

Evolution of the Surgical Net

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Abstract

The surgical net technique, originally conceptualized to mitigate postoperative hematomas, has evolved into a versatile tool, transcending its initial purpose, and signaling a new era of surgical innovation. This article provides a comprehensive overview of the surgical net's journey from a targeted solution to a multifaceted surgical asset and explores its burgeoning applications, challenges, and future trajectories. Despite early reluctance due to anatomical concerns and unfamiliarity with the novel technique, the surgical net's consistent success in various surgical contexts from facial surgeries to gynecological applications has catalyzed its widespread global adoption. The technique's integration of the progressive tension method and enhanced skin redraping capabilities underscores its contribution to optimal aesthetic outcomes and improved surgical control. Noteworthy is its role in the innovative concept of gliding surgery, marked by procedures like the gliding brow lift and Glidelift, demonstrating the surgical net's adaptability and effectiveness in diverse surgical environments.

Contributions from international surgeons have expanded its applications to areas like axillary space obliteration after breast implant, postmastectomy closure, and the management of postpartum hemorrhage, showcasing the surgical net's global impact and universal commitment to optimizing surgical outcomes. The article delves into the anatomical considerations essential for adapting the surgical net technique to various surgical contexts, emphasizing the need for continuous research, clinical trials, and multidisciplinary collaboration to navigate emerging challenges and ensure its sustained efficacy and safety.

Keywords

- ▶ hemostatic net
- ▶ surgical net
- ▶ hemostasis
- ▶ surgical Innovation

In conclusion, the article highlights the surgical net technique's unwavering potential for further advancements, greater procedural efficiency, and the continued elevation of patient care standards. The consistent evolution of its applications, paired with a dedicated approach to addressing emergent challenges, reinforces the surgical net's enduring contribution to surgical innovation and global patient welfare.

Continuous evolution and innovation define the field of plastic surgery. Within this context, the inception and advancement of the "hemostatic net," now referred to as the "surgical net," underscore this unwavering commitment to progress. Originally conceived by visionary surgeons in Brazil as an approach to treating hematomas, the hemostatic net has transcended its initial purpose.¹ Its evolution reflects the

trajectory of many surgical advancements; born out of necessity, refined through experience, and diversified in application. Today, surgeons worldwide recognize the surgical net as not merely a prophylactic adjunct but an integral component of numerous surgical procedures. This chapter embarks on a comprehensive exploration of the surgical net's journey from a pioneering solution for hematoma

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management to its contemporary and multifaceted role in global surgical practice, offering insights into its transformative impact and potential future advancements.

Historical Background

Origin

The origin of the hemostatic net lies rooted in the ancient technique of quilting stitches, a method hailing from as far back as 3400 BCE. Traditionally used to bind together the multiple layers of a quilt, these stitches have traversed from domestic usage to a groundbreaking medical application. This historical concept involves stitching through all three layers of a quilt—the top, batting, and bottom—ensuring the layers remain integrated. Without the quilting stitches, the layers would separate, shortening the lifespan of the quilt.²

Understanding the paramount role of quilting stitches in binding layers together offers a window into the modern medical adaptation of this method. The work of Mehta, in 1979, marked a significant milestone, as the authors applied the quilting stitch concept to fixate full-thickness skin grafts, an innovation they detailed in the *British Journal of Ophthalmology*.³ Their revolutionary method reduced seromas and hematomas beneath the flap by eliminating dead space and enabling adhesion even in the complex contours of the face, thereby enhancing graft survival.

The quilting stitch technique soon permeated other realms of surgery, offering solutions for challenges in various procedures. In 1997, Titley et al utilized external quilting sutures alongside drains for the donor site postlatissimus dorsi flap harvest, markedly diminishing seroma incidence.⁴ Their proposition posited that the obliterating dead space and prevention of skin and musculature shearing fundamentally minimized seroma formation.

A year later, in 1998, Baroudi and Ferreira expanded the application of internal quilting sutures to abdominoplasties, effectively reducing seroma occurrence. They had been using this strategy for half a decade, extending its use to other cases, including recurrent pseudobursae and tissue avulsion, to successfully mitigate seromas by reducing shearing forces.⁵

The dawn of the 21st century witnessed further evolution with Pollock and Pollock's publication in the year 2000, which introduced the concept of progressive tension sutures in abdominoplasties.^{6,7} These were not full-thickness stitches, but they similarly eradicated dead space, preventing fluid collections both acutely and chronically, and gained widespread acceptance for seroma reduction.

Further expanding the horizons of this technique, Pollock and Pollock applied progressive tension sutures to facelifts in 2003, eliminating dead space and distributing tension broadly across the flap, thereby minimizing complications and enhancing aesthetic outcomes.⁷ Subsequent publications, including Hudson's in 2010, echoed the advantages of quilting and progressive tension sutures in varied surgeries, underscoring their role in reducing dead space, minimizing fluid accumulation, and ensuring even tension distribution.⁸

Despite these advancements, challenges persisted, particularly regarding the comprehensive coverage of facelift flaps,

inhibiting the widespread adoption of internal progressive tension concepts in face and neck lifts. Nevertheless, the origins and evolution of the hemostatic net undoubtedly rest on the solid foundation of historical and innovative surgical techniques.

Invention

Encouraged by positive outcomes from abdominoplasty sutures and the successful implementation of transfixing sutures for flap stabilization, Auersvald and Auersvald set out to devise a more efficient method to prevent hematomas. Inspired by Pontes' work on rhytidoplasty and Rho et al's strategy to prevent hematoma after axillary liposuction for hyperhidrosis treatment, the concept of a hemostatic net began to take shape.^{1,9,10}

Initially, approaches to treating small hematomas involved bedside drainage or operative intervention for larger hematomas, with the conventional cauterization of bleeding vessels. However, recurring and minor hematomas were managed through blood aspiration and transfixing sutures to stabilize the skin and obliterate the virtual space. Concerns of potential ischemia or necrosis due to these sutures in the skin flap were quickly dispelled when quality skin healing was consistently achieved.

This successful use of transfixing sutures led to the development of a hemostatic net, initially utilized as a remedial measure for large hematomas to a preventive application against hematomas.

The hemostatic net effectively prevented hematoma occurrence in the crucial first 72 postoperative hours. This impressive outcome is attributed to a combination of factors, including total space obliteration, skin pressure on the superficial musculoaponeurotic system (SMAS)—platysma, and flap stability. Contrary to initial concerns, the hemostatic net did not increase the incidence of ischemia or necrosis. Crucial technical aspects, such as avoiding extensive cauterization and ensuring sufficient flap thickness, contributed to this success, reinforcing the paramountcy of meticulous surgical technique.^{1,11}

This is further corroborated by the initial experience of the senior author (T.G.O.D.) with the surgical net, utilized in a case with a massive and expanding hematoma. Beyond achieving hemostasis, the surgical net effectively eradicated the anticipated extended healing period commonly associated with a facelift hematoma. The expedited recovery and standardized postoperative healing can be ascribed to the complete removal of dead space and fluid accumulations (→ Fig. 1).

Initial Application

Surgical Technique

Initially, in our practice the hemostatic net was applied after facelift procedure, after tailoring, and in setting the subcutaneous flaps. This new method was executed with continuous sutures, using Mononylon 4-0 suture material with a triangular 30-mm needle, ensuring the closure of the virtual space created during the dissection of skin in the middle



Fig. 1 (A) A 68-year-old patient with deep plane facelift, deep cervicoplasty with submandibular gland reduction, anterior digastric reduction and deep fat reduction, four lid blepharoplasty, fat injections, and full-face CO₂ laser. (B) Patient presents 24 hours' postoperative, with an expanding hematoma, pending airway compromise, and uncontrolled hypertension. (C) Immediately after hematoma evacuation and application of surgical net. (D) Forty-eight hours after hematoma evacuation and application of surgical net. (E) Patient shown 3 weeks after massive hematoma evacuation without any sequelae. (F) One and half years' postoperative.

third and neck regions. For patients with very thin skin, a 5–0 nylon suture was used alternatively.

The first line of the net began in the most medial and lower neck dissection area, following a systematic needle passage pattern. This involved transfixing perpendicular to the skin, diving into the SMAS–platysma at a 45-degree angle, and reemerging at the same angle approximately 0.8 to 1 cm from the entry point. A consistent distance was maintained between stitches, ensuring that the suture would not be loose when the patient's head was turned medially. The approach aimed at bringing the SMAS–platysma into contact with the skin, effectively closing the space^{1,11,12} (► Fig. 2, ► Video 1).

Video 1

The surgical net application to close subcutaneous dead space from skin flap elevation in deep plane facelift. Online content including video sequences viewable at: <https://www.thieme-connect.com/products/ejournals/html/10.1055/a-2334-4448>.

This process was executed meticulously, ensuring all unattached areas were comprehensively covered by the hemostatic net. Once one side was finished, the opposite side underwent the same procedure, reinforcing uniformity and comprehensive coverage.

Comparative Analysis

In the initial phase, a comparison was drawn by Auersvald and Auersvald between patients treated with and without the hemostatic net. This comparison evaluated the hemostatic net's efficacy against the traditional use of a drain. The findings were substantial, marking a significant decrease in hematomas in patients treated with the hemostatic net, without any significant increase in necrosis or ischemia of the flap. This compelling outcome offered evidence in favor of the hemostatic net's efficacy, giving it a place as a promising tool in postfacelift procedures.¹

Challenges

The incorporation of the hemostatic net in facelift procedures initially met with a series of challenges and skepticism, a common reception toward novel medical approaches.

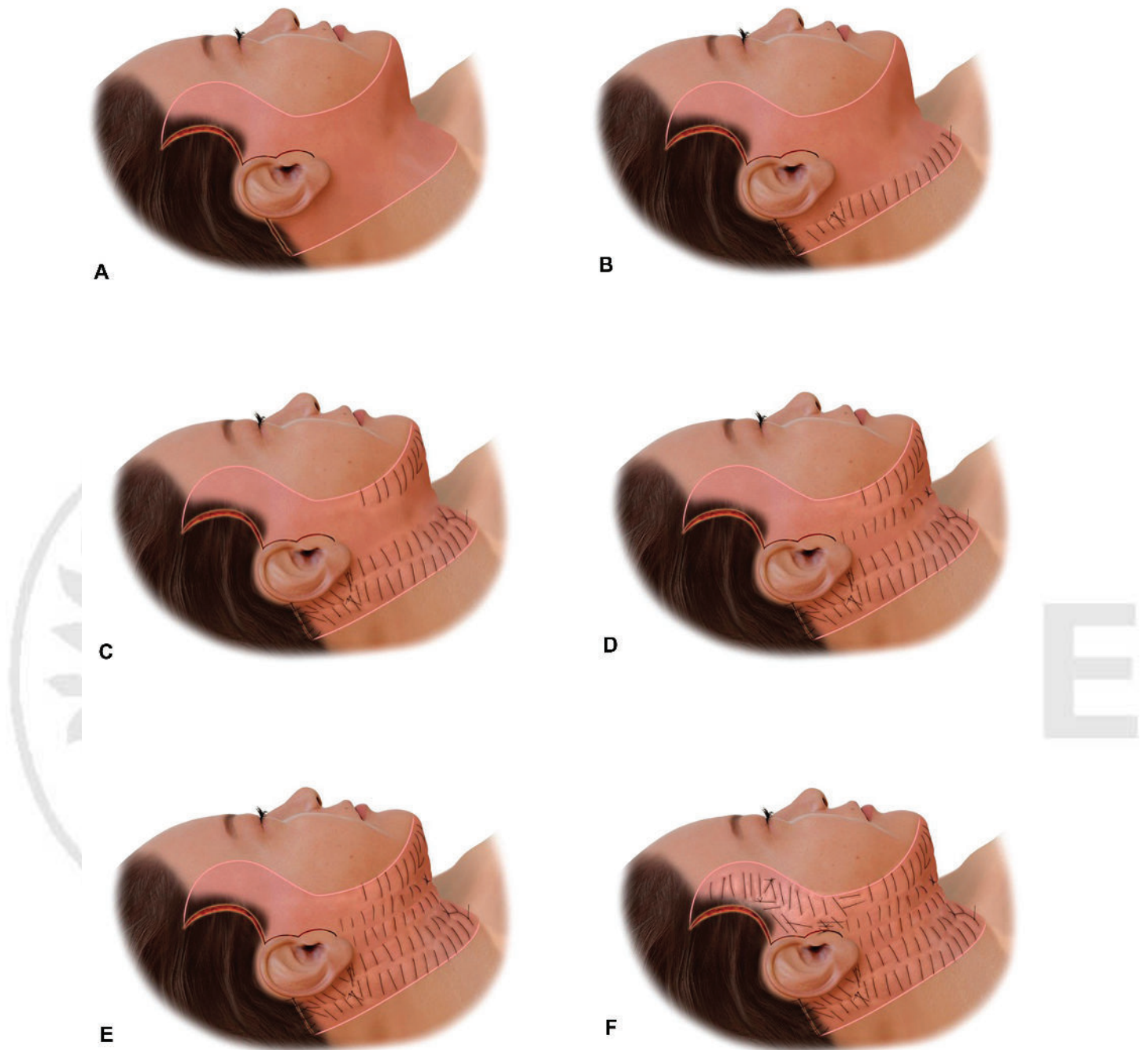


Fig. 2 (A) Area of skin undermining marked for surgical net application. (B) With assistants stabilizing the skin flap in the optimal position, the first row of suture is placed in inferior most aspect of skin undermining. Each pass of the needle must include a pass through the underlying soft tissue to obliterate the dead space. A 4-0 nylon with a 30-mm cutting needle is utilized. (C) The skin along the jawline is redraped and secured with the second row. (D) The skin in the dependent jawline is secured superior to the cervicomandibular line. (E) The neck skin is secured with the final row of sutures. (F) Facelift flap is secured to the underlying SMAS and temporalis fascia. SMAS, superficial musculoaponeurotic system.

Below is an expanded and comprehensive exploration of each challenge and the corresponding responses:

Initial Aesthetic Concerns

- Challenge: a foremost concern was the initial appearance after surgery. The unique look, described as barbaric by some, led to doubts about patient acceptance¹² (→Fig. 1C).

- Response: clear and detailed patient education and consultation played a critical role in addressing this concern in our practice. By providing images and comprehensive explanations regarding the temporary nature (48–72 hours) and the significant benefits of the hemostatic net, patients' apprehensions were considerably alleviated. Surgeons worldwide reported a similar favorable patient response, with many noting that past patients questioned

why they didn't have it, and some patients sought out the surgeon specifically for this technique.

Questioning the Necessity

- Challenge: the necessity of the hemostatic net was queried, especially considering the above-average hematoma rate reported by Auersvald and Auersvald.^{1,11}
- Response: addressing this challenge required highlighting the significant complications that hematomas can cause after facelift surgery. Hematomas can lead to severe complications like flap ischemia and tissue loss, possibly resulting in life-threatening situations and disfiguring scars. Highlighting the crucial role of the hemostatic net in effectively preventing these complications justified its use in facelift surgeries.¹²

The senior author (T.G.O.D.) has encountered four small, delayed hematomas in 1,000 consecutive surgical net cases compared with a 1.6% hematoma rate prior to the adoption of the net. Each one was treated with evacuation under local anesthetic with reapplication of a small surgical net (►Fig. 3, ►Video 2).

Video 2

Management of delayed hematoma with aspiration and surgical net application. Online content including video sequences viewable at: <https://www.thieme-connect.com/products/ejournals/html/10.1055/a-2334-4448>.

Added Operation Time

- Challenge: surgeons were concerned about the extra time the technique would add to the surgical procedure.
- Response: the added time was shown to be a reasonable trade-off considering the significant reduction in hematoma-related risks and complications, thus improving the overall surgical and recovery experience for both the patient and the surgical team.¹²



Fig. 3 (A) A 68-year-old patient with preoperative deep plane facelift, deep cervicoplasty, fat injections, and full-face CO₂ laser. (B) Ten days' postoperative with localized lower neck hematoma. (C) Ten days' postoperative immediately after evacuation of localized lower neck hematoma and surgical net application. (D) Two years' postoperative.

Comparison with Other Products

- Challenge: surgeons compared the hemostatic net with other existing hematoma and seroma prevention methods, questioning its relative effectiveness.
- Response: emphasizing the unique ability of the hemostatic net to reduce hematoma occurrences predictably and safely, in contrast to other methods, highlighted its distinctive and superior efficacy. The stabilization it provides to the surgical area significantly reduces the risks associated with postoperative neck movement, further endorsing its use.^{1,11}

The surgical net has essentially eliminated the occurrence of seromas in our facelift procedures. We frequently experienced serous fluid accumulation under the skin flaps, especially in the dependent submental triangle. Since the adoption of the surgical net we have encountered two seromas in the temporal face without occurrence in the most dependent skin flaps in the submental triangle. Both seromas were managed with aspiration of seroma in the office with reapplication of the surgical net (►Fig. 4, ►Video 3).

Video 3

Management of delayed seroma formation with aspiration and surgical net application. Online content including video sequences viewable at: <https://www.thieme-connect.com/products/ejournals/html/10.1055/a-2334-4448>.

Concerns about Skin Ischemia or Necrosis

- Challenge: questions about potential skin ischemia or necrosis due to the tourniquet-like effect of the hemostatic net were raised.
- Response: a meticulously conducted SPY perfusion-based study effectively quelled these concerns. The study, which measured baseline flap perfusion pre- and postnet

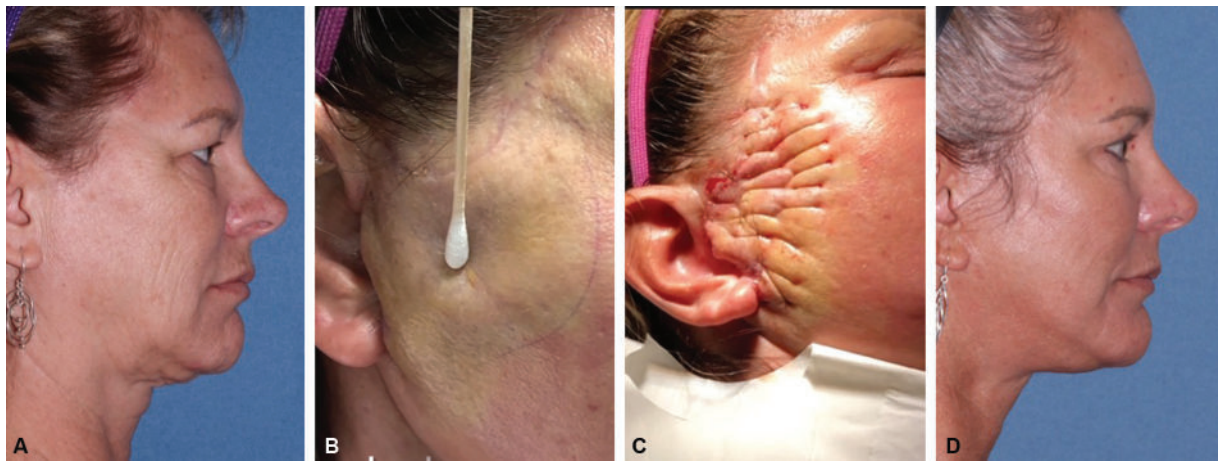


Fig. 4 (A) A 54-year-old patient with preoperative facelift, fat injection, and CO₂ laser. (B) Seroma formation on postoperative day 9. (C) Seroma aspirated and surgical net application on postoperative day 9. (D) Two years' postoperative facelift, fat injection, and CO₂ laser and treatment of seroma.

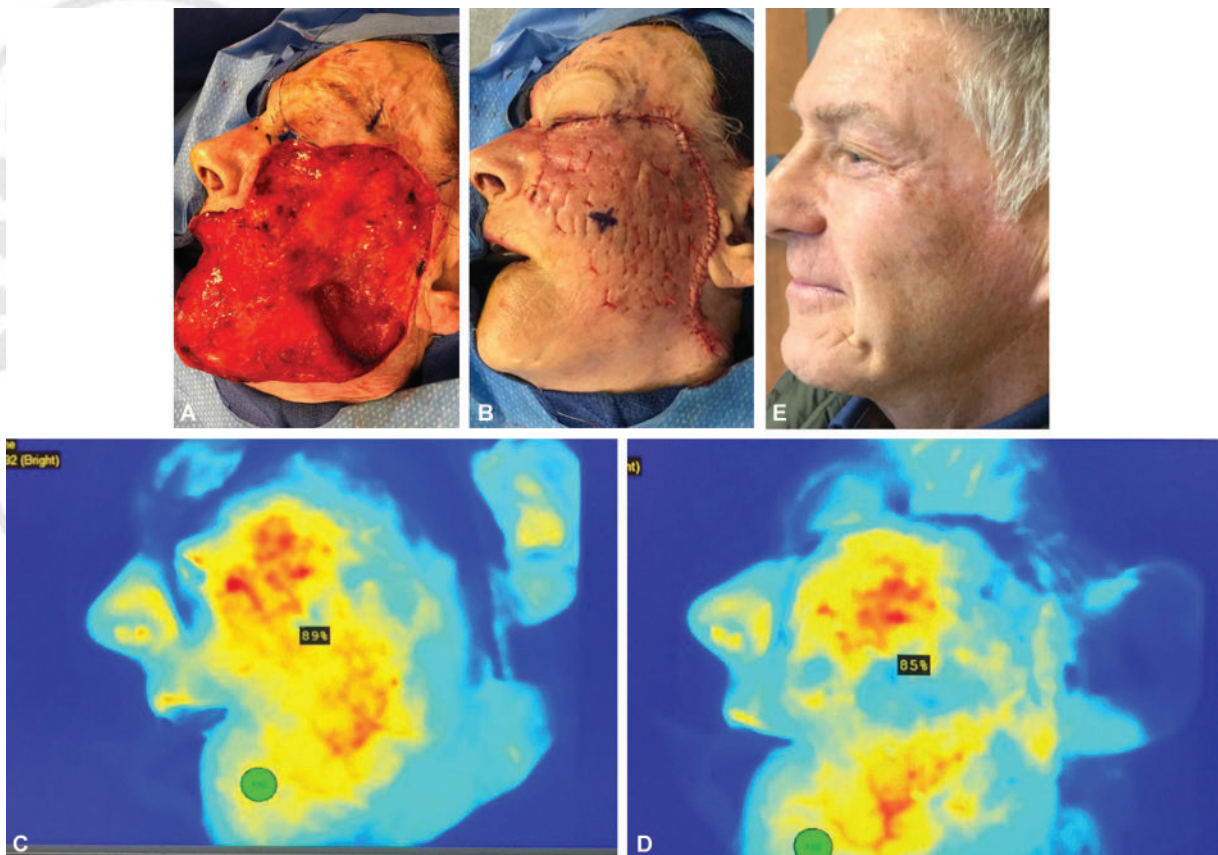


Fig. 5 A 68-year-old M s/p melanoma resection with involvement of the left upper and lower eyelid who underwent cervicofacial flap and lateral canthopexy. (A) Surgical defect after resection. (B) Intraoperative view of flap inset and net applied. (C) Intraoperative SPY image after cervicofacial flap inset, before application of the net (A). (D) Intraoperative SPY image after application of the net. (E) The patient 6 weeks postoperatively.

application, found an insignificant difference in relative values, thereby providing quantitative support against the possibility of increased tissue ischemia or necrosis^{12,13} (→ Fig. 5). Further evidence affirming the safety of the surgical net comes from anatomical and radiological perfusion studies conducted on cadavers, which showed that the application of the surgical net did not interfere with perfusion.¹⁴

Potential Damage to Vessels or Nerves

- Challenge: there were fears of inadvertently damaging vessels or nerves due to the blind suture application of the hemostatic net.
- Response: accumulated surgical experiences and observations reported no incidents of permanent paresis of

nerves. The hemostatic net's continuous, superficial sutures, and delicate needles minimized the risk to facial nerves and vessels, further substantiated by postoperative Doppler ultrasonography showing maintained vascular flow of the jugular vessels.¹⁵ Additionally, a recent study used a rat model to examine the effects of needle penetration on a peripheral nerve, mimicking unintended nerve penetration during the application of a surgical net. The researchers observed no instances of extended nerve impairment, and histological evaluations revealed no structural impact on any of the specimens.¹⁶

Track Marks/Skin Pigmentation

- Challenge: concerns were raised about the possibility of persistent track marks or hypo/hyperpigmentation after surgery.

- Response: real-world application data revealed minimal to no lasting pigmentation issues. Any transient hyperpigmentation, experienced by a minor percentage of patients, typically resolved within 3 months with the use of 2% hydroquinone lightening cream (→ Fig. 6). Hypopigmentation is a rare occurrence in our practice at less than 0.2%. High-risk patients are identified as those with significant solar damage and Poikiloderma of Civatte with evidence of preexisting hypopigmentation^{1,11,12,15} (→ Fig. 7).

In summation, the hemostatic net, despite initial resistance, has proven its significant value in facelift surgeries. Thorough patient education, detailed comparative evaluations with existing procedures, and solid, evidence-backed responses to concerns about potential damage to the skin and vascular system have successfully mitigated the challenges faced. The global surgical community continues to



Fig. 6 (A) A 56-year-old patient with a Fitzpatrick skin type 4 preoperative deep plane facelift and deep cervicoplasty. (B) Forty-eight hours s/p deep plane facelift and deep cervicoplasty with surgical net in place. (C) Four weeks' postoperative with hyperemic needle marks. (D) Six weeks' postoperative with postinflammatory hyperpigmentation (PIH). Patient being treated with 2% hydroquinone. (E) One postoperative with resolution of PIH.



Fig. 7 (A) A 63-year-old patient with preoperative face and neck lift with poikiloderma of Civatte. (B) The surgical net in place. (C) One-year postoperative demonstrates the areas of hypopigmentation from the surgical net.

witness the growth and increasing acceptance of the hemostatic net.

Evolution of the Technique

The broadened horizon of hemostatic net applications encompasses numerous pivotal areas. Initially utilized as a hemostatic tool, the net now plays a vital role in controlling multiple variables at the conclusion of surgery, and thus referenced to as the surgical net. The meticulous application of the net not only upholds its fundamental purpose of hemostasis by eliminating dead space and reducing the shearing effect, akin to the quilting method, but also seamlessly integrates the progressive tension method. This integration is achieved by applying gentle traction on the skin during its application, ensuring the uniform distribution of tension across the entire surgical area and thereby averting excessive stress on the suture line.^{12,15}

In addition to these advancements, the surgical net's role in enhanced skin redraping proves invaluable. This is done by the involvement of assistants, holding retractors or skin hooks to provide adequate tension in the appropriate vector as the net is applied. This allows precise skin redraping and securement in the preferred position, permitting surgeons to effectively

shape and contour the operated area even in patients with significant excess of poor-quality skin (► Fig. 8).

This refined control translates to more predictable and desirable results, highlighting the surgical net's contribution to improved surgical control and outcomes.¹² With all the aforementioned benefits, the surgical net can offer unparalleled control over various postoperative factors, some of which were considered uncontrollable, stands out as a monumental advancement. This heightened control culminates in more consistent, predictable, and satisfying outcomes, bolstering both patient and surgeon satisfaction (► Fig. 9).

Expansion of its Application

The diverse utility and numerous benefits of the surgical net have notably paved the way for groundbreaking advancements and the development of innovative surgical procedures. Surgeons worldwide have started to integrate and modify the concept of the surgical net into their practices, fully utilizing its extensive benefits.

The surgical net's emergence has also birthed the innovative concept of gliding surgery, marked notably by Dr. Fausto Viterbo's gliding brow lift.¹⁷ This pioneering technique uses subcutaneous frontal detachment with minimal incisions,



Fig. 8 (A, D) Preoperative appearance of a 73-year-old patient with excessive poor-quality lower neck skin. (B, E) Forty-eight hours postoperatively high lateral SMAS face lift with buccal fat pad suspension, deep cervicoplasty, and fat grafting with surgical precisely redraping cervical skin. (C, F) Three years' postoperative shows good redraping of skin. (G) 22-year-old photo for comparison. SMAS, superficial musculoaponeurotic system.



Fig. 9 (A, D, G) A 58-year-old patient with massive weight loss and obstructive sleep apnea with significant laxity and redundancy of skin in the inferior neck that requires low release of skin that has significant risk for postoperative bleeding. (B, E) Surgical net applied to the lowest aspects of the neck. (D, F, H) One-year postoperative.

utilizing the surgical net for temporary cutaneous fixation, enabling precise reshaping and stable elevation of the eyebrow. Based on Mendelson's gliding planes, gliding surgery emphasizes strategic development of surgical spaces between tissue layers, thereby allowing these layers' adjustment after release.¹⁸ The surgical net assists in postgliding fixation, ensuring the customization, control, and stability of the outcomes while significantly reducing the recovery time by minimizing dead space, hence lowering the risk of hematomas and seromas.¹⁹

Our observations, along with those of other early adopters of the surgical net, indicate that the limited fixation of 48 to 72 hours is adequate to reliably hold the tissue in the desired position for favorable long-term results. We hypothesize that the elimination of "microfluid" collections allows rapid adhesions to the underlying soft tissues. Furthermore, each suture fixation point may serve as a source of inflammation, contributing to multiple points of fixation. The redraping of skin without excision aligns with the "skin accommodation" observations described by Dumas et al.²⁰

This innovative approach has fueled the evolution and expansion of gliding surgery into a myriad of surgical procedures including extended brow lifts, closed facelifts, lip lifts, jowl lifts, periorbital shaping, and midface lifting to mention a few. This evolution is epitomized by both Ozan Sozer's Glidelift, giving patients periorbital shaping and a midface lift with hidden scars, as well as the senior author's gliding perioral lifts. The ability to lift and reshape the lateral

lip utilizing a limited subnasal skin excision with subaponeurotic release of the lateral lip, mouth corner, and adjacent jowls with customized fixation with the application of the surgical net clearly demonstrates the efficacy of the concepts and principles of gliding surgery^{21,22} (–Fig. 10).

Other Applications

With the progressive advancement of time and burgeoning interest, the global surgical community is observing the diverse and increasing application of the surgical net technique across a multitude of surgical contexts. Numerous surgeons have adopted and modified the technique for various purposes.

The surgical net has been used to prevent bruising in gynecomastia and applied for obliterating the axillary space after breast implant inclusion. It also has been utilized for postmastectomy closures, for treating late seroma after orthopaedic surgery and for recruiting eyelid skin cranially for the treatment of ectropion. It has also found use in managing dead space after large lipoma resection.²³

Additional utilization spans lateral breast liposuction, abdominoplasty, and one such publication on supratip fine-tuning in rhinoplasties.^{24,25} It has been leveraged to avoid hematoma after gynecomastia surgery and continues to find use in skin grafts, flaps, latissimus donor sites, and other breast surgeries, as well as the continued treatment of axillary hyperhidrosis.^{26,27} In the realm of gynecological surgery, the



Fig. 10 (A, C) Preoperative photographs of a 73-year-old patient after previous face lift, neck lift, and lip lift by unknown surgeon. (B, D) Seventy-two hours after deep plane secondary facelift, fat grafting, and perioral jowl lifting. (E, F) One-year postoperative.

surgical net technique is making significant contributions to the management of postpartum hemorrhage by controlling bleeding and potentially preventing hysterectomies.²⁸

The increasing application and myriad of uses demonstrate the surgical net technique's adaptability, offering new pathways for innovation and improvement in numerous surgical fields, ensuring better, safer, and more effective outcomes for patients worldwide.

New Challenges

As the application of the surgical net technique broadens, new horizons of surgical innovation are concurrently shadowed by emerging questions and challenges. This development indicates the necessity for a renewed, rigorous examination, and adaptation of the method for diverse anatomical contexts. Despite the proven benefits in facial surgeries such as minimized scarring and pigmentation changes and assuring lasting results after 48 to 72 hours, these successes prompt a revisit to original concerns as the technique's application expands. The unique anatomy of the face, with its distinct vessel and nerve structures, may not mirror the anatomical contexts of other surgical sites, thereby necessitating a careful,

context-specific reassessment of the surgical net technique's applicability and effectiveness.

Different anatomical regions pose distinct challenges and variables that may not align with the successful outcomes witnessed in facial applications of the surgical net. A deliberate, nuanced understanding and approach to varying anatomical structures are imperative to ensure the surgical net technique's efficacy and safety across diverse surgical contexts and regions. As the surgical net technique permeates various surgical fields, its adaptation must be rooted in a robust understanding of the specific anatomical, physiological, and surgical contexts to maintain and enhance its beneficial impacts.

Continuous research, clinical trials, and multidisciplinary collaboration are essential to navigating the emerging challenges, ensuring the surgical net technique's evolution aligns with the paramount goal of optimized patient outcomes and surgical excellence.

Future

The trajectory of the surgical net technique mirrors the archetypal stages of the Invention Development Pyramid,

underscoring its evolution from a conceptual solution to a widely recognized and adopted surgical tool. The inception of the surgical net technique was rooted in the identified need to mitigate the prevalence of hematomas postoperatively, spotlighting a critical area for surgical enhancement.

In the awareness of solutions stage, despite the existence of alternative methods, the surgical net emerged as a pioneering approach, offering a novel solution to the longstanding challenge of postoperative hematomas. Systematic research and clinical application have fortified the proof of concept for the surgical net technique, demonstrating its effectiveness and utility in real-world surgical contexts.

Initial market hesitancy, largely attributed to ingrained cognitive biases and resistance to novel techniques, gradually dissolved as the tangible benefits and successes of the surgical net technique were consistently showcased in the market responsiveness stage. Enhanced patient outcomes and surgical efficiency have bolstered the technique's acceptance and integration within the surgical community.

In the improvement and substitution stage, current advancements in the surgical net technique epitomize this stage, where widespread adoption has spurred innovative applications, modifications, and refinements. Surgeons now increasingly harness the surgical net across diverse surgical contexts, continuously enriching its functionality, versatility, and impact.

Looking to the future, the surgical net technique stands on the cusp of an exciting future, marked by continuous evolution, adaptation, and innovation. Surgeons and medical researchers will likely unveil new dimensions, applications, and enhancements, further solidifying the surgical net's position as an indispensable asset within the surgical armamentarium. This sustained growth and development will inevitably necessitate a proactive approach to navigating emergent challenges, ensuring the surgical net technique's unwavering commitment to surgical excellence and optimized patient well-being.

Conclusion

The surgical net, originally developed as a solution to postoperative hematomas, has evolved into a versatile tool that extends far beyond its initial design. From its role in ensuring hemostasis and addressing various postoperative issues to spearheading groundbreaking procedures like gliding surgery, the surgical net underscores its dynamic and adaptable nature. Globally, surgeons acknowledge its efficacy in a diverse range of contexts, such as postmastectomy closures, managing late seromas, and even in pivotal roles within gynecological surgery, like addressing postpartum hemorrhage. Notwithstanding initial hesitations and anatomical reservations, its proven versatility and consistent successes have fostered its widespread adoption and iterative evolution within the surgical community. Traversing the stages of the invention development continuum from identifying the problem to its consistent refinement, the surgical net's trajectory exemplifies the spirit of surgical innovation. Its origins in addressing hematomas have expanded into a broad array of applications, heralding a future of enhanced surgical

outcomes and pioneering techniques. As the global surgical community progressively incorporates and refines the surgical net's applications, its future seems poised for unparalleled advancements, procedural excellence, and a relentless pursuit of elevated patient care standards. This dynamic evolution, coupled with a steadfast dedication to surmounting emergent challenges, epitomizes the surgical net's seminal role in shaping surgical innovation and championing patient well-being.

Conflict of Interest

None declared.

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THIEME