# JPRAS

An International Journal of **Surgical Reconstruction**

JPRAS
An International Journal of
Surgical Reconstruction
www.JPRASurg.com

ELSEVIER

Review

# Deep neck surgery in deep plane facelifts - learning from evidence and experience

Alexandre G. Lellouch [a,b,c,d,*], Leonard Knoedler [a,e],
Michael Alfertshofer [e], Jillian Dean [f], Adriana C. Panayi [e],
Raffaele Aguglia [a], Curtis L. Cetrulo Jr. [a,b], Kevin Sadati [g]

[a] Division of Plastic and Reconstructive surgery, Cedars Sinai Hospital, Los Angeles, USA
[b] Vascularized Composite Allotransplantation Laboratory, Center for Transplantation Sciences, Massachusetts General Hospital, Harvard Medical School, Boston, MA, USA
[c] Université Paris Cité, Inserm The Paris Cardiovascular Research Center, Team Endotheliopathy and Hemostasis Disorders, Paris, France
[d] AP-HP, Hôpital Européen Georges Pompidou, Hematology Department, Paris, France
[e] Charité-Universitätsmedizin Berlin, corporate member of Freie Universität Berlin and Humboldt-Universität zu Berlin, Department of Oral and Maxillofacial Surgery, Mittelallee 2, 13353 Berlin, Germany
[f] University of Pittsburgh, School of Medicine, Pittsburgh, PA, USA
[g] Private Practice, Newport Beach, CA, USA

**Summary** Deep plane facelifts have gained popularity for their natural and long-lasting results, prompting increased focus on advanced neck rejuvenation techniques. Both clinical experience and literature support refined strategies to address platysmal laxity, glandular prominence, and fat distribution. Midline corset platysmaplasty and lateral platysma repositioning improve structural support and jawline definition. Novel plication methods, including purse-string, crisscross, and layered sutures, enhance durability and patient satisfaction. Submandibular gland reduction, subplatysmal fat excision, and selective myotomies targeting the digastric and sternocleidomastoid muscles further contribute to cervicomental contouring. Adjunctive procedures such as fasciotomies improve tissue mobility and complement deep-plane dissection. Collectively, these innovations yield high patient satisfaction and sustained aesthetic outcomes. As surgical precision and technology evolve, individualized, anatomy-driven approaches will remain central to optimizing neck rejuvenation.
© 2025 British Association of Plastic, Reconstructive and Aesthetic Surgeons. Published by Elsevier Ltd. All rights are reserved, including those for text and data mining, AI training, and similar technologies.

* Correspondence to: Division of Plastic and Reconstructive Surgery, Cedars-Sinai Medical Center, Los Angeles, CA, USA.
  *E-mail address:* alexandre.lellouch@cshs.org (A. Lellouch).

## Contents

The demand for aesthetic surgery has seen a significant rise in recent years, with deep plane facelifts emerging as a preferred technique for holistic facial rejuvenation.[1] Unlike traditional facelifts, which primarily address more superficial tissue layers, the deep plane facelift targets deeper structures, including the superficial musculoaponeurotic system (SMAS) and ligaments (zygomatic, masseteric, mandibular retaining, platysma-auricular) to achieve more natural and long-lasting results.[2,3] This approach not only enhances midface elevation but also allows for more effective neck contouring, positioning it as a powerful technique in facial rejuvenation.[4,5]

A patient-specific surgical plan is essential to appropriately integrate aesthetic and functional objectives into the preoperative strategy, particularly in cases of advanced cervical aging.[6] Deep neck surgery serves as a critical extension of deep plane rhytidectomy, enabling direct modification of key anatomical structures, including the platysma, anterior digastric bellies, submandibular glands, and subplatysmal fat, through targeted myotomies, glandular debulking, and adipose contouring to optimize the cervicomental angle.[7,8]

However, there is a lack of integrated research combining scientific knowledge with extensive clinical experience in deep neck surgery for facelift patients. To date, the majority of research on deep neck surgery in deep plane facelifts stems from single-surgeon and/or single-center retrospective outcome studies.[7,9,10] Reviewing these helps derive overarching concepts and structured treatment protocols. This review synthesizes current literature on deep neck surgery in the context of deep plane facelifts, focusing on platysma management, digastric muscle and submandibular gland reduction, liposuction, fat excision, and the role of myotomies and fasciotomies in neck contouring. By combining scientific evidence with decades of surgical expertise, this review provides insights to refine techniques, improve patient care, and optimize long-term outcomes.

## Platysma management (Figure 1)

Effective platysma management is fundamental to achieving optimal neck rejuvenation in deep-plane facelifts. The platysma, a broad, thin sheet extending from the clavicle to the mandible, plays a pivotal role in cervicomental contour and facial aesthetics. With aging, progressive medial separation of the platysma leads to vertical banding, skin laxity, and cervicomental blunting.[11] The severity of platysmal laxity and the degree of separation directly influence surgical decision-making, ranging from mild banding correctable with simple plication to severe structural loss, requiring advanced techniques such as corset platysmaplasty or extended platysma suspension. The selection of a plication technique depends on patient-specific anatomy, the degree of platysmal separation, skin quality, tissue elasticity, and functional considerations, including preservation of dynamic neck mobility and prevention of postoperative rigidity.[12] The following paragraphs review different surgical techniques to address the platysma, starting with standard midline platysmaplasty over corset platysmaplasty and lateral platysmaplasty to surgical refinements in platysmal plication.

### Midline platysmaplasty

Midline platysmaplasty involves medial approximation of the platysma to correct banding and redefine the cervicomental angle. It is suited for patients with mild to moderate midline
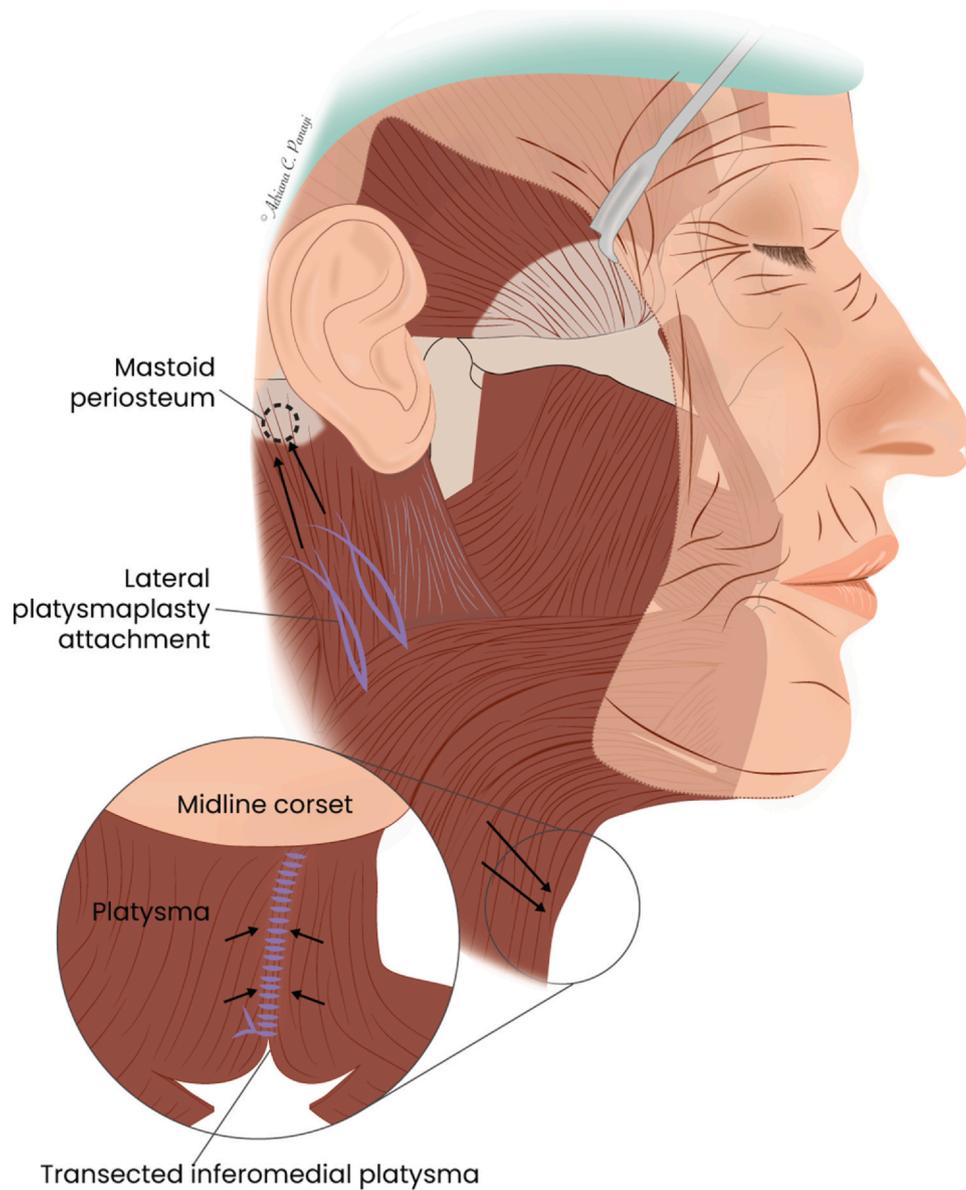
**Figure 1** Platysmaplasties: In the lateral platysmaplasty, the platysmal flap is repositioned in a supero-posterior direction and anchored to the mastoid region. When combined with midline platysmaplasty, these techniques enable the redefinition of the cervicomanidbular angle.

platysmal laxity (1–2 cm separation), particularly those with prominent vertical bands that persist despite subplatysmal lipectomy and good tissue elasticity.[12] However, it does not address lateral skin redundancy, making it less appropriate for those with significant lateral platysmal laxity. The technique is performed through a submental incision, where the platysma is exposed, trimmed if needed, and approximated using interrupted or continuous sutures, ensuring the tension is balanced to avoid over-tightening and dynamic restriction.[13] This technique forms the foundation for more advanced approaches aimed at improving durability and contour in more severe presentations.

## Corset platysmaplasty

Corset platysmaplasty extends midline plication by reinforcing the platysma with a multi-layered, overlapping suture technique, creating a rigid, supportive sling.[12] This technique is ideal for severe midline platysmal separation (> 3 cm), where simple plication is inadequate.[14] It is also beneficial for patients with recurrent banding after prior platysmaplasty, as the suture design reduces the risk of reformation. Given the 45% recurrence rate of platysmal bands in some techniques within one year, corset platysmaplasty offers a more durable solution in selected patients.[15] In cases where lateral laxity is more prominent, however, midline-focused techniques must be supplemented with additional procedures.

## Lateral platysmaplasty

Lateral platysmaplasty addresses lateral platysmal laxity, enhancing jawline definition and mitigating lateral neck skin redundancy.[16] Unlike midline plication, which primarily

improves anterior neck contour, lateral platysmaplasty repositions the platysma in the posterior neck to achieve a sharper mandibular border.[12] This technique is particularly indicated for patients with substantial lateral platysmal descent and moderate to severe skin laxity along the jawline, where medial tightening alone would be insufficient.[16] The platysma is secured to the mastoid fascia or sternocleidomastoid muscle (SCM) via periauricular incisions, allowing precise vector control depending on suture placement, thereby enabling the surgeon to optimize jawline definition while preventing distortion.[17] As techniques continue to evolve, refinements in suture strategy and vector planning further enhance the effectiveness of platysmal plication (Figure 1).

## Refinements in platysmal plication

Refinements in plication techniques allow for greater customization based on the degree of platysmal laxity and patient-specific anatomy. Purse-string platysmaplasty is particularly effective for mild to moderate laxity, using circumferential sutures to create a uniform contour, enhancing submental definition and balancing tension across the midline.[18] For cases requiring additional midline reinforcement, crisscross plication incorporates diagonal mattress sutures, creating multidirectional support that improves structural stability and reduces band recurrence by counteracting the forces contributing to vertical banding.[19] A study by Sadati et al. combined extended deep plane and high SMAS facelift techniques, minimizing skin delamination and preserving deep structures. This innovative approach, using lateral platysma purse-string hammock sutures, achieved high-definition neck contouring with enhanced jawline depth. When analyzing 134 patients, the authors reported shorter drainage durations and lower complication rates in the preservation facelift group, highlighting its efficacy and safety.[20] For more severe cases of platysmal laxity, a three-layer plication technique can be used, incorporating deep, intermediate, and superficial suture layers to maximize durability and natural mobility. This approach is particularly beneficial for patients with poor skin elasticity or those undergoing comprehensive cervicoplasty.[21] These refinements have translated into sustained patient satisfaction: 97.8% of patients rated their outcomes as 'very good' or 'beyond expectations' at one year, and 68.5% maintained high satisfaction after 12.6 years (Table 1).[22] These advanced plication strategies are further complemented by innovations in skin handling that minimize complications and improve long-term results.

## Skin delamination techniques: conventional vs. preservation approach

Skin delamination is a critical component of facelift surgery, impacting flap perfusion, tissue mobility, and long-term aesthetic outcomes. Historically, wide skin undermining was employed to facilitate redraping and repositioning, as seen in techniques popularized by Hamra et al. and Jacono et al.[23,24] While this approach enhances mobility, it also increases dead space, prolongs recovery, and elevates the risk of vascular compromise and contour irregularities. Contemporary trends have shifted toward preservation-focused methods that minimize undermining to maintain vascular integrity and retain ligamentous support. Techniques described by Sadati et al. and Roskies et al. involve limited dissection with retention of a "skin island" over cervical retaining ligaments, enabling sufficient flap mobility while reducing complications, optimizing healing, and producing more consistent and durable aesthetic results.[25,26] This evolution in skin management reflects a broader shift toward safer, anatomy-preserving strategies across all facets of cervicofacial surgery.

## Removal of submandibular glands

Submandibular gland hypertrophy or ptosis can contribute to submental fullness, especially when glandular prominence

**Table 1** Platysma Plication Techniques and Their Clinical Indications.

| Technique | Indicated Laxity Severity | Recurrence Risk | Best Patient Candidates |
|---|---|---|---|
| Midline Platysmaplasty | Mild to moderate (1−2 cm separation) | Moderate if not combined with lateral plication | Younger patients with good skin elasticity |
| Corset Platysmaplasty | Severe (> 3 cm separation, recurrent banding) | Lower recurrence than standard midline plication | Older patients, recurrent banding, poor skin elasticity |
| Lateral Platysmaplasty | Moderate to severe lateral laxity | Low when combined with deep-plane facelift | Patients with jawline blunting and lateral skin redundancy |
| Purse-String Platysmaplasty | Mild to moderate submental laxity | Higher recurrence if significant laxity is present | Patients with mild platysmal laxity requiring contouring |
| Crisscross Plication | Moderate laxity with dynamic banding | Lower recurrence than standard midline plication | Patients with dynamic platysmal bands |
| Three-Layer Plication | Severe laxity with poor skin elasticity | Very low due to reinforced multi-layer suturing | Older patients with severe platysmal atrophy |
| Platysmal Overlap Technique | Thin skin with mild to moderate laxity | Moderate, mitigated by technique precision | Thin-skinned patients needing subtle correction |
| Extended Platysma Suspension | Severe laxity with poor skin elasticity | Lowest recurrence rate, superior long-term stability | Patients requiring long-term structural support and contouring |

creates convexity despite optimal skin and platysmal contouring.[27] Submandibular gland reduction is indicated when gland fullness remains visible or palpable after addressing superficial structures, asymmetric gland prominence causes contour irregularities, or glands obscure a well-defined mandibular border.[28] Magnetic resonance imaging (MRI) is valuable for differentiating true glandular hypertrophy from subplatysmal fat, ensuring precise surgical planning. MRI provides detailed visualization of glandular architecture and surrounding musculature, helping distinguish pathological hypertrophy from age-related volume changes.[29] For unclear cases, ultrasound offers real-time evaluation of glandular volume and vascularity, with high-resolution ultrasound demonstrating efficacy in distinguishing hypertrophic glands from adjacent soft tissue fullness, refining surgical indications.[30,31]

Careful preservation of Wharton's duct and the marginal mandibular nerve is critical, as injury may lead to salivary dysfunction or nerve palsy.[32-35] Over-reduction can cause submandibular hollowness, especially in younger patients with good skin elasticity, emphasizing the importance of a patient-tailored approach. Long-term outcomes following submandibular gland reduction are highly favorable, with patient satisfaction rates exceeding 90% at one year. Studies with extended follow-up show superior contour stability in patients undergoing gland excision compared to those treated with suspension alone. A study involving 112 patients reported a 12.5% complication rate, with the most common issues being submandibular sialocele (4.5%) and marginal mandibular neuropraxia (4.5%), both of which resolved without long-term sequelae (Table 2).[28]

## Liposuction and fat excision: differentiating between subcutaneous and subplatysmal fat removal (Figure 2)

Achieving a well-defined cervicomental contour often requires addressing both subcutaneous and subplatysmal fat compartments.[17] While excess subcutaneous fat contributes to soft tissue fullness and jawline blunting, subplatysmal fat leads to deeper structural convexity that cannot be corrected through liposuction alone.[36] Careful differentiation between these layers is critical for selecting the appropriate technique, balancing aesthetic improvement with structural integrity.[37]

### Subcutaneous fat removal: liposuction considerations

Liposuction is the primary method for subcutaneous fat reduction, offering a minimally invasive approach while preserving vascular integrity and skin retraction. It is most effective in younger patients with good skin elasticity and significant superficial fat. Preoperative assessment, including pinch thickness ($> 1$ cm in the submental area) and sonographic imaging, helps distinguish subcutaneous fat from deeper fibrofatty tissues. Liposuction is performed through small incisions using fine cannulas (2-3 mm) and cross-tunneling techniques to avoid contour irregularities. Over-aggressive liposuction should be avoided to prevent dermal adherence and skin redundancy.[38] In patients with marginal skin elasticity, energy-assisted lipolysis techniques, such as

**Table 2**  Surgical Approaches for Submandibular Gland Modification.

| Technique | Indication | Key Considerations |
|---|---|---|
| Partial Gland Excision | Marked hypertrophy with excessive glandular volume | Preserves salivary function while reducing bulk |
| Glandular Debulking | Moderate hypertrophy with well-defined mandibular contour | Avoids over-reduction to prevent contour depression |
| Suspension Techniques | Gland ptosis without hypertrophy | Repositions gland rather than excising it to maintain volume |
| Hybrid Approach (Excision + Suspension) | Mixed hypertrophy and ptosis | Optimizes both volume reduction and structural support |

This table summarizes techniques such as partial gland excision, glandular debulking, suspension methods, and hybrid approaches, highlighting their specific indications and essential considerations for optimal patient outcomes.
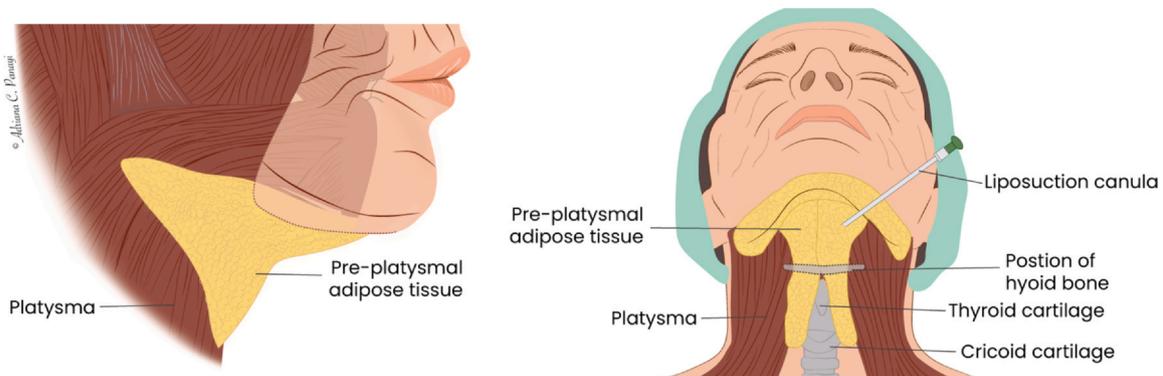


**Figure 2**  Subcutaneous adipose tissue can be aspirated by liposuction canula.
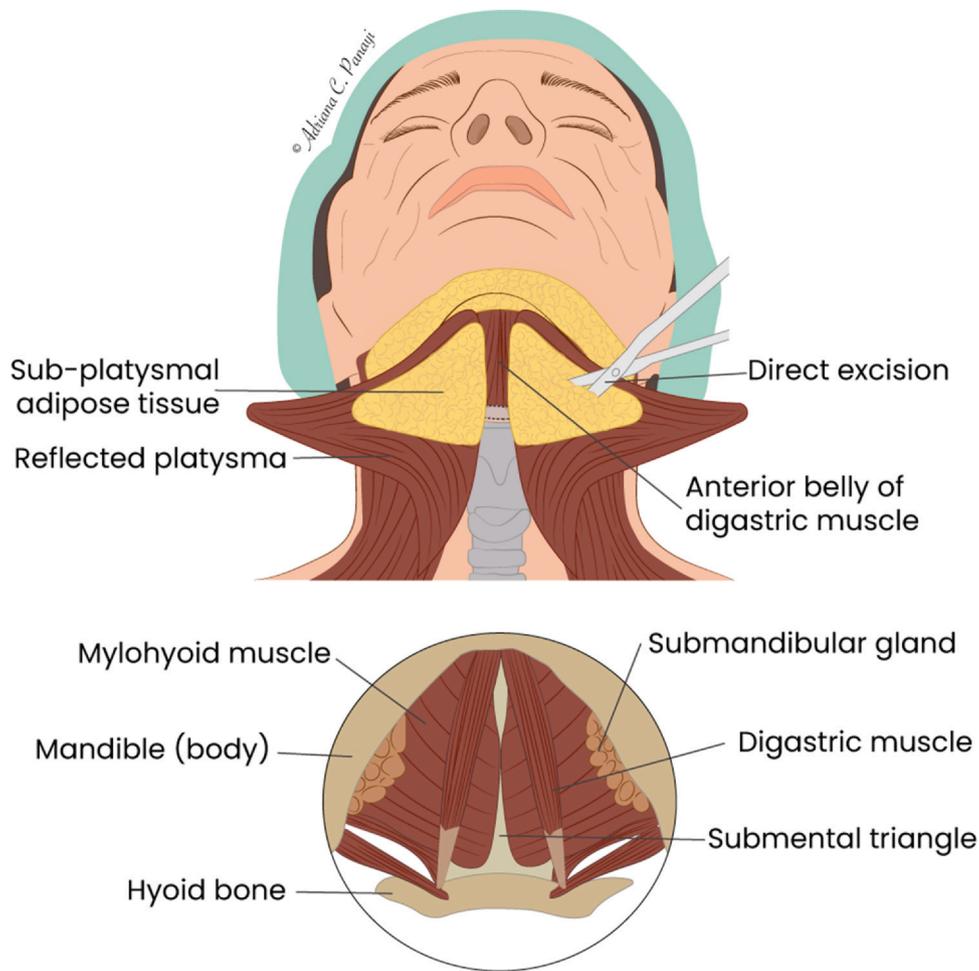
**Figure 3** Subplatysmal adipose tissue can be excised by surgical lipectomy. Visual representation and muscle anatomical relationships of the submandibular gland.

RFAL and LAL, can improve skin contraction. Studies show RFAL improves skin retraction, particularly in those with mild to moderate laxity.[39,40] These techniques are further discussed in section 3.3 (Figure 2).[38,41]

### Subplatysmal fat excision: when liposuction is insufficient

Subplatysmal fat excision is often performed alongside platysmaplasty, submandibular gland reduction, or digastric contouring in the same surgery to achieve optimal structural refinement (Figure 3).[17] Sharp and blunt dissection techniques allow for precise fat removal while avoiding excessive reduction, which can lead to contour deficiencies, increased banding, or exaggerated visibility of deeper anatomic structures.[12] Long-term outcomes indicate that subplatysmal fat excision results in more stable cervicomental contouring compared to liposuction alone, with improved definition persisting beyond five years postoperatively (Table 3).[42]

### Adjunctive considerations and emerging techniques

Energy-assisted lipolysis (RFAL, ultrasound, laser) has expanded options for neck contouring, promoting collagen remodeling and skin tightening.[43] Because excessive subplatysmal fat excision can cause hollowing, especially in younger patients with minimal skin redundancy, selective fat grafting may be used to restore volume and balance the contour. A systematic review comparing traditional liposuction to energy-assisted techniques found that multimodal approaches achieved superior skin contraction and contour retention, particularly in patients with borderline skin laxity.[42] Preoperative high-resolution ultrasound and elastography can further refine patient selection, allowing for more precise procedural planning.[44]

### Myotomies and fasciotomies in neck contouring

Surgical contouring of the deep neck in the context of deep-plane facelifts often extends beyond mere redraping of lax or excess tissue and removal of fat. Muscle and fascia incisions in the neck, myotomies and fasciotomies, can play a crucial role in relieving constriction and refining cervicomental contour. By directly addressing underlying muscular and fascial structures, these techniques help achieve an optimal neck profile. These techniques contribute to structural refinement in patients presenting with persistent

**Table 3**  Distinguishing Between Subcutaneous and Subplatysmal Fat for Optimal Aesthetic Outcomes.

|  | Subcutaneous Fat (Liposuction) | Subplatysmal Fat (Excision) |
| --- | --- | --- |
| Anatomical Location | Superficial to the platysma | Deep to the platysma, in the suprasternal space |
| Palpation Findings | Mobile, compressible fat | Firmer, deep fullness with less mobility |
| Best Patient Profile | Younger, good skin elasticity, mild to moderate fat excess | Older, deeper fat deposits, poor cervicomental definition |
| Surgical Approach | Liposuction via 2-3 mm cannulas | Direct excision via submental incision |
| Recurrence Risk | Low, but dependent on skin retraction | Low, but over-reduction risks contour defects |
| Common Adjuncts | Energy-assisted lipolysis (radiofrequency, laser) | Platysmaplasty, digastric contouring |
| Potential Complications | Skin laxity, contour irregularities | Hollowing, platysmal banding |

This table delineates the anatomical locations, palpation findings, ideal patient profiles, surgical approaches, recurrence risks, common adjuncts, and potential complications associated with subcutaneous fat (addressed via liposuction) and subplatysmal fat (managed through excision).

deep fullness, dynamic banding, or limited improvement following superficial interventions including platysma plications and suspensions.[45,46] Again, optimized patient selection and surgical execution are paramount to ensuring functional preservation and aesthetically pleasing results.[47]

## Myotomy techniques

Myotomies in the neck aim to restore a balanced and harmonious muscular architecture, maintaining function while also improving the aesthetic appearance of the neck. Advances in selective and layer-specific approaches now allow surgeons to tailor the muscle release to the patient's anatomy and degree of aging.[48]

### Platysma myotomy
Platysma myotomy is indicated when persistent banding or excessive muscle tone reduces the effectiveness of standard platysmaplasty. The surgeon makes a submental or extended cervicomental incision to access the platysma and selectively releases muscle fibers to relieve tension causing neck bands.[49] Modifications of this technique allow for customization based on the patient's anatomy.

For lateral tension, a lateral myotomy may release tension along the mandibular attachment, softening the lateral neck contour. Pezeshk et al. described a technique involving bilateral excision of a muscle wedge along its lower border, reducing tension and improving neck contouring.[50] A suture placed at the lowest portion of the muscle can further refine the result by reinforcing plication and enhancing the inferior neck profile. For central bands, a medial myotomy targets the central portion of the platysma using a vertical incision parallel to the midline.[48]

In cases where partial myotomies are insufficient, complete platysma transection can provide a more definitive solution. Meningaud et al. showed that incomplete sectioning of the platysma can contribute to band recurrence due to an anastomotic network between the cervical branch of the facial nerve and the cervical plexus.[51,52] A full-thickness transection with a 3 cm gap between the muscle edges leads to long-term aesthetic improvements with no recurrence of bands and a low complication rate.[12] For patients with both thick subplatysmal fat and prominent platysmal bands, a composite approach including fat removal, muscle transection, and flap redraping offers comprehensive cervicomental contouring.[49,53]

Careful attention is needed to avoid over-releasing the platysma, which can lead to excessive tissue laxity or unnatural submental hollowing. To mitigate this, some surgeons use closed platysma myotomy, performing selective myotomies via percutaneous incisions using specialized instruments. This minimally invasive technique reduces downtime and scarring while maintaining muscle integrity and still achieving muscle relaxation.[48] Research indicates that complete, selective suspension of the platysma enhances cervicomental contour and leads to superior long-term results.[46]

### Digastric myotomy
Hypertrophy of the anterior belly of the digastric muscle often contributes to persistent submental fullness that remains resistant to fat excision alone. In these cases, the enlarged muscle obscures the defined neck appearance typically sought in rejuvenation.[37,54,55] A recent systematic review identified the digastric muscle as the second most altered anatomical structure during deep plane neck lifts (58.6% of cases). Hypertrophy can be managed with a targeted partial myotomy via a submental incision, refining the submental profile by selectively debulking muscle tissue and enhancing neck contour.[55,56] The procedure is performed symmetrically to preserve muscle function. Talei et al. demonstrated that patients with anterior digastric hypertrophy achieve a well-defined submental profile through this approach.[7] This technique is particularly valuable when traditional fat excision fails to provide the desired contour, directly addressing the muscular contribution to submental fullness. Long-term outcomes suggest that subtotal excision offers greater contour stability than simple debulking, especially in cases of hypertrophic digastric muscles. However, in patients with neuromuscular hyperactivity, muscle thickening may occur over time, requiring long-term follow-up and adjunctive interventions. Postoperatively, most patients recover without jaw mobility impairment.[57]

### Sternocleidomastoid muscle myotomy
Among other indications, SCM myotomy has been reported as an approach in gender-affirming surgery, offering potential for refining neck contour, particularly in conjunction with deep-plane neck lifts in patients with a marked bulking in the lateral aspects of the neck. This technique aims to reduce the prominence of the SCM, contributing to a softer

neck profile. The procedure involves a controlled transection of the SCM at a predetermined level to allow for muscle retraction and subsequent atrophy. It is carefully performed to preserve critical neurovascular structures including the spinal accessory nerve while enhancing overall cervicomental aesthetics.[58] When combined with a deep-plane facelift and/or neck lift, SCM myotomy has the potential to further pronounce the jawline and smoothen lateral neck contours. While not routinely employed in neck-lifting procedures yet, this technique shows promise in addressing structural neck fullness and may become a valuable addition to facial feminization and rejuvenation procedures in general.[59]

## Fasciotomy techniques

Fasciotomies in deep-plane facelifts are designed to release restrictive fascial planes that impede effective redraping, enhancing tissue mobility, refining jawline definition, and creating a more defined cervicomental angle. This technique distributes tension along deep structures rather than superficially, reducing skin irregularities and improving long-term aesthetic stability. The subplatysmal fasciotomy targets the deep cervical fascia beneath the platysma. The surgeon carefully incises fascial attachments that tether the platysma and underlying tissues, liberating the soft tissue envelope. This release allows for smoother redraping over deeper structures, minimizing jowls and submental fullness. The technique enhances the mobility of the platysma and adjacent tissues, facilitating a more natural transition between the neck and lower face, improving aesthetic outcomes while maintaining safety.[17,60]

A refinement introduced with the hyo-neck lift technique focuses on platysma fixation to the deep cervical fascia instead of the hyoid bone.[61] Unlike traditional techniques relying on anterior corset platysmaplasty, this method ensures a posterior vector of tension, enhancing the cervicomandibular angle by flattening the submental area. This approach incorporates deep-plane fasciotomies with selective release of the pretracheal fascia and mandibular retaining ligament to improve tissue mobilization while preserving vascular integrity. It uses limited subcutaneous dissection, lateral platysma suspension to the mastoid fascia, and early postoperative botulinum toxin injections to stabilize the platysma-to-fascia fixation, preventing muscle regeneration and recurrence of platysmal bands. This method reduces recovery time, improves long-term stability, and lowers band recurrence, making it a safer and more effective alternative to conventional subplatysmal techniques. Additionally, addressing the parotidomasseteric fascia enhances cheek and jawline repositioning, contributing to more balanced facial rejuvenation.[61]

## Integrating myotomy and fasciotomy techniques in neck rejuvenation

Achieving an optimal cervicomental contour in deep-plane facelifts often requires a comprehensive approach combining myotomy and fasciotomy techniques. The neck's aging process is multifactorial, influenced by changes in various tissues, requiring more than just superficial fat

removal or platysma plication.[36,62] By reducing muscle tension and releasing restrictive fascial planes, surgeons create an environment for smoother redraping, resulting in a more defined jawline and a natural transition between the neck and lower face.

This integrated strategy is particularly effective in patients with persistent deep fullness, dynamic banding, or limited improvement following superficial interventions like liposuction and plication. For example, a selective lateral platysma myotomy reduces muscle tension along the mandibular attachment, while a concurrent subplatysmal fasciotomy frees the soft tissue envelope from tethering. Similarly, when submental fullness is caused by hypertrophic digastric muscles and dense cervical fascia, combining a digastric myotomy with a broader cervical fasciotomy improves neck contour. This comprehensive approach addresses both muscular tension and fascial rigidity, providing balanced rejuvenation that preserves function and enhances aesthetics. However, careful patient selection is crucial, as overly aggressive releases may result in functional impairment or unnatural appearance.[46,63]

## Safety and outlook

Continued advancements in platysmal plication, submandibular gland management, and fat excision have led to more durable and natural aesthetic outcomes. However, compared to more superficial neck lift techniques, the combination of deeper techniques in the neck area appears to be associated with increased risks.[64,65] Bleeding is one of them, whether immediate postoperative or delayed. Although postoperative drains can help reduce ecchymosis, they have not been shown to significantly lower the risk of hematoma.[66] Likewise, the effectiveness of quilting sutures in the context of deep neck surgery remains to be clearly established.[67] Additionally, it is important to emphasize that a thorough understanding of anatomy is essential for preserving neural structures encountered during subplatysmal neck dissection, specifically the marginal mandibular branch of the facial nerve and the great auricular nerve.[68] The use of magnification loupes and appropriate instruments, such as bipolar rather than monopolar cautery, may help reduce the risk of nerve injury.[69] As combined procedures become increasingly common, such as simultaneous submandibular gland excision, deep-plane facelifting, and myotomies, surgeons must remain vigilant regarding cumulative operative time, perioperative swelling, and compounded complication risks. Comprehensive informed consent and careful staging in high-risk patients (e.g., smokers, those with comorbidities) are critical for ensuring safety. Ethically, practitioners must balance aesthetic benefits with potential morbidity and be transparent about the limits of surgical correction.

Besides further research on the surgery, optimizing perioperative planning and screening carries the potential to advance deep plane face lifts and neck rejuvenation. For example, artificial intelligence (AI) may streamline preoperative screening and postoperative follow-ups. In other fields of plastic surgery (headache surgery, rhinoplasty, facial palsy) AI has already been investigated to improve

screening quality and increase screening through-put.[70-73] Further, AI has been used to simulate potential surgical outcomes, objectify postoperative outcomes and develop targeted treatment plans that support shared decision-making and surgeon-patient communication.[70,74-76] Despite its significant promise, the integration of AI into facial plastic surgery presents challenges, particularly in terms of data sharing and potential mismatches between simulated outcomes and actual postoperative results.[77] Clinicians must clearly communicate that AI-generated outcomes are estimations, not guarantees, and maintain oversight over all algorithmic inputs and outputs. Ongoing collaboration between clinicians, ethicists, and technologists is essential to ensure that AI applications align with medical professionalism, patient autonomy, and equitable access. Moreover, regenerative therapies (senolytics, exosome therapy, platelet-rich plasma) remain to be synchronized with surgical approaches.[78-80] In addition, bio-stimulating therapies (calcium hydroxylapatite, poly-L-lactic acid) may help further improve and preserve outcomes following neck rejuvenation and deep plane facelifts.[81]

## Conclusion

The evolution of neck contouring techniques in deep plane facelifts has significantly improved aesthetic precision and long-term patient satisfaction. Corset and lateral platysmaplasty provide enhanced support and definition, addressing various degrees of platysmal laxity. Submandibular gland management and differentiated fat removal techniques ensure comprehensive contour refinement. The incorporation of myotomies and fasciotomies further enhances cervicomental aesthetics by addressing deeper structural concerns. As surgical methodologies and techniques advance, patient-tailored approaches will continue to drive positive and sustainable outcomes in neck rejuvenation. Future long-term research is warranted to gain a deeper understanding of the longevity of the different surgical techniques.

## Ethical approval

Not required.

## Funding

## Conflicts of interest

None declared.

## References

1. Triana L, Palacios Huatuco RM, Campilgio G, Liscano E. Trends in surgical and nonsurgical aesthetic procedures: a 14-year analysis of the International Society of Aesthetic Plastic Surgery—ISAPS. *Aesthetic Plast Surg* 2024;**48**:4217–27.
2. Ackerman BM, Savalia NB. Systematic approach to deep plane facelift. *Aesthetic Plast Surg* 2025. https://doi.org/10.1007/s00266-025-04793-0.
3. Becker FF, Bassichis BA. Deep-plane face-lift vs superficial musculoaponeurotic system plication face-lift: a comparative study. *Arch Facial Plast Surg* 2004;**6**:8–13.
4. Chinta SR, Brydges HT, Laspro M, Shah AR, Cohen J, Ceradini DJ. Current trends in deep plane neck lifting: a systematic review. *Ann Plast Surg* 2025;**94**(2):222–8.
5. Bray D, Talei B. Male deep-plane face and neck lifting. *Facial Plast Surg Clin North Am* 2024;**32**:339–51.
6. Batniji RK. Why deep plane face and neck lifting results in the maximum short- and long-term results? My primary choice for rhytidectomy in my practice. *Facial Plast Surg* 2024;**40**:717–22.
7. Talei B, Gould D, Ziai H. Vectorial analysis of deep plane face and neck lift. *Aesthet Surg J* 2024;**44**:1015–22.
8. Bray D. Extended composite approach to deep plane face lifting with deep contouring of the neck and the nuances of secondary and tertiary facelifting: principles for restoration of natural anatomy and aesthetically attractive face and neck contour. *Facial Plast Surg* 2024;**40**:750–65.
9. Dodhia S, Taylor C, Barrera JE. Combined deep plane facelift/necklift and inspire hypoglossal nerve stimulator surgery. *Laryngoscope* 2025;**135**(6):2014–6. https://doi.org/10.1002/lary.32010.
10. Swanson E. Outcome analysis in 93 facial rejuvenation patients treated with a deep-plane face lift. *Plast Reconstr Surg* 2011;**127**(2):823–34. https://doi.org/10.1097/PRS.0b013e3181fed81f.
11. Trindade De Almeida A, De Boulle K, Lorenc ZP, et al. Platysma prominence: review and expert analysis of clinical presentation, burden, and treatment considerations. *Plast Reconstr Surg Glob Open* 2025;**13**:e6490.
12. Alexander L, Patel BC. *Platysmaplasty Facelift*. StatPearls. Treasure Island (FL): StatPearls Publishing; 2025.
13. Giampapa VC, Mesa JM. Neck rejuvenation with suture suspension platysmaplasty technique. *Clin Plast Surg* 2014;**41**:109–24.
14. Meningaud J-P, Pensato R, Pineau V, et al. Facelift: assessment of total platysma muscle transection to prevent the recurrence of platysmal bands. *Aesthetic Plast Surg* 2024;**48**:122–33.
15. Gomez DA, James IM, Turer DM, et al. Light-guided percutaneous neck rejuvenation with division of platysma bands and suture suspension: a multicenter retrospective study. *Aesthet Surg J* 2023;**43**:393–404.
16. Borisenko AS, Sharobaro VI, Burkhonova NS, Avdeev AE, Ahmed Alsheikh YM. Advanced surgical approaches for the rejuvenation of the submental and cervicofacial regions: a literature review for a personalized approach. *Cosmetics* 2025;**12**:26.
17. Auersvald LA, Auersvald A. Sternohyoid muscles plication and sternocleidomastoid muscles rejuvenation in neck lift: a retrospective study of 1,019 consecutive patients. *Plast Aesthet Res* 2021;**2021**.
18. Timberlake AT, Cameron Brawley C, Paul BC, Rosenberg DB. Complete platysma muscle suspension in deep-plane face-lift surgery. *Plast Reconstr Surg* 2025;**155**(4):699e–703e. https://doi.org/10.1097/PRS.0000000000011705.
19. Mueller GP, Leaf N, Aston SJ, Stone CW. The percutaneous trampoline platysmaplasty: technique and experience with 105 consecutive patients. *Aesthet Surg J* 2012;**32**:11–24.
20. Sadati K, Mathieu O, Cetrulo Jr CL, Lellouch AG. Advancements in face lift techniques: preservation face lift with a rotating

pedant flap. *Plast Reconstr Surg Glob Open* 2025;**13**(3):e6619. https://doi.org/10.1097/GOX.0000000000006619.

21. Citarella ER, Condé-Green A, Sinder R. Triple suture for neck contouring: 14 years of experience. *Aesthet Surg J* 2010;**30**:311–9.

22. Friel MT, Shaw RE, Trovato MJ, Owsley JQ. The measure of face-lift patient satisfaction: the Owsley Facelift Satisfaction Survey with a long-term follow-up study. *Plast Reconstr Surg* 2010;**126**:245–57.

23. Hamra ST. The deep-plane rhytidectomy. *Plast Reconstr Surg* 1990;**86**:53–61. discussion 62-63.

24. Jacono AA, Alemi AS, Harmon JJ, Ahmedli N. The effect of a novel platysma hammock flap during extended deep plane facelift on the signs of aging in the neck. *Aesthet Surg J* 2022;**42**:845–57.

25. Sadati K, Motakef S. Triple-C SMAS plication facelift for natural facial rejuvenation. *Plast Reconstr Surg Glob Open* 2019;**7**:e2575.

26. Roskies M, Bray D, Gordon NA, Gualdi A, Nayak LM, Talei B. Limited delamination modifications to the extended deep plane rhytidectomy: an anatomical basis for improved outcomes. *Facial Plast Surg Aesthet Med* 2024;**26**:657–64.

27. McCleary SP, Moghadam S, Le C, Perez K, Sim M-S, Roostaeian J. Age-related changes in the submandibular gland: an imaging study of gland ptosis versus volume. *Aesthet Surg J* 2022;**42**:1222–35.

28. 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.

29. Patel S, Bhatt AA. Imaging of the sublingual and submandibular spaces. *Insights Imaging* 2018;**9**:391–401.

30. Mashkevich G, Wang J, Rawnsley J, Keller GS. The utility of ultrasound in the evaluation of submental fullness in aging necks. *Arch Facial Plast Surg* 2009;**11**:240–5.

31. Kehrer A, Ruewe M, Batista da Silva NP, et al. Using high-resolution ultrasound to assess post-facial paralysis synkinesis—machine settings and technical aspects for facial surgeons. *Diagnostics* 2022;**12**:1650.

32. Lukavsky R, Linkov G, Fundakowski C. A novel approach to submandibular gland ptosis: creation of a platysma muscle and hyoid bone cradle. *Arch Plast Surg* 2016;**43**:374–8.

33. Guyuron B, Jackowe D, Iamphongsai S. Basket submandibular gland suspension. *Plast Reconstr Surg* 2008;**122**(3):938–43.

34. Kehrer A, Ruewe M, Klebuc M, et al. Objectifying the antagonistic role of the depressor anguli oris muscle in synkinetic smile formation utilizing high-resolution ultrasound—a prospective study. *Plast Reconstr Surg* 2023. https://doi.org/10.1097/PRS.0000000000010287.

35. Nahlieli O. Complications of traditional and modern therapeutic salivary approaches. *Acta Otorhinolaryngol Ital* 2017;**37**:142–7.

36. Pérez P, Hohman MH. *Neck Rejuvenation*. StatPearls. Treasure Island (FL): StatPearls Publishing; 2025.

37. Mejia JD, Nahai FR, Nahai F, Momoh AO. Isolated management of the aging neck. *Semin Plast Surg* 2009;**23**:264–73.

38. Diniz DA, Gonçalves KK, Silva CC, et al. Complications associated with submental liposuction: a scoping review. *Med Oral* 2022;**27**:e257–64. https://doi.org/10.4317/medoral.25122.

39. Chia CT, Theodorou SJ, Hoyos AE, Pitman GH. Radiofrequency-assisted liposuction compared with aggressive superficial, subdermal liposuction of the arms: a bilateral quantitative comparison. *Plast Reconstr Surg Glob Open* 2015;**3**:e459.

40. McBean JC, Katz BE. Laser lipolysis: an update. *J Clin Aesthet Dermatol* 2011;**4**:25–34.

41. Weinstein AL, Nahai F. A layered approach to neck lift. *Plast Aesthet Res* 2021;**8**:11. https://doi.org/10.20517/2347-9264.2020.192.

42. Keramidas E, Rodopoulou S. Radiofrequency-assisted liposuction for neck and lower face adipodermal remodeling and contouring. *Plast Reconstr Surg Glob Open* 2016;**4**:e850.

43. Pereira-Netto D, Montano-Pedroso JC, Aidar ALES, Marson WL, Ferreira LM. Laser-assisted liposuction (LAL) versus traditional liposuction: systematic review. *Aesthetic Plast Surg* 2018;**42**:376–83.

44. Nasreddine H, Tlaiss Y, Hassan F, Ibrahim R. Ultrasound assessment of facial and neck aging: a noninvasive approach to a minimally invasive treatment. *J Med Ultrasound* 2024;**32**:244–8.

45. Labb D, Franco RG, Nicolas J. Platysma suspension and platysmaplasty during neck lift: anatomical study and analysis of 30 cases. *Plast Reconstr Surg* 2006;**117**:2001–7.

46. Marten T, Elyassnia D. Management of the platysma in neck lift. *Clin Plast Surg* 2018;**45**:555–70.

47. Fedok F, Chaikhoutdinov I, Garritano F. The difficult neck in facelifting. *Facial Plast Surg* 2014;**30**:438–50.

48. Gonzalez R. Composite platysmaplasty and closed percutaneous platysma myotomy: a simple way to treat deformities of the neck caused by aging. *Aesthet Surg J* 2009;**29**:344–54.

49. Cambiaso-Daniel J, Giordano S, Agnelli B, Bella LL, Gualdi A. Neck lift to treat platysma bands and defining cervical angle: a systematic review and pooled analysis. *Facial Plast Surg* 2024. https://doi.org/10.1055/s-0044-1791690.

50. 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.

51. Brennan PA, Elhamshary AS, Alam P, Anand R, Ammar M. Anastomosis between the transverse cervical nerve and marginal mandibular nerve: how often does it occur? *Br J Oral Maxillofac Surg* 2017;**55**:293–5.

52. Seidel R, Wree A, Schulze M. Anastomoses (superficial cervical ansa) between the cervical plexus and peripheral facial nerve branches: implications for regional anesthesia in carotid endarterectomies – anatomical study. *Local Reg Anesth* 2021;**14**:133–8.

53. Mani M. Total composite flap facelift and the deep-plane transition zone: a critical consideration in SMAS-release midface lifting. *Aesthet Surg J* 2016;**36**:533–45.

54. Chinta SR, Brydges HT, Laspro M, Shah AR, Cohen J, Ceradini DJ. Current trends in deep plane neck lifting: a systematic review. *Ann Plast Surg* 2025;**94**:222–8.

55. Bravo FG. Reduction neck lift. *Clin Plast Surg* 2018;**45**:485–506.

56. Ghoraba SM. Deep tissue sculpture in neck rejuvenation: review of 641 consecutive cases. *Plast Reconstr Surg Glob Open* 2024;**12**(12):e6364.

57. Rohrich RJ, Sinno S, Vaca EE. Getting better results in face-lifting. *Plast Reconstr Surg Glob Open* 2019;**7**:e2270.

58. Roberts SO, Cardozo A. A detailed review of the spinal accessory nerve and its anatomical variations with cadaveric illustration. *Anat Sci Int* 2024;**99**:239–53.

59. Bhethanabotla RM, Callander JK, Wulu JA, Knott PD. Minimally invasive sternocleidomastoid muscle thinning for cervical feminization. *Facial Plast Surg Aesthet Med* 2025;**27**:91–7.

60. O'Daniel TG. Optimizing outcomes in neck lift surgery. *Aesthet Surg J* 2021;**41**:871–92.

61. Le Louarn C. Hyo-neck lift evolution: neck lift with fixation of the platysma to the deep cervical fascia. *Ann De Chir Plast Esthét* 2018;**63**:164–74.

62. Engerer N, Frank K, Moellhoff N, et al. Aging of the neck decoded: new insights for minimally invasive treatments. *Aesthetic Plast Surg* 2022;**46**:1698–705.

63. Minelli L, van der Lei B, Mendelson BC. The deep fascia of the head and neck revisited: relationship with the facial nerve and implications for rhytidectomy. *Plast Reconstr Surg* 2024;**153**:1273–88.

64. Grover R, Jones BM, Waterhouse N. The prevention of haematoma following rhytidectomy: a review of 1078 consecutive facelifts. *Br J Plast Surg* 2001;**54**(6):481–6. https://doi.org/10.1054/bjps.2001.3623.

65. Jacono AA, Alemi AS, Russell JL. A meta-analysis of complication rates among different SMAS facelift techniques. *Aesthet Surg J* 2019;**39**(9):927–42. https://doi.org/10.1093/asj/sjz045.

66. Jones BM, Grover R, Hamilton S. The efficacy of surgical drainage in cervicofacial rhytidectomy: a prospective, randomized, controlled trial. *Plast Reconstr Surg* 2007;**120**(1):263–70. https://doi.org/10.1097/01.prs.0000264395.38684.5a.

67. Auersvald A, Auersvald LA. Hemostatic net in rhytidoplasty: an efficient and safe method for preventing hematoma in 405 consecutive patients. *Aesthetic Plast Surg* 2014;**38**(1):1–9. https://doi.org/10.1007/s00266-013-0202-5.

68. Sinclair NR, Coombs DM, Kwiecien G, Zins JE. How to prevent and treat complications in facelift surgery, Part 1: short-term complications. *Aesthet Surg J Open Forum* 2021;**3**(1):ojab007. https://doi.org/10.1093/asjof/ojab007.

69. Rao KN, Zafereo M, Rao AN, et al. Implication of surgical loupes on complications following thyroidectomy: a meta-analysis. *Eur Arch Otorhinolaryngol* 2025;**282**(3):1159–69. https://doi.org/10.1007/s00405-024-09003-2.

70. Chartier C, Gfrerer L, Knoedler L, Austen WG. Artificial intelligence-enabled evaluation of pain sketches to predict outcomes in headache surgery. *Plast Reconstr Surg* 2023;**151**:405–11.

71. Knoedler S, Alfertshofer M, Simon S, et al. Turn your vision into reality—AI-powered pre-operative outcome simulation in rhinoplasty surgery. *Aesthet Plast Surg* 2024;**48**:4833–8.

72. Knoedler L, Baecher H, Kauke-Navarro M, et al. Towards a reliable and rapid automated grading system in facial palsy patients: facial palsy surgery meets computer science. *J Clin Med* 2022;**11**:4998.

73. Knoedler L, Miragall M, Kauke-Navarro M, et al. A ready-to-use grading tool for facial palsy examiners—automated grading system in facial palsy patients made easy. *J Pers Med* 2022;**12**:1739.

74. Knoedler L, Hoch CC, Schaschinger T, et al. Objective and automated facial palsy grading and outcome assessment after facial palsy reanimation surgery – a prospective observational study. *J Stomatol Oral Maxillofac Surg* 2024:102211. https://doi.org/10.1016/j.jormas.2024.102211.

75. Knoedler L, Hoch CC, Knoedler S, et al. Objectifying aesthetic outcomes following face transplantation – the AI research metrics model (CAARISMA ® ARMM). *J Stomatol Oral Maxillofac Surg* 2025;**126**:102277.

76. Frank K, Day D, Few J, et al. AI assistance in aesthetic medicine—a consensus on objective medical standards. *J Cosmet Dermatol* 2024;**23**:4110–5.

77. Kenig N, Monton Echeverria J, Rubi C. Ethics for AI in plastic surgery: guidelines and review. *Aesthetic Plast Surg* 2024;**48**(11):2204–9. https://doi.org/10.1007/s00266-024-03932-3.

78. Thau H, Gerjol BP, Hahn K, et al. Senescence as a molecular target in skin aging and disease. *Ageing Res Rev* 2025;**105**:102686.

79. Vun J, Iqbal N, Jones E, Ganguly P. Anti-aging potential of platelet rich plasma (PRP): evidence from osteoarthritis (OA) and applications in senescence and inflammaging. *Bioengineering* 2023;**10**:987.

80. Pagani A, Duscher D, Geis S, et al. The triple adipose-derived stem cell exosome technology as a potential tool for treating triple-negative breast cancer. *Cells* 2024;**13**:614.

81. Fisher SM, Borab Z, Weir D, Rohrich RJ. The emerging role of biostimulators as an adjunct in facial rejuvenation: a systematic review. *J Plast Reconstr Aesthet Surg* 2024;**92**:118–29.