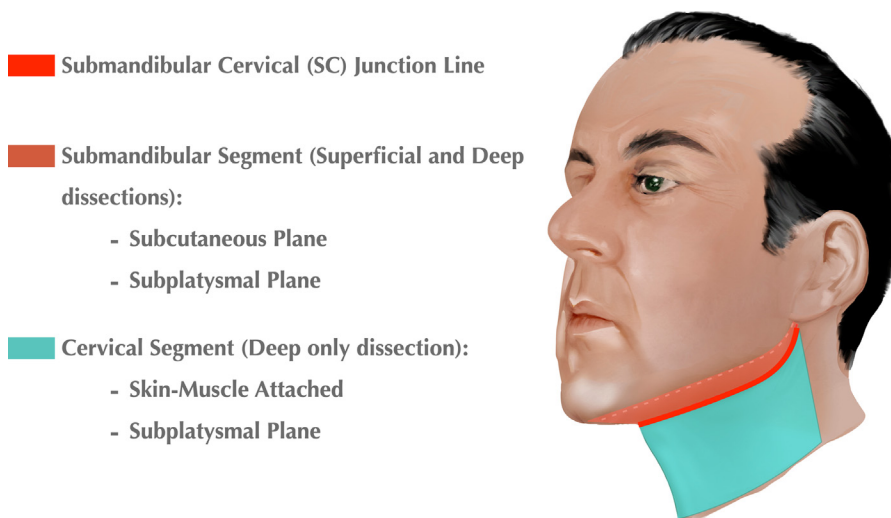
E-mail address: fgbravo@clinicagomezbravo.com

Clin Plastic Surg 49 (2022) 257–273

<https://doi.org/10.1016/j.cps.2021.12.002>

0094-1298/22/© 2022 Elsevier Inc. All rights reserved.

Descargado para Eilyn Mora Corrales (emorac17@gmail.com) en National Library of Health and Social Security de ClinicalKey.es por Elsevier en abril 07, 2022. Para uso personal exclusivamente. No se permiten otros usos sin autorización. Copyright ©2022. Elsevier Inc. Todos los derechos reservados.



**Fig. 1.** The Submandibular-Cervical Junction Line (red line), whereby the submandibular segment (orange) and cervical segment (green) of the neck meet. In a dual-plane neck lift, each segment is dissected and managed differently. (Modified from Bravo FG. Reduction Neck Lift: The Importance of the Deep Structures of the Neck to the Successful Neck Lift. Clin Plast Surg. 2018 Oct;45(4):485-506.)

Careful planning should be undertaken when deciding what techniques to use and which anatomic structures need to be addressed to achieve optimal results in neck contouring, as the management of the deep structures of the neck is often a requirement in modern cervical rejuvenation.<sup>4</sup>

## SURFACE AESTHETICS OF THE MALE NECK

A thorough knowledge of the morphologic characteristics of the young and attractive male neck and jawline is essential to understand the surgical maneuvers necessary to mimic those features and design a surgical plan accordingly. Hence, a careful analysis and description of the surface aesthetics of the neck and submandibular region of the male patient, as well as of its underlying anatomy is paramount to achieve good outcomes in neck lift surgery.

A clinically relevant surface landmark when analyzing neck aesthetics is the *submandibular-cervical (SC) junction line*, which lies below the border of the jawline and delineates whereby the submandibular segment of the neck meets the cervical segment (**Fig. 1**). This line serves as the reference point to establish 3 different angles which have significance in cervical aesthetics: (1) the anterior submandibular-cervical angle (ie, the submental-cervical angle), which constitutes the most studied proportion in the neck and that should be around 100° in the attractive young individual, (2) the lateral submandibular-cervical angle, around 120°, and (3) the posterior

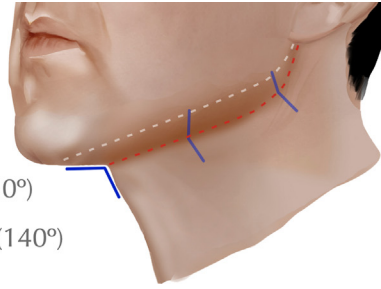
submandibular-cervical angle, which should be around 140° (**Fig. 2**).

The submental-cervical angle has been the most studied in the literature<sup>6,7</sup> because it is easily measurable from the profile view. Unfortunately, the lateral and posterior submandibular-cervical angles are less evident, as they can only be analyzed from a postero-cranial or antero-caudal view (**Fig. 3**) and will only be perceived visually by the shadow formed beneath the mandible in the three-quarter and profile views (**Fig. 4**).

There is a general consensus that achieving a well-defined jawline is one of the main objectives of a successful surgical cervicofacial rejuvenation procedure. A well-defined mandible requires that the surface of the lower cheek and jaw, be separated sufficiently from the neck. This separation or depth beneath the border of the mandible allows a shadow to be cast below the full length of the mandible which is a key element in the perception of a well-defined jawline.

The separation of the mandible from the neck is more evident anteriorly as the chin projects more from the neck than any other area of the mandible and the submandibular cervical angle is more acute anteriorly and gradually tapers down along the submandibular-cervical junction line posteriorly. To achieve a successful neck lift, however, depth beneath the mandible should be achieved along its body and angle as well (zones 2 and 3),<sup>4,8</sup> by reducing the submandibular structures at these levels, aiming to provide a shadow underneath the entire length of the jawline, which will greatly define it.

- Mandibular Border
- Submandibular-Cervical Junction Line
- Submental-Cervical Angle (100°)
- Lateral Submandibular-Cervical Angle (120°)
- Posterior Submandibular-Cervical Angle (140°)



**Fig. 2.** Submandibular angles of the neck (*blue lines*), defined by the mandibular border (*dashed white line*) and the Submandibular-Cervical junction line (*dashed red line*). (Modified from Bravo FG. Reduction Neck Lift: The Importance of the Deep Structures of the Neck to the Successful Neck Lift. Clin Plast Surg. 2018 Oct;45(4):485-506.)

This shadow is seen as an extension of the submental line into the neck when viewed in profile view, forming an *extended submental line*, which is an important feature of the young and attractive neck (**Fig. 5**). Achieving an extended submental line should be an objective when performing neck lift surgery, to obtain a *single crease neck* when the patient looks down, as opposed to a *double crease neck*, which often occurs as a surgical stigma of face and neck lift surgery when the deep submandibular structures are not adequately managed (**Fig. 6**).

Other important features in male neck surface aesthetics are an evident thyroid cartilage protuberance, at an approximate 140° angle with respect to the anterior neck line and a visible sternocleidomastoid muscle line centrally and cranially near the mandible, defining the musculomandibular triangle (**Fig. 7**).

## THE NECK'S INFLUENCE ON PERCEPTION

Modifying the shape of a specific anatomic structure may have a considerable influence on the way individuals are perceived by others. A thorough understanding of this phenomenon is essential to the plastic surgeon to prioritize which areas need to be addressed first, according to the patient's concerns and expectations.

In the case of the neck, its surgical modification may have a significant impact on the way male patients are perceived by others with respect to 3 distinct areas: (1) their apparent age, (2) their attractiveness, and (3) their body mass index or overall physical fitness and body type.

### ***Impact of the Neck on Male Perceived Age: the Impact of Perifacial Versus Centrofacial Morphology on the Overall Perception of Facial Aging***

The neck has a profound impact on the overall perception others have of our age. To determine whether morphologic changes occurring at the

periphery of the face with aging have more or less of an impact on the overall perception of facial aging than those occurring centrally, the following study was performed<sup>9</sup>: 1171 photographs of 100 male public figures collected from Google Images were analyzed. Public domain images in 3-quarter view were selected and 50 subjects were randomly chosen for the study.

Through imaging software, the central part of the face was swapped between the younger and older versions of each subject. The resulting set of digitally altered images consisted of a young perifacial version with an aged centrofacial area and an elderly perifacial version with a young centrofacial area (**Fig. 8**). Subsequently, 32 individuals were recruited to evaluate the modified images. Each volunteer was asked to select the subject that they considered to be the youngest out of each set of modified images. Statistical analysis of the data was performed, which showed that a significant 61.2% ± 2.6% ( $P < .05$ ) of individuals selected subjects with the youngest perifacial morphology and older centrofacial anatomy as the ones with an overall youngest appearance. 15% of the male subjects studied presented with a predominant facial thinning with aging (Type I aging), while in 85% of the subjects, a predominant perifacial expansion was noted (Type II aging). In both instances, the same conclusion may be drawn from the careful analysis of facial images of individuals as they age: the aging process is devastating.

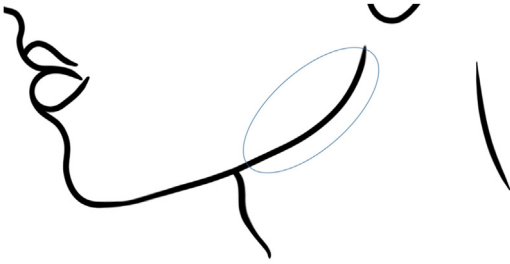
The finding that most individuals perceive subjects with a more juvenile perifacial area as younger, despite a more elderly centrofacial appearance, may have a significant influence on the direction our specialty should take regarding facial rejuvenation. Efforts on improving perifacial areas such as the jawline and neck despite requiring more complex surgical procedures should remain a key element in the management of the aging face. In conclusion, with respect to facial rejuvenation and just as was the case with



**Fig. 3.** Antero-caudal (*left*) and postero-cranial (*right*) views, which allow the visualization of the lateral submandibular-cervical angle.



**Fig. 4.** Appreciation of the lateral and posterior submandibular-cervical angles through shadow depth in the three-quarter (above) and profile (below) views. The 3D models on the right had submandibular volume reduction applied digitally. The same lighting was used for all models.



**Fig. 5.** Extended submental line (blue oval line), continuing the submental line into the neck, defining the mandibular border.

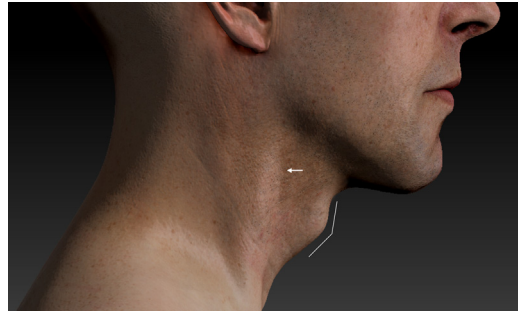
the Italian Renaissance, the frame is just as important as the painting itself and the neck lift may be considered as the new face lift.

### **Impact of the Neck on Male Perceived Attractiveness**

Several studies have demonstrated the importance the neck plays when determining the attractiveness of an individual, based on both the submental-cervical angle<sup>6</sup> and on neck ptosis.<sup>10</sup>



**Fig. 6.** 52-year-old secondary face and neck lift patient with a double crease neck (white oval lines) before (above) and after (below) a reduction neck lift procedure. Note the achievement of a single crease neck with an extended submental line (white oval) after the surgery.



**Fig. 7.** Surface aesthetics of the male neck with an evident thyroid protuberance at an approximately 140° angle to the anterior cervical line and visible sternocleidomastoid muscle shadow lines centrally and cranially (white arrow), blending together with the submandibular shadow to form the musculomandibular triangle.

The neck and jawline also play a very important role in one of the 4 main attributes that influence facial attractiveness: sexual dimorphism (ie, features that accentuate the masculinity of the male individual). The other 3 being averageness, symmetry, and youthfulness.<sup>11,12</sup>

Indeed, a well-defined, cuadrangular, and prominent jawline, together with a noticeable thyroid cartilage protuberance (ie, Adam's apple) are key features of the masculine attractive individual, as evidenced by the fact that they are essential areas targeted in facial gender reassignment surgery.<sup>13,14</sup>

### **Impact of the Neck on Male Perceived Fitness**

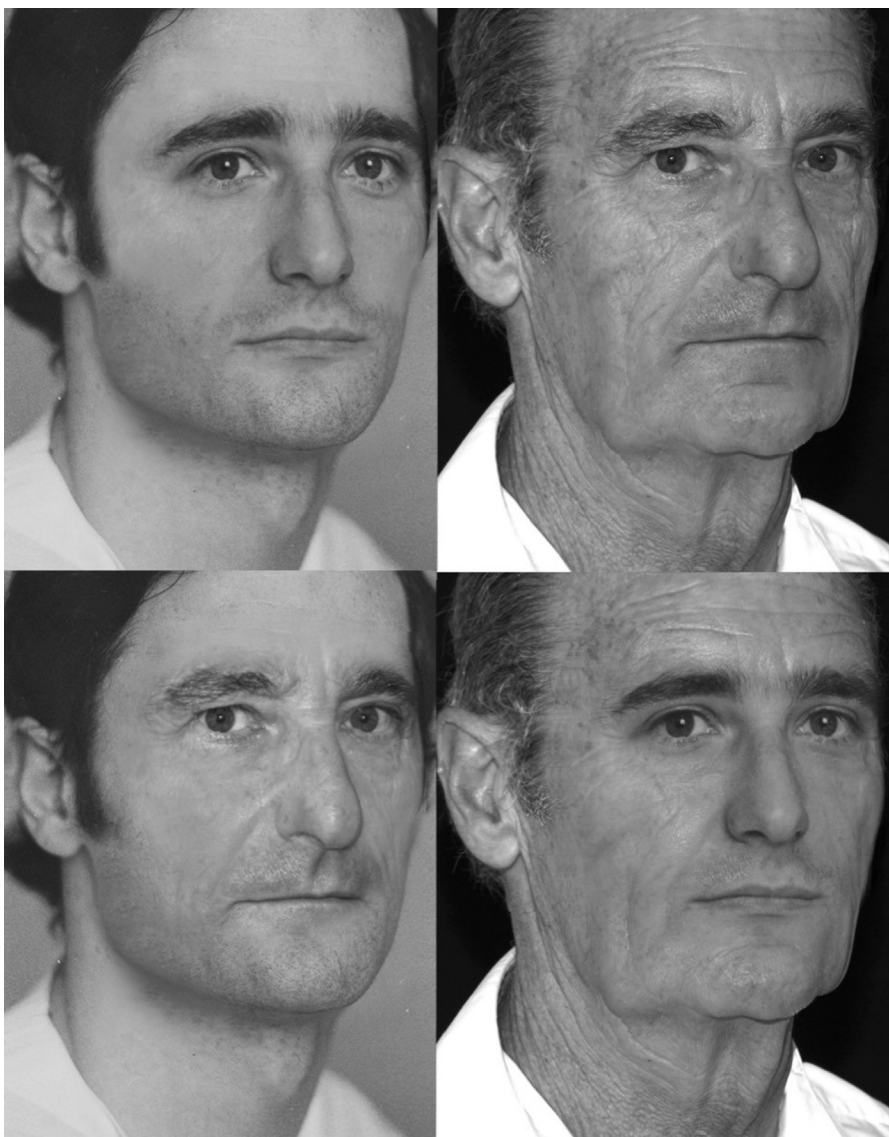
Then neck has a significant influence on the apparent body mass index of an individual and their overall fitness and body type. In fact, most patients that have undergone a neck lift procedure remark that the most frequent comment they encounter postoperatively by their acquaintances unaware of their surgery is whether they have lost weight.

The correlation between neck volume and perceived body type is evidenced by the fact that neck circumference is used as a screening method for detecting overweight and obese patients<sup>15</sup> and male individuals with a neck circumference equal or greater than 37 cm may require additional evaluation of overweight or obesity status.<sup>16</sup>

Furthermore, a recent study has also shown an increase in the volume of the submandibular glands with both aging and body mass index.<sup>17</sup>

### **SURGICAL TECHNIQUE - DUAL-PLANE REDUCTION NECK LIFT**

Despite the obvious inclination to attempt minimally invasive neck lift procedures by recontouring



**Fig. 8.** Young and aged versions (above) of a male individual. The images had their central face swapped between them through digital software (below) and participants were asked to identify which of the 2 photographs depicted an older individual: the one on the lower left (with a young perifacial appearance but aged central face) or the one on the lower right (with a young central face but aged perifacial morphology).

the neck with suspension sutures,<sup>18</sup> it may be more appropriate, to produce long-lasting corrections, to avoid over operating in the superficial planes to improve on deeper problems.<sup>19</sup>

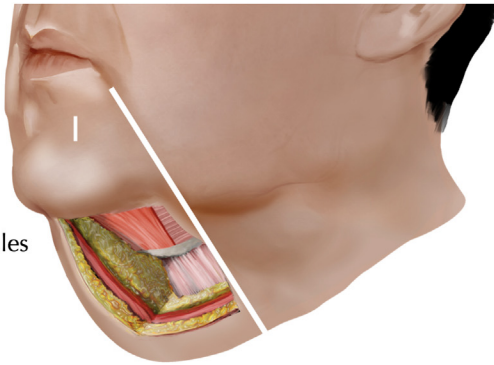
Indeed, although a visible improvement of the submandibular contour may be achieved temporarily by aggressively pulling and tightening the skin and platysma over any protruding subplatysmal structure, a relapse of the submandibular fullness will eventually happen with time, especially in the profile view with the patient looking down (ie, Connel view).

When performing a dual-plane reduction neck lift, 2 distinct goals are pursued and managed independently: (1) volume recontouring or reduction, which is mainly accomplished in the deep structures of the neck beneath the platysma and (2) superficial redraping, which consists of the management of the platysma itself and of the overlying subcutaneous fat and skin under minimal tension.

A dual-plane approach to the neck is used, meaning 2 different dissection planes are carried out. In the area cranial to the SC junction line (ie,

## Zone I

- Supraplatysmal fat
- Inter-SCMO fat
- Subplatysmal fat
- Anterior belly of the Digastric Muscles
- Hyoid Release



**Fig. 9.** Submandibular Zone I, below the submental region. The anatomic structures that may be addressed are the supraplatysmal fat, the intersternocleidomastoid origin fat, the subplatysmal fat, the anterior belly of the digastric muscles, and the hyoid. (Modified from Bravo FG. Reduction Neck Lift: The Importance of the Deep Structures of the Neck to the Successful Neck Lift. Clin Plast Surg. 2018 Oct;45(4):485-506.)

submandibular segment), a plane is developed both superficial and deep to the platysma, while in the area caudal to this line (ie, cervical segment), dissection is carried out only deep to the platysma, leaving the muscle attached to its overlying skin (see Fig. 1).

## Deep Work – Volume Contouring and Reduction

Some individuals without excessive submandibular volume may benefit from a tightening face-lift procedure, through the management of the platysma-skin superficial layer alone. However, most male patients with any degree of perifacial expansion or submandibular fullness will have better outcomes with contouring of the deeper structures of the neck through a reduction neck lift.

It is useful to divide the submandibular region into 3 distinct zones, according to the anatomic structures that need to be addressed to approach them systematically.<sup>4,8</sup>

### Zone I

This is the zone underneath the parasymphysal lines or anterior mental region of the mandible (Fig. 9).

A substantial reduction of subplatysmal fat is frequently necessary to obtain results in male neck lift surgery. Not only does this fat account for a considerable amount of the overall soft-tissue volume of the neck<sup>20,21</sup> but also its management through liposuction alone is often not successful, due to its deep location in the neck and its more fibrous consistency.

Resection is best carried out through direct excision by means of an anterior open approach using electrocautery.

Reduction of the anterior belly of the digastric (ABD) muscles may be required to achieve a flat surface under the chin in selected patients presenting with submental fullness. Excessive bulkiness of the ABD muscles, may be assessed both pre- and intraoperatively by tilting the patient's head down or bringing the mandible down toward the neck. If muscular bulging occurs, tangential resection with electrocautery through an anterior approach should be considered.

ABD muscle reduction may also be required if both the subplatysmal fat and submandibular gland have also been reduced. Partial resection of these 2 latter structures may make more evident the presence of the ABD muscles in the neck post-operatively; therefore, making it necessary to reduce these muscles as well.

### Zone II

This region represents the area below the body of the mandible, between the parasymphysis and angle and its management is key to improve jawline definition (Fig. 10).

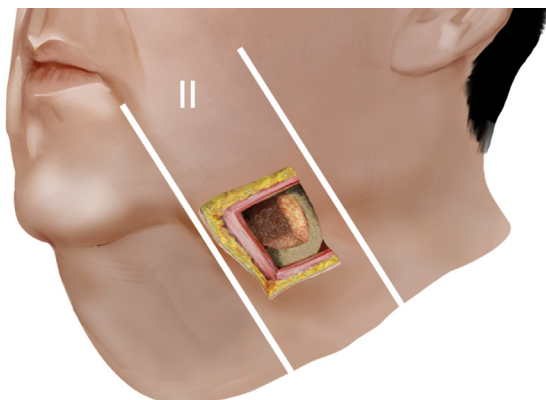
Most of the volume responsible for submandibular fullness at this level is due to a deep subplatysmal cervical structure, the submandibular gland, which is often enlarged<sup>22,23</sup> and caudally displaced.<sup>24</sup>

Patients with submental fullness will often present with enlarged submandibular glands (SMGs) and partial surgical reduction of the segment of the gland laying below the level of the mandible may significantly improve jawline definition.

Providing depth under the mandible at this level will improve the lateral submandibular-cervical angle allowing a shadow to appear under the lateral jawline and resulting in a more visible anterior edge of the sternocleidomastoid muscle,

## Zone II

- Jowl
- Submandibular gland



**Fig. 10.** Submandibular Zone II, below the body of the mandible. The anatomic structures usually managed are the submandibular jowl and the submandibular gland. (Modified from Bravo FG. Reduction Neck Lift: The Importance of the Deep Structures of the Neck to the Successful Neck Lift. Clin Plast Surg. 2018 Oct;45(4):485-506.)

which provides a pleasing musculomandibular triangle.

Surgical reduction of the SMGs is better achieved through an anterior submandibular incision posterior to the submental crease,<sup>25–27</sup> although partial reductions may also be performed through a lateral face-lift approach.<sup>28,29</sup>

### Zone III

This is the area below and behind the angle of the mandible and it plays an important role in delineating the posterior edge of the jawline, forming the posterior submandibular-cervical angle, and creating a retromandibular hollow or groove (Fig. 11).

Superficial fat may be scarce in this area and oftentimes, most of the volume in this zone is due to a prominent tail of parotid gland, which is located deep to the SMAS/platysma plane.<sup>30</sup>

To achieve adequate posterior jawline definition in patients with excessive fullness at this level, partial reduction of the tail of the parotid gland (TPG) may be warranted.<sup>4,26</sup>

Careful SMAS/platysma flap elevation is necessary to expose the parotid gland and to adequately cover the resected area to avoid Frey's Syndrome postoperatively.

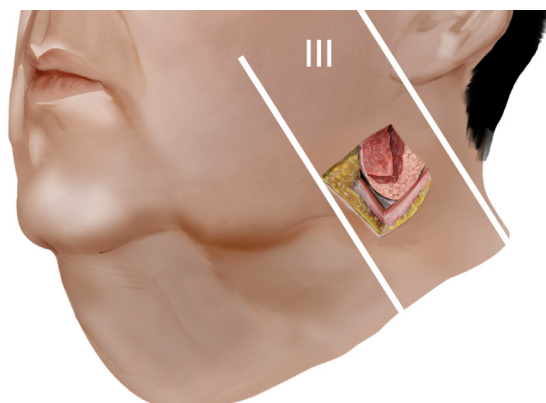
### Superficial Work - Skin, Subcutaneous Fat, and Platysma Redraping

Once an adequate submandibular contour is achieved through the reduction of the deep structures of the neck, attention is paid to the superficial layers, with the goal of achieving a natural, tension-free redraping of the overlying platysma, subcutaneous fat, and skin.

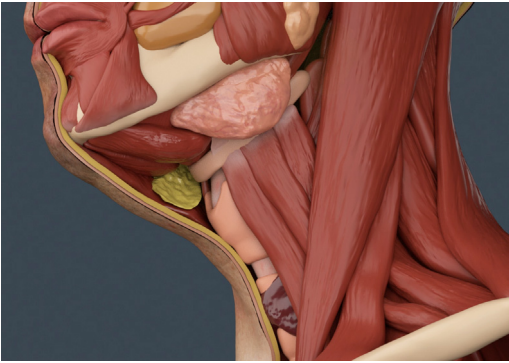
The work performed superficially is key to achieving a well-padded and even subcutaneous layer in the neck, as well as to preventing platysma

## Zone III

- Preplatysmal fat
- Tail of the Parotid Gland



**Fig. 11.** Submandibular Zone III, below the angle of the mandible. The anatomic structures that may be addressed are the preplatysmal fat and the tail of the parotid gland.



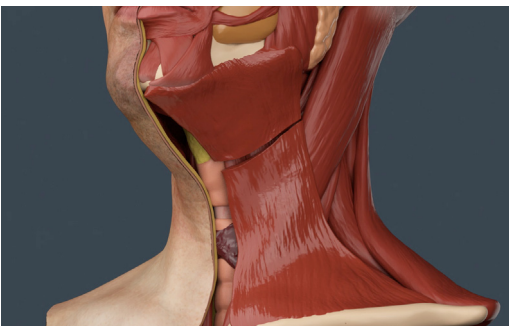
**Fig. 12.** A patch of subplatysmal fat is shown being left attached to the undersurface of the platysma at the level of the hyoid.

band recurrence and addressing skin laxity or wrinkling in older male patients.

### 3D Z-Platysmaplasty

The SC junction line is the landmark used to manage the platysma dissection. It must be noted that this line must be marked on the skin below the level of the hyoid preoperatively, as it will end up higher on the neck after the procedure. A lateral traction maneuver performed on the skin of the neck while asking the patient to flex his neck will help identify the patients' SC junction line which divides the neck into a submandibular and a cervical segment.

Along the submandibular segment, the platysma is dissected completely from the skin superficial to it as well as from the deeper subplatysmal structures. Care is taken to preserve a patch of subplatysmal fat attached to the undersurface of the muscle at the level of the hyoid, which will aid in preventing platysma band recurrence (**Fig. 12**). The cervical segment (caudal to the SC junction line) is dissected only deep to the



**Fig. 13.** Full-length, full-thickness horizontal transection of the platysma is shown, which divides the platysma into cranial and caudal portions.

platysma, leaving the skin and subcutaneous fat attached to the muscle superficially.

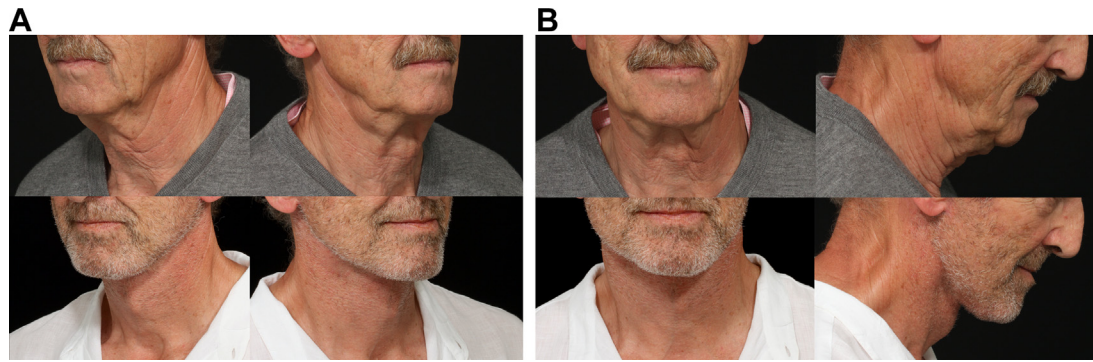
The platysma is transected horizontally, full-length and full-thickness along the preoperative SC junction line (below the hyoid), dividing the platysma into a cranial and a caudal segment (**Fig. 13**). The deep cervical fascia is also transected at this level, taking care not to injure the anterior cervical veins and its communicating branches to the external jugular vein, which run immediately beneath it. The purpose of this is twofold: (1) it completely separates the cranial and caudal platysma segments, preventing the transmission of forces with muscle contraction through the deep cervical fascia, which may cause dynamic band recurrence<sup>31</sup> and (2) it allows for the denervation of the caudal platysma segment by injury to the cervical branch of the facial nerve which runs deep to the platysma laterally.<sup>32</sup> This caudal denervation of the platysma not only decreases the incidence of platysma band recurrence but also enhances the overlying skin quality considerably through a surgical "botulinum toxin effect" (**Fig. 14**).

To avoid platysma band recurrence a Z-plasty approach is planned, as it generally constitutes the best option to treat scar bands and skin webbing in plastic surgery. Other authors have proposed the use of Z-plasties for midline platysma plication.<sup>33,34</sup> The method proposed here is different and is based on a 3D Z-plasty concept, consisting in separating the cranial and caudal segment of each medial platysma band as far away from each other as possible through opposing vectors, following the x, y, and z axis of 3D space (**Fig. 15**).

Midline plication of the cranial platysma segments is performed with interrupted resorbable sutures, anchoring the medial edges of the platysma both to the anterior belly of the digastrics<sup>35</sup> and to the hyoid bone.<sup>36,37</sup> Excess platysma, when present, may be trimmed vertically before performing the plication or horizontally if bow-stringing of the platysma is observed.

The caudal inter-platysma fat, which is attached to the skin and medial edges of the caudal platysma segments, is suspended vertically and anchored to the hyoid to provide adequate soft tissue padding of the thyroid cartilage and prevent medial window shading of the platysma.

Laterally, the cranial platysma segment is tightened through an inter-locking cable suture anchored to the mastoid. This suture may further define and provide depth to Zone 3, once both the superficial fat and the most posterior-caudal portion of the submandibular gland have been reduced and as long as the tail of the parotid gland



**Fig. 14.** (A, B) 72-year-old-patient before (above) and after (below) undergoing a dual-plane reduction neck lift. Notice the improvement in skin wrinkling and quality after the surgical denervation of the caudal portion of the platysma and the correction of the thick platysma bands through 3D Z-platysmaplasty.

is not overly hypertrophic. The caudal platysma segment, with its overlying attached skin, is also anchored to the mastoid region through 2 interlocking cable sutures, shifting both the muscle and skin together as a unit, in a similar fashion as other authors have described previously,<sup>28,29</sup> but applying this composite flap concept only to the caudal platysma (ie, below the SC junction line).

**Subcutaneous Fat Management**

Reduction of superficial subcutaneous fat should be carried out judiciously and devised as a means of fine-tuning the desired outcome. Maintaining sufficiently thick padding of subcutaneous fat attached to the undersurface of the elevated skin flap in the neck is key to achieve a soft and natural result, avoiding a skeletonized look and reducing the risk of skin adhesences or irregularities, which may be difficult to correct secondarily.

Zone 1 is usually the area with the most amount of superficial fat accumulation. Excision is carried

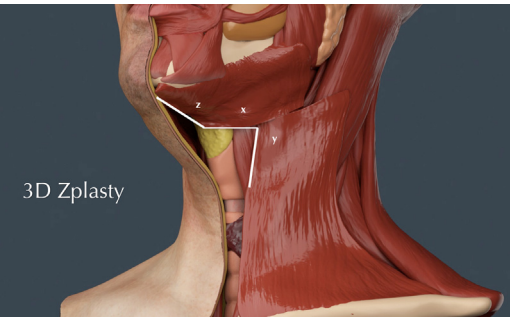
out through en-bloc resection using electrocautery, taking care not to injure the underlying platysma muscle.

Although most of the volume in Zone 2 is often due to a prominent submandibular gland, a submandibular jowl may also be present at this level, and must be managed either by direct excision (jowlectomy), microliposuction with 1 cc syringes, and blunt fine-tip cannulas or resuspension into the face.

Finally, in Zone 3, much of the volume present is often due to a large tail of the parotid gland, oftentimes an adequate improvement may be achieved without the need to address the gland by reducing the subcutaneous fat overlying the platysma, which is firmly attached to it in this zone. As mentioned previously, care should be taken not to injure the underlying platysma when resecting the fat in this area with electrocautery or scissors.

**Skin Redraping**

The final step performed in the superficial layer is the redraping of the skin, which is achieved by applying a hemostatic net at the end of the procedure and leaving it in place for at least 48 hours postoperatively.<sup>38</sup> The use of this technique has 4 main purposes: (1) skin redistribution along the submandibular segment of the neck, extending into the jawline and mastoid area, (2) hematoma and seroma prevention, avoiding the need for drains, dressings or compression garments, (3) improvement of the vascular supply to the skin flap, avoiding excessive tension at the wound edges by redistributing tension along the flap, (4) serve as an added anchoring mechanism to the cable sutures used, by implementing a belt-suspender concept, and (5) reduce the postoperative recovery time and downtime, by diminishing bruising and swelling.



**Fig. 15.** Illustration depicting the final position of the medial border of the platysma responsible for vertical band formation after 3D Z-platysmaplasty. Notice the separation of the cranial and caudal edges of the platysma in opposing directions, forming a Z configuration along the 3 planes of 3D space: x, y, and z.



**Fig. 16.** 29-year-old patient before (above) and after (below) a dual-plane reduction neck lift procedure through and anterior approach only (short-scar neck lift) after unsuccessful laser liposuction was performed elsewhere, which left him with an underdone neck deformity. The patient also had silicone implants placed previously at the angle of the mandible, which were removed transorally at the time of the neck procedure.

## COMPLICATIONS

### *Sialocele*

The subcutaneous accumulation of saliva due to the partial resection of the SMGs may occur in approximately 2% of patients undergoing this technique.<sup>39</sup> Management is performed by serial percutaneous aspiration in the office. Botulinum toxin may be applied directly on the gland prophylactically in the operating room or postoperatively after draining the collection once it has occurred.

A temporary hemostatic net may also be applied under local anesthesia in the office to occlude dead space while the sialocele resolves. Recommending a salivary resting diet during the early postoperative period may greatly reduce the incidence of this complication. Such a diet includes restriction in the mastication of solid foods and avoidance of foods that may be excessively salty, sour, spicy, or sweet.<sup>40</sup>



**Fig. 17.** 38-year-old patient before (above) and after (below) a dual-plane reduction neck lift procedure through and anterior approach (short-scar neck lift). Small perilobular incisions were also used to partially reduce prominent tails of both parotid glands.

### ***Xerostomia***

Partial SMG reduction during neck lift surgery does not result in dry mouth syndrome.<sup>39</sup> Studies that have presented an association of SMG resection with this complication belong to the oncologic literature, whereby complete SMG excision is performed in the setting of head and neck cancer. Most of these patients also receive oral radiotherapy, which accounts for the high incidence of xerostomia they refer.<sup>41</sup>

### ***Lower Lip Depressor Weakness***

Although temporary weakness of the depressors of the corner of the mouth may occur due to injury to the marginal mandibular branch of the facial nerve during SMG reduction in up to 9% of patients, these numbers are related to transcutaneous complete resections performed directly over the gland in the setting of pathologic or tumoral disorders.<sup>42</sup> Partial gland reductions performed at the moment of face-lift surgery, present with transient depressor weakness rates of up to 4%, which are similar to those occurring in face-lift procedures overall without SMG reduction.<sup>39</sup> Such a complication is more likely related to general face-lift maneuvers such as the release of the mandibular osteocutaneous retaining ligament, which is in close anatomic relationship to the terminal branches of the marginal mandibular branch of the facial nerve.<sup>43</sup> Other mechanisms may be related to the participation of the platysma as a lower lip depressor and its possible transient denervation during platysmaplasty maneuvers,<sup>44</sup> although this influence has also been questioned previously.<sup>32</sup>

### ***Hematoma***

Although the risk of a postoperative hematoma after neck lift surgery has been greatly reduced due to the application of the hemostatic net during the early postoperative period,<sup>38</sup> partial excision of the SMG should only be attempted if a possible profuse intraoperative or early postoperative bleeding may be adequately managed, due to the close relationship of the facial artery and common facial vein to the gland.

### ***Prolonged Swelling***

A long recovery time, occasionally associated with stiffness and a frozen neck deformity, has usually been attributed to the open neck approach through a submental incision when extensive deep work and skin undermining is performed. The use of the hemostatic net<sup>38</sup> combined with the dual-plane concept, whereby skin

undermining is limited to the submandibular segment of the neck, provide recovery times similar to those obtained with lateral-only approaches.

### ***Inadequate Aesthetic Outcome***

Several inappropriate intraoperative clinical decisions or postoperative problems may hinder the final result and require surgical revisions:

1. Platysma band recurrence may emerge early in the postoperative period. A correct diagnosis is necessary, as different causes may mimic this entity and not be true recurrences of the initial platysma band. Irregular subcutaneous fat accumulation, prominent anterior belly of the digastric muscles, skin adhesences to the underlying platysma as well as skin webbing over the SC junction line may all be erroneously considered as recurrent bands. Prevention may be achieved by the implementation of the 3D Z-platysmaplasty concept described previously, including the elevation of the medial edges of the platysma together with a patch of subplatysmal fat to avoid medial skin adherence to the muscle; adequate fixation of the medial platysma edges both to the digastric muscles and to the hyoid bone to avoid cheese wiring of the midline plethysmography; suspension of the caudal inter-platysma fat to the hyoid to ensure the SC junction line is covered by an adequate layer of subcutaneous fat and platysma that will avoid skin webbing; and denervation of the caudal segment of the platysma, through horizontal deep cervical fascia transection and cervical branch of the facial nerve injury, to improve skin quality and wrinkling of the cervical segment of the neck, as well as achieve relaxation of the medial platysma bands. In any case, the threshold for revising a recurrent band should be very low, as oftentimes it may be performed under local anesthesia and thanks to the use of a local submental hemostatic net,<sup>38</sup> the recovery is usually very fast.
2. An underdone neck deformity may be the most prevalent problem after neck enhancement procedures, as evidenced by the significant differences between the desired submental-cervical angle of patients compared with those proposed by specialists providing treatments in this region.<sup>6</sup> Furthermore, many specialists manage the neck through submental liposuction only, not addressing muscle laxity or prominent subplatysmal structures, which are more evident in a flexed neck position, not usually presented in side-by-side pre- and



**Fig. 18.** Young 27-year-old patient before (above) and after (below) a dual-plane reduction neck lift procedure through and anterior approach only (short-scar neck lift). The patient also underwent a closed preservation rhinoplasty with push down of the dorsum and an earlobe reduction.

postoperative images (**Fig. 16**). In other cases, open approaches may have been used through a submental incision, but inadequate management of the deep structures of the neck, together with excessive tension applied to the face, may produce an overdone face-underdone neck deformity yielding a double-crease neck (see **Fig. 6**).

3. Overdone-skeletonized neck deformities may occur after neck lift surgery and may be difficult to repair postoperatively, despite modern fat grafting techniques. Although often attributed to subplatysmal maneuvers such as SMG reduction or shaving of the anterior belly of the digastric muscles, the majority of such cases are actually secondary to excessive



**Fig. 19.** Thin 53-year-old patient before (above) and after (below) a dual-plane reduction neck lift procedure through and anterior approach only (short-scar neck lift). Reduction of the deep subplatysmal structures was also performed to achieve redraping of the skin and platysma under no tension.



**Fig. 20.** Thin 41-year-old patient before (above) and after (below) a dual-plane reduction neck lift procedure through and anterior approach only (short-scar neck lift). Reduction of the deeper structures of the neck was necessary to adequately contour the submental region and neck, before tightening the platysma.

- resection of subcutaneous fat in the neck or failure to leave sufficient subplatysmal fat over the hyoid and thyroid cartilages to provide for a soft and natural submental-cervical angle.
4. A cobra neck deformity is the result of excessive debulking of the subcutaneous and subplatysmal fat in Zone 1 without adequately addressing the paramedian volume in the neck usually caused by prominent submandibular glands. This produces depression or divot

centrally in the neck and often requires reduction of the submandibular glands and anterior belly of the digastric muscles to correct.

**INDICATIONS**  
***Heavy, Thick, Obtuse Neck Patients***

Patients with large neck circumferences and abundant submandibular volume are excellent candidates for a dual-plane reduction neck lift procedure. These men often require addressing large



**Fig. 21.** Thin 59-year-old patient before (above) and after (below) a dual-plane reduction neck lift procedure in which both lateral and anterior approaches were performed. After adequate contouring of the deeper structures, the platysma and skin were redraped under minimal tension extending to the retroauricular area.

subplatysmal structures and often result in high satisfaction rates after the procedure, not only because of their rejuvenated look and enhanced attractiveness thanks to a better-defined jawline and thyroid cartilage protuberance (Adam's apple) but also because of the slimmed-down appearance they portray (**Fig. 17**).

### **Secondary Facelift or Postsubmental Liposuction Patients**

Patients that have previously gone through either a submental liposuction or an open neck lift procedure with unsatisfactory results due to an underdone neck deformity (see **Fig. 16**) or a double-crease neck deformity (see **Fig. 6**) are good candidates for a secondary neck lift procedure addressing the deep structures of the neck and platysma adequately.

### **Young Patients**

Younger patients who might complain of lack of jawline definition or excessive submandibular fullness or that might consult for a possible chin implant placement in the setting of a rhinoplasty procedure may benefit from a short scar isolated neck lift through a submental incision only, using the techniques described previously. These young individuals are usually good candidates as they are often slim and a well-defined neck and jawline is well suited for their complexion (**Fig. 18**).

### **Older Patients**

Despite the general notion that an excessively well-defined jawline and neck may look unnatural in older patients, these individuals, especially if they are fit and active, will greatly benefit from an improved neck appearance, as this is usually the area most affected by aging and despite producing a large impact on perceived age, it usually does not have an effect identifying traits, which usually lie on other anatomic structures such as the eyes or mouth, so the patient will seem younger but not look different (see **Fig. 14**).

### **Thin Patients with Skin Laxity**

Thin patients without excessive submandibular volume may benefit from a dual-plane reduction neck lift procedure through an anterior-only approach (**Figs. 19 and 20**) or by combining anterior and lateral approaches when more skin laxity and poor skin quality is present (**Fig. 21**). Reduction of the deeper structures of the neck and adequate platysma management medially and laterally when necessary ensures a more long-lasting and defined result by minimizing any

tension on the superficial layers from the deep structures with neck movement.

## **SUMMARY**

With the recent rise of nonsurgical and minimally invasive facial procedures, the neck lift has become the cornerstone of facial rejuvenation surgery.<sup>45,46</sup> Plastic surgeons offering surgical solutions in this area are expected to deliver results and these are often best achieved through direct surgical reduction of the deep structures of the neck and adequate management of the superficial layers, including the skin and platysma.

A thorough understanding of the surface aesthetics of the neck and submandibular region, as well as of the relevant anatomic structures susceptible to contouring is essential to providing male patients with successful outcomes in cervicofacial rejuvenation.

The dual-plane reduction neck lift presented may be a useful technique to providing long-lasting, natural results for a variety of male patients seeking enhancement of this important anatomic region.

## **CLINICS CARE POINTS**

- A careful evaluation and analysis of the neck should be carried out in all male patients seeking facial rejuvenation procedures, as improvement in this region has important benefits in male apparent age, attractiveness, and fitness.
- Contouring and reduction of the deep subplatysmal structures of the neck are often necessary to achieve natural and long-lasting results in male surgical facial rejuvenation.
- A dual-plane dissection of the neck together with the use of modern skin redraping techniques broadens the indications for neck lift procedures in male patients and reduces complications while shortening recovery times despite the use of an anterior open submental approach.

## **REFERENCES**

1. Aesthetic plastic surgery national databank statistics 2020. *Aesthet Surg J* 2021;41:1–16.
2. Stuzin JM. Discussion: a comparison of the full and short-scar face-lift incision techniques in multiple

- sets of identical twins. *Plast Reconstr Surg* 2016; 137:1715–7.
3. Lawrence WT, Plastic Surgery Educational Foundation DATA Committee. Nonsurgical face lift. *Plast Reconstr Surg* 2006;118:541–5.
  4. Bravo FG. Reduction neck lift: the importance of the deep structures of the neck to the successful neck lift. *Clin Plast Surg* 2018;45:485–506.
  5. Guerrero-Santos J, Espaillet L, Morales F. Muscular lift in cervical rhytidoplasty. *Plast Reconstr Surg* 1974;54:127–30.
  6. Naini FB, Cobourne MT, McDonald F, et al. Submental-cervical angle: perceived attractiveness and threshold values of desire for surgery. *J Maxillofac Oral Surg* 2016;15:469–77.
  7. Ellenbogen R, Karlin JV. Visual criteria for success in restoring the youthful neck. *Plast Reconstr Surg* 1980;66:826–37.
  8. O'Daniel TG. Optimizing outcomes in neck lift surgery. *Aesthet Surg J* 2021;41(8):871–92.
  9. Bravo FG. The impact of perifacial vs centrofacial morphology on the overall perception of facial aging. In: *The Aesthetic Meeting*. Montreal, Canada: American Society for Aesthetic Plastic Surgery (ASAPS); 2015.
  10. Forte AJ, Andrew TW, Colasante C, et al. Perception of age, attractiveness, and tiredness after isolated and combined facial subunit aging. *Aesthet Plast Surg* 2015;39:856–69.
  11. Rhodes G. The evolutionary psychology of facial beauty. *Annu Rev Psychol* 2006;57:199–226.
  12. Cunningham MR, Barbee AP, Pike CL. What do women want? Facialmetric assessment of multiple motives in the perception of male facial physical attractiveness. *J Pers Soc Psychol* 1990;59:61–72.
  13. Sykes JM, Dilger AE, Sinclair A. Surgical facial esthetics for gender affirmation. *Dermatol Clin* 2020; 38:261–8.
  14. Capitán L, Gutiérrez Santamaría J, Simon D, et al. Facial gender confirmation surgery: a protocol for diagnosis, surgical planning, and postoperative management. *Plast Reconstr Surg* 2020;145: 818e–28e.
  15. Pei X, Liu L, Imam MU, et al. Neck circumference may be a valuable tool for screening individuals with obesity: findings from a young Chinese population and a meta-analysis. *BMC Public Health* 2018; 18:529.
  16. Ben-Noun L, Sohar E, Laor A. Neck circumference as a simple screening measure for identifying overweight and obese patients. *Obes Res* 2001;9:470–7.
  17. Sawan T, Tower JJ, Gordon NA, et al. The submandibular gland and the aging neck: a longitudinal volumetric study. *Aesthet Plast Surg* 2021;45: 987–91.
  18. Giampapa VC, Mesa JM. Neck rejuvenation with suture suspension platysmaplasty technique: a minimally invasive neck lift technique that addresses all patients' anatomic needs. *Clin Plast Surg* 2014; 41:109–24.
  19. Nahai F. Reconsidering neck suspension sutures. *Aesthet Surg J* 2004;24:365–7.
  20. Raveendran SS, Anthony DJ, Ion L. An anatomic basis for volumetric evaluation of the neck. *Aesthet Surg J* 2012;32:685–91.
  21. Larson JD, Tierney WS, Ozturk CN, et al. Defining the fat compartments in the neck: a cadaver study. *Aesthet Surg J* 2014;34:499–506.
  22. Mahne A, El-Haddad G, Alavi A, et al. Assessment of age-related morphological and functional changes of selected structures of the head and neck by computed tomography, magnetic resonance imaging, and positron emission tomography. *Semin Nucl Med* 2007;37:88–102.
  23. Saito N, Sakai O, Bauer CM, et al. Age-related relaxo-volumetric quantitative magnetic resonance imaging of the major salivary glands. *J Comput Assist Tomogr* 2013;37:272–8.
  24. Lee MK, Sepahdari A, Cohen M. Radiologic measurement of submandibular gland ptosis. *Facial Plast Surg* 2013;29:316–20.
  25. Singer DP, Sullivan PK. Submandibular gland I: an anatomic evaluation and surgical approach to submandibular gland resection for facial rejuvenation. *Plast Reconstr Surg* 2003;112:1150–4 [discussion 1155].
  26. Bravo FG. Submandibular and parotid gland reduction in facelift surgery. *Plast Reconstr Surg* 2013; 132:95–6.
  27. Mendelson BC, Tutino R. Submandibular gland reduction in aesthetic surgery of the neck: review of 112 consecutive cases. *Plast Reconstr Surg* 2015;136:463–71.
  28. Gonzalez R. The LOPP-lateral overlapping plication of the platysma: an effective neck lift without submental incision. *Clin Plast Surg* 2014;41:65–72.
  29. Pelle-Ceravolo M, Angelini M, Silvi E. Treatment of anterior neck aging without a submental approach: lateral skin-platysma displacement, a new and proven technique for platysma bands and skin laxity. *Plast Reconstr Surg* 2017;139:308–21.
  30. Feldman J. Neck lift. Stuttgart, Germany: Thieme; 2006.
  31. Ellenbogen R, Karlin JV. Regrowth of platysma following platysma cervical lift: etiology and methodology of prevention. *Plast Reconstr Surg* 1981;67: 616–23.
  32. Sinno S, Thorne CH. Cervical branch of facial nerve: an explanation for recurrent platysma bands following necklift and platysmaplasty. *Aesthet Surg J* 2019;39:1–7.
  33. Weisman PA. Simplified technique in submental lipectomy. *Plast Reconstr Surg* 1971;48:443–6.

34. Guerrerosantos J. Managing platysma bands in the aging neck. *Aesthet Surg J* 2008;28:211–6.
35. Citarella ER, Condé-Green A, Sinder R. Triple suture for neck contouring: 14 years of experience. *Aesthet Surg J* 2010;30:311–9.
36. Le Louarn C. Hyo neck lift: preliminary report. *Ann Chir Plast Esthet* 2016;61:110–6.
37. Yousif NJ, Matloub HS, Sanger JR. Hyoid suspension neck lift. *Plast Reconstr Surg* 2016;138:1181–90.
38. Auersvald A, Auersvald LA. Hemostatic net in rhytidoplasty: an efficient and safe method for preventing hematoma in 405 consecutive patients. *Aesthet Plast Surg* 2014;38:1–9.
39. Benslimane F, Kleidona IA, Cintra HPL, et al. Partial removal of the submaxillary gland for aesthetic indications: a systematic review and critical analysis of the evidence. *Aesthet Plast Surg* 2020;44:339–48.
40. Marten T. Neck lift: defining anatomical problems and applying logical solutions. Las Vegas, USA: ASAPS Facial and Rhinoplasty Symposium; 2018.
41. Jaguar GC, Lima EN, Kowalski LP, et al. Impact of submandibular gland excision on salivary gland function in head and neck cancer patients. *Oral Oncol* 2010;46:349–54.
42. Preuss SF, Klusmann JP, Wittekindt C, et al. Submandibular gland excision: 15 years of experience. *J Oral Maxillofac Surg* 2007;65:953–7.
43. O'Daniel TG. Understanding deep neck anatomy and its clinical relevance. *Clin Plast Surg* 2018;45:447–54.
44. Ellenbogen R. Pseudo-paralysis of the mandibular branch of the facial nerve after platysmal face-lift operation. *Plast Reconstr Surg* 1979;63:364–8.
45. Stuzin JM. Discussion: a comparison of the full and short-scar face-lift incision techniques in multiple sets of identical twins. *Plast Reconstr Surg* 2016;137:1715–7.
46. Pezeshk RA, Sieber DA, Rohrich RJ. Neck rejuvenation through the lateral platysma window: a key component of face-lift surgery. *Plast Reconstr Surg* 2017;139:865–6.