

Review Article

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Wound closure techniques and postoperative wound management in aesthetic surgery: an evidence-based narrative review

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ABSTRACT

Optimal wound closure and postoperative wound management are critical determinants of outcomes in aesthetic surgery, where success is defined not only by complication avoidance but also by scar quality and patient satisfaction. This narrative review synthesizes current evidence on layered closure strategies, suture materials and techniques, tension-reducing methods such as progressive tension sutures, and postoperative topical wound and scar management. Particular attention is given to topical agents commonly used in Latin American clinical practice, including acexamic-acid-based formulations (Recoveron®/Recoveron N®) and pirfenidone-based topical therapy (commercially aligned with Kitoscell-Q®).

Keywords: Aesthetic surgery, Layered wound closure, Progressive tension sutures, Scar management, Topical wound therapy, Pirfenidone

INTRODUCTION

In aesthetic surgery, wound healing quality directly influences the final cosmetic result. Procedures such as abdominoplasty, mastopexy, rhytidectomy, and body contouring require closure techniques that minimize tension, reduce dead space, and promote favorable scar maturation. Poor closure mechanics may result in hypertrophic scarring, wound dehiscence, or contour distortion, even in the absence of infection.¹⁻¹⁰

Modern approaches emphasize biomechanical principles, particularly layered closure and tension redistribution, combined with evidence-based postoperative scar modulation.^{3,6,7}

PRINCIPLES OF WOUND CLOSURE IN AESTHETIC SURGERY

Layered closure is the cornerstone of aesthetic wound management. The majority of tensile forces should be absorbed by deep tissue layers, including the superficial

fascia and deep dermis, allowing the epidermis to be approximated under minimal tension. This strategy reduces ischemia at the wound edges and improves long-term scar quality (Figure 1).^{3,6,11-13}

Control of dead space is equally important, as persistent shear forces and fluid accumulation can prolong inflammation and negatively affect scar maturation. Techniques such as progressive tension sutures (PTS) address both seroma prevention and aesthetic outcomes by stabilizing tissue planes.^{6,7,11-13}

SUTURE MATERIALS AND TECHNIQUES

Continuous versus interrupted sutures

A randomized controlled trial comparing continuous subcuticular and interrupted closure demonstrated that continuous techniques can achieve comparable or superior cosmetic outcomes while improving efficiency and uniform tension distribution.¹

However, interrupted sutures may still be preferable in anatomically complex or high-mobility areas (Figure 2).

Barbed sutures in aesthetic surgery

Barbed sutures have gained popularity in aesthetic procedures due to reduced closure time and even force distribution along long incisions. A randomized trial in plastic surgery demonstrated their safety and effectiveness when used in appropriate tissue planes.⁴ Proper technique is essential to avoid suture extrusion or superficial placement.¹⁴⁻¹⁶



Figure 1: Layered closure. Maxon 3-0 sutures and subdermal suture with Monocryl 4-0. Lipoabdominoplasty.



Figure 2: Closure of nipple-areola complex with continuous sutures. Layered. Nylon 5-0.

Progressive tension sutures

Progressive tension sutures have been validated in a prospective randomized double-blind trial showing reduced postoperative seroma formation following abdominoplasty.⁶ Their integration into aesthetic surgery supports improved wound stability, reduced dead space, and enhanced scar outcomes.

Barbed sutures have also been successfully combined with PTS techniques to improve efficiency without compromising results.⁷

ADJUNCTIVE CLOSURE METHODS

Tissue adhesives, particularly cyanoacrylate-based products, have been evaluated as alternatives or adjuncts to conventional sutures. A recent meta-analysis demonstrated comparable outcomes in clean surgical wounds, supporting their use as epidermal adjuncts in low-tension aesthetic closures rather than as substitutes for layered closure.^{2,17-20}

Figure 3 shows intermediate phase healing 1-month intradermal technique and simple stitches.



Figure 3: Intermediate phase healing 1-month intradermal technique and simple stitches.

POSTOPERATIVE SCAR AND WOUND MANAGEMENT

Silicone-based therapy

Silicone gel remains one of the most evidence-supported interventions for preventing hypertrophic scarring. A randomized, placebo-controlled, double-blind clinical trial demonstrated significant reduction in hypertrophic scar development with topical silicone gel application.⁵ This modality is widely applicable in aesthetic surgery due to its favorable safety profile.

Topical antibiotics

A systematic review and meta-analysis found no significant benefit of routine topical antibiotic prophylaxis in clean or clean-contaminated surgery.⁸ In aesthetic surgery, routine use should therefore be avoided in favor of meticulous surgical technique and judicious postoperative care.

Acesamic-acid-based topical therapy (Recoveron® / Recoveron N®)

Acesamic-acid-based topical formulations, commercially referenced as Recoveron®, have been used as comparators in controlled wound-healing studies.⁹ While these data do not validate all commercial variants, they support discussion of Recoveron-based therapy as an adjunct in

wound care, particularly in regions where it is routinely used. Any formulation containing antibiotics, such as Recoveron N®, should be used selectively in accordance with antimicrobial stewardship principles.^{8,9}

Pirfenidone-based topical therapy (Kitoscell-Q®)

Pirfenidone exhibits antifibrotic properties and has demonstrated clinical benefit in scar modulation. A

controlled clinical trial in pediatric burn patients showed improved outcomes in hypertrophic scars treated with topical pirfenidone.¹⁰ Additional randomized data in chronic wound healing further support its role in regulating inflammation and extracellular matrix remodeling.¹⁰ These findings provide a scientific basis for pirfenidone-based topical therapy in high-risk aesthetic scars. Table 1 shows comparative overview of wound closure methods and scar-prevention adjuncts.

Table 1: Comparative overview of wound closure methods and scar-prevention adjuncts.

Domain	Options	Best-use aesthetic scenarios	Main upside	Main cautions
Dermal/epidermal pattern	Running subcuticular versus interrupted	Long, low-curvature incisions; cosmesis-focused skin alignment	Efficiency; even tension distribution	Less “micro-control” at corners/complex geometry
Long-incision technology	Barbed versus conventional sutures	Abdominoplasty/large excisions; efficiency needs	Faster closure; distributed load	Technique-sensitive; extrusion risk if superficial
Dead space strategy	Progressive tension sutures	Abdominoplasty; flap advancement body contouring	Reduced shear/dead space; may reduce interventions	Added operative time; learning curve
PTS + barbed implementation	Barbed PTS closure	Efficiency-focused abdominoplasty protocols	Shorter time while maintaining PTS concept	Same PTS principles still required
Epidermal adjunct	Tissue adhesive	Low-tension wounds; add-on over layered closure	Barrier + simplified aftercare	Not a substitute for deep tension control
Scar modulation	Silicone gel	Early postoperative scar prevention in higher-risk patients	Noninvasive; controlled trial support	Requires adherence; dermatitis rare
Topical antibiotics	Ointment/cream antibiotics	Select high-risk scenarios (not routine clean wounds)	High local concentration	Stewardship; dermatitis/resistance concerns
“Regional” topicals	Recoveron® (acexamic-acid-based)	Adjunctive wound care where locally used	Clinical utilization in research context	Product variants differ; avoid over-claiming
Antifibrotic topical	Pirfenidone gel (e.g., Kitoscell-Q®-aligned)	High-risk hypertrophic scarring; early hypertrophic signs	Controlled clinical trial scar improvement	Availability/regulatory differences

CONCLUSION

Effective wound closure and management in aesthetic surgery require a biomechanics-driven approach emphasizing layered closure, tension redistribution, and dead-space control. Evidence supports selective use of barbed sutures, progressive tension sutures, silicone gel, and antifibrotic topical agents such as pirfenidone. Routine topical antibiotic use is not supported in clean aesthetic procedures. Integration of these evidence-based strategies optimizes both surgical safety and aesthetic outcomes.

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