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REVIEW ARTICLE

A review of epidermal closure materials in dermatologic surgery: Impact on cosmetic outcome, infection and cost.

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ABSTRACT

The selection of epidermal closure material in dermatologic surgery is influenced by multiple factors, including the type of material (absorbable vs. non-absorbable, and tissue adhesive), tension, postoperative bleeding/infection risk, cosmetic outcome and cost. This review article focuses on the different epidermal closure materials commonly utilized in dermatologic surgery and examines their impact on cosmetic outcome, infection rate and cost. Tissue adhesives provide comparable cosmetic outcomes to sutures and may offer a slight advantage in certain cases. Infection rates are lower with tissue adhesives due to their bactericidal properties, while absorbable and non-absorbable sutures show similar infection risks. Cost analysis reveals minor differences, with tissue adhesives and sutures having comparable overall expenses when factoring in material costs and follow-up care. The choice of closure material should be guided by wound characteristics, patient preference, and clinical context.

Introduction

In dermatologic surgery, the choice of epidermal closure material plays a pivotal role in both functional and cosmetic outcomes. Surgeons must weigh numerous factors—including anatomic location, defect size, skin tension, and patient-specific considerations such as age and healing capacity—when determining the most appropriate closure technique and material[1]. A dermatologic surgeon's familiarity with the wide array of surgical techniques and closure materials is essential for optimizing surgical outcomes[2]. Layered closures are commonly employed in dermatologic surgery, with this review focusing specifically on the materials used for epidermal closure.

Patient expectations surrounding cosmetic outcomes have grown in recent years. Given the prominent visibility of many dermatologic surgical sites, cosmetic outcomes represent a critical component of overall patient satisfaction and long-term quality of life. Subtle variations in scarring, pigmentation, or texture may markedly influence patients' perceptions of surgical success. Growing patient concern over aesthetic outcomes highlights the need to investigate the primary epidermal closure materials to yield the most favorable cosmetic results.

Postoperative infection rates remain a significant concern as they can compromise wound healing, result in suboptimal cosmetic outcomes, and necessitate additional interventions. Different closure materials may be associated with variable risks of infection, thereby emphasizing the importance of evidence-based material selection.

Healthcare expenditure is also an important consideration. The cost of materials, time required for suture placement and removal, and the need for follow-up visits all contribute to the overall value of a given closure method. These financial considerations are particularly important in high-volume practices or procedures involving large numbers of closures.

Given these cosmetic, clinical, and economic considerations, a comprehensive evaluation of epidermal closure materials is warranted. This review aims to synthesize current evidence on suture types and tissue adhesives used in dermatologic surgery, with the goal of guiding clinical decision-making to optimize aesthetic outcomes, minimize complications, and promote cost-effective care.

Suture

Sutures have long been the standard for primary wound closure in dermatologic surgery[3]. Ideal suture techniques should evert wound edges, provide prolonged support, be easy to place, and minimize any potential scarring[4].

Sutures are characterized by their physical properties–degradation ability, composition, configuration, surface, and coating[2]. Non-absorbable sutures (e.g., nylon, polypropylene) are favored for superficial closures due to their high tensile strength and resistance to degradation[3]. Non-absorbable sutures are placed superficially, either through the epidermis or dermis and are utilized for epidermal re-approximation, additional wound support in high tension closures, and additional hemostasis. For deeper defects, absorbable sutures (e.g. polyglactin) are used in a layered closure to reduce dead space and tension, improving wound approximation and cosmetic outcomes[2].

Absorbable sutures are classified by composition as natural or synthetic. Natural sutures degrade via proteolysis and provoke higher inflammation, while synthetic sutures degrade through hydrolysis with less tissue reactivity[2]. Silk sutures are a type of natural suture that is often utilized in mucosal or intertriginous locations due to its low tensile strength and flexibility[1]. Monofilament sutures (e.g. nylon, polypropylene) have a smooth surface, low friction coefficient, lower inflammatory properties, and reduced infection risk but have lower knot security[2]. Multifilament sutures, composed of braids or twists, offer superior pliability, easier handling, and stronger tensile properties, but carry a higher risk of surgical site infection and coefficient of friction[2].

Non-Absorbable Sutures

Non-absorbable sutures play a critical role in surgical procedures requiring wound support. Unlike absorbable sutures, which degrade and are absorbed by the body over time, non-absorbable sutures maintain their tensile strength indefinitely and must be manually removed. The two most utilized non-absorbable sutures are polypropylene and nylon[3]. While non-absorbable sutures provide the benefit of sustained wound support and high tensile strength, they also pose certain limitations[3]. The potential for chronic foreign body reactions, increased risk of infection, and the necessity of suture removal, which can cause patient discomfort, must be considered when selecting the appropriate suture material.

Absorbable Sutures

Absorbable sutures help reduce tension and dead space in deep closures. While non-absorbable sutures are typically used, there's a shift toward absorbable sutures for epidermal closures due to convenience, cost, and cosmetic benefits[4].

Absorbable sutures lose most tensile strength within 60 days, with absorption influenced by tissue type, infection, and mucosal placement. Ideal absorbable sutures have low reactivity, high strength, slow absorption, and secure knots[2]. Polyglactin 910 and poliglecaprone 25 are most commonly used, with poliglecaprone 25 linked to lower extrusion rates[4]. Polydioxanone is a monofilament suture that maintains its tensile strength for a longer duration and is useful in areas of high tension or closures requiring higher dermal support.

Chromic gut and polyglactin 910 are absorbed the fastest and provoke the highest inflammatory response, whereas polydioxanone is associated with lower tissue reactivity and less suture perforation[4]. Refer to Table 1 for a summary of sutures and their properties.

TABLE 1: A summary of sutures and their properties[5,6,7,8].

Suture	Absorbable/non-absorbable	Tissue reactivity	Composition	Absorption	Strength retention
Nylon	Non-absorbable	Moderate	Synthetic, monofilament	Not absorbed	Loss of strength 15%-20% per year
Polypropylene	Non-absorbable	Low	Synthetic, monofilament	Not absorbed	High tensile strength (>90%) after 90 days
Vicryl (polyglactin 910)	Absorbable	Low	Synthetic, braided	Completely absorbed by 56-70 days	75% present at 2 weeks, 25% at 1 month
Vicryl Rapide (irradiated polyglactin-910)	Absorbable	Low	Synthetic, braided	Completely absorbed by 6 weeks	50% of tensile strength lost at 5 days
Monocryl (poliglecaprone 25)	Absorbable	Low	Synthetic, monofilament	Completely absorbed by 91-119 days	Retains 60%-70% of tensile strength at 1 week, complete loss at 3 weeks
Fast-absorbing gut	Absorbable	Low	Natural, monofilament	Completely absorbed by 21-42 days	Lose 50% of tensile strength over 3-5 days
Chromic gut	Absorbable	High	Natural, monofilament	Absorption time over 90 days	Tensile strength remains for 10-14 days
Polydioxanone (PDS)	Absorbable	High	Synthetic, monofilament	Absorption complete by 6 months	25% of tensile strength remains at 6 weeks

Tissue Adhesives

The growing use of TAs is attributed to their efficiency, low complication rate, and ease of application. Classified as cyanoacrylates, TAs are part of a family of fast-acting adhesives. Cyanoacrylate chemicals polymerize upon contact with moisture on the skin, forming a strong, water-resistant bond within 10 seconds[9].

The application of TAs is particularly advantageous for low-tension wounds with well-approximated edges and are often applied over dermal sutures[2]. The adhesive forms a pliable film that stabilizes the wound while acting as a barrier to infection. In vitro studies have demonstrated that cyanoacrylates possess intrinsic bactericidal properties against gram-positive bacteria, further contributing to their antimicrobial benefits. The use of TAs has been associated with lower infection rates and minimal wound inflammation compared to traditional sutures[9].

Practical benefits for both patients and healthcare providers are offered by TAs. They allow for faster and less painful wound closure, often performed by support staff, and don't require removal, reducing follow-up care[2]. However, successful application requires that the wound edges be in direct contact, as seepage of adhesive between the edges can inhibit healing[2]. Moreover, TAs are not suitable for high-tension wounds or mucosal surfaces[9]. Postoperative bleeding may compromise the adhesive bond, leading to wound dehiscence.

Cosmetic Outcome

Achieving optimal cosmetic outcomes is an important aspect to dermatologic surgery. A review of 21 studies overall showed no significant differences in cosmetic outcomes between epidermal closure methods, suggesting that cost-effectiveness and convenience may become more influential in method selection.

NON-ABSORBABLE VS ABSORBABLE SUTURES

Multiple studies have found no significant difference in cosmetic outcomes between non-absorbable and absorbable sutures. A 2018 systematic review and meta-analysis of eight studies on primary closure of facial wounds confirmed no cosmetic advantage for either suture type, regardless of the evaluation method[10]. Similarly, a comparative study by Aboul-Fettouh et al. included 134 patients who underwent linear repairs reported no significant difference in patient satisfaction between the two suture types[11].

Direct comparative studies support these findings. In a 2003 clinical trial of 41 patients with facial skin cancers closed with rotational advancement flaps, one half of each wound was sutured with 5-0 polypropylene (non-absorbable) and the other with 5-0 polyglactin 910 (absorbable). After six months, photographic analysis showed no significant difference in scar formation[12]. A randomized clinical trial by Moran et al. consisted of 105 facial wounds closed with rapidly absorbable polyglactin 910 on one side and nylon (non-absorbable) on the other side found no significant difference in cosmetic outcomes at six months, with similar scores on the visual analog scale, wound evaluation scale, and Stony Brook Scar Evaluation Scale scores were comparable between the two suture types (P = .72, .57, and .21, respectively)[13].

Rosenzwieg et al. conducted a randomized controlled study (RCT) of 48 Mohs micrographic surgery (MMS) closures comparing 5-0 poliglecaprone-25 (absorbable) and 6-0 polypropylene (non-absorbable) also found no significant difference in cosmetic results at one week and four months, with blinded evaluators unable to identify a consistently superior closure type based on scar appearance[14]. Another RCT by Eisen et al. reported a slight, but statistically significant cosmetic advantage for 5-0 polypropylene (non-absorbable) over 5-0 fast-absorbing gut (FG) (absorbable) at three months, as assessed by the Patient and Observer Scar Assessment Scale (POSAS) scale[15]. However, the authors of the study note that the significant difference was minimally below the threshold for a clinically significant difference.

An additional RCT quantified resulting erythema associated with non-absorbable vs absorbable sutures. Majd et al. conducted a study of 210 patients undergoing MMS evaluated erythema intensity (EI) with different suture types. In the first group, defects were closed with half continuous irradiated polyglactin-910 (IPG) and half nylon sutures. In the second group, IPG was compared with FG sutures. No significant difference in EI was found between suture types at 2 and 6 months[16].

TISSUE ADHESIVES VS SUTURES

Several studies have found no significant difference in cosmetic outcomes between TA and sutures for epidermal closure. A study by Kim et al. included 14 facial linear repairs greater than 3 cm showed no significant cosmetic difference between octylcyanoacrylate (OCA) TA and FG sutures at three months (p = .23)[17]. Similarly, a RCT of 14 face and neck squamous cell carcinomas (SCCs) or basal cell carcinomas (BCCs) found comparable mean cosmetic ratings between high-viscosity octyl cyanoacrylate (HVOCA) and sutures (6.64 vs 6.77; p = .35), although patients preferred OCA for ease of care[18]. A split-wound trial of intermediate closure with and without 2-octyl cyanoacrylate (2-OCA) and a study of 45 infraorbital incisions also showed no significant cosmetic difference between TAs and sutures[19,20].

Zhuang et al. performed a RCT of 44 postoperative defects ≥3 cm, half of each wound was closed with either 2-OCA or FG. No significant difference was observed in total POSAS scores (12.3 vs 11.6; p = .40), though pigmentation was worse with 2-OCA (1.98 vs 1.79; p = .05)[21]. A randomized study by Bartensstein et al. consisted of 71 skin cancer patients reported no significant difference in wound appearance on the Visual Analog Scale (p = .4693) and modified Hollander Wound Evaluation Score (p = .6413) between TAs and sutures[22].

Three studies demonstrated superior cosmetic outcomes with TA. Lins et al. found significantly better visual analog scale scores at one year with 2-OCA closure compared to those closed with sutures (21.7 ± 16.3 vs 29.2 ± 17.7; $p = 0.03$) in a study of 111 patients undergoing elective facial plastic surgery[23]. In another study involving 19 facial wounds, Saxena et al. found that TA was associated with improved scar appearance compared to sutures. The difference in scar quality was statistically significant ($p = 0.045$)[24]. Similarly, a randomized clinical study of 20 maxillofacial surgery patients found that TA closures resulted in significantly better Manchester Scar Scale scores at both one month ($p = 0.001$) and three months ($p < 0.001$) compared to sutures[25].

Two studies found sutures to have better cosmetic outcomes than TA. In a 2009 trial with 8 patients, Tierney et al. concluded that wounds closed with FG sutures scored slightly higher (3.56 vs 3.19; $p = 0.05$) than those closed with TA[26]. A clinical trial conducted by Bernard et al. consisted of 52 excisional wounds in children showed sutures had a significantly higher visual analog scale score (63.3 mm vs 47.8 mm for TA; $p = 0.02$), though the Hollander Wound Evaluation Scale showed no significant difference[27].

The growing body of literature supports non-inferiority of TA versus suture in cosmetic outcomes. In addition, patients and surgeons tend to prefer TA over sutures for epidermal closure due to its ease of application and post-care requirements[18,19]. Additionally, the absence of postoperative sutures reduces the need for suture removal visits and patient discomfort, making TA a convenient option.

Infection Rate

Surgical site infections (SSIs) rate within dermatologic surgery is low (<2%) but can lead to significant morbidity and increase healthcare expenditure. A meta-analysis encompassing 11 studies with a total of 751 participants compared infection rates between absorbable and non-absorbable sutures. Of the 377 patients closed with absorbable sutures, two wound infections (0.53%) were identified, while three infections (0.80%) were noted among the 374 patients who

received non-absorbable sutures[28]. The forest plot analysis demonstrated no statistically significant difference in infection rates between absorbable and non-absorbable sutures, suggesting that the choice of suture material does not significantly impact the likelihood of SSIs.

Moreover, evidence suggests that TAs may offer superior protection against SSIs compared to sutures. A large retrospective analysis of 5,138 patients who underwent MMS or wide local excision (WLE) with primary linear closure between 2017 and 2022 reported an overall infection rate of 2.80%. However, patients closed with TA had a significantly lower infection rate (1.22%, n = 32) compared to those closed with sutures (4.44%, n = 112)[29]. A subanalysis excluding high-tension areas such as the scalp and trunk confirmed this trend, with a 1.15% infection rate for TA closures versus 3.27% for sutures ($P < .0001$)[29]. The reduced infection rate with TAs is likely attributable to the bactericidal properties of cyanoacrylates, which cause bacterial cell dehydration and death through water diffusion gradients, as well as the physical barrier created by the adhesive that minimizes bacterial entry points.

Cost

Cosmetic results and infection rates are comparable between TAs and sutures. Multiple studies have evaluated the cost-effectiveness of different closure materials, including TA, absorbable sutures, and non-absorbable sutures.

Zempsky et al. utilized a health economic model to evaluate the costs of different closure methods by considering factors like application time, material costs, and the likelihood and cost of dehiscence and infection. The analysis showed that while adhesive strips had the lowest average cost per laceration, the costs of TAs and sutures were closely matched. It also revealed that TAs were reported to cost $28.77 per laceration, with a cost of $74.68 per infected laceration and $46.68 per laceration with dehiscence[30]. In comparison, sutures cost $24.11 per laceration, $69.91 per infected laceration, and $41.91 per laceration with dehiscence[30]. The cost of follow-up care for suture removal was not included in the health economic analysis and is a significant limitation to the study.

Fosko et al. described a cost-saving method of wound closure in nearly 500 patients where undyed polyglactin 910 was used for both subcuticular and epidermal closure. The authors of this study began using Vicryl for epidermal closures to conserve suture material when their supply of non-absorbable suture was depleted. By using the remaining Vicryl instead of opening an additional package of nylon suture, the study reported an average savings of $3.36 per reconstruction. While this might seem modest, it translated to a 50% reduction in suture costs per procedure. When projected over an entire year (e.g., 400 repairs), this resulted in an estimated savings of approximately $1,350, or $336 per 100 repairs[28]. Since sutures represent a fixed cost in surgical supplies, the authors of this study incorporated this method into their practice to reduce overall expenses.

Decker et al., in a separate retrospective cohort study, analyzed wound closure costs after MMS and WLE between 2017 and 2022 reported comparable expenses between different closure methods[29]. The cost of TA application ($5.96), polypropylene suture ($5.93), and FG suture ($6.33) were found to be similar, suggesting that absorbable sutures offer competitive cost efficiency relative to non-absorbable options[29].

Since the cost differences between TAs and sutures are relatively minor, the selection of one material over the other can be guided by factors such as procedure time, material availability, and overall practice cost efficiency.

Conclusions

The choice of epidermal closure material in dermatologic surgery impacts cosmetic outcomes, infection rates, and cost. Evidence suggests no consistent cosmetic advantage between absorbable and non-absorbable sutures, with both

providing similar scar appearance and patient satisfaction. Compared to sutures, TAs offer comparable cosmetic results and may reduce infection rates due to their bactericidal properties. Cost differences between closure methods are minimal, with TAs and sutures demonstrating similar overall expenses when considering material costs and follow-up care. Additionally, TA was often cited as both surgeons and the patients favored epidermal closure method due to the decreased wound care and simple application. Given the similar outcomes, the selection of closure material should be guided by wound characteristics, anatomic location, patient preference, and clinical efficiency. Understanding the strengths and limitations of each closure method allows dermatologic surgeons to optimize surgical results and patient satisfaction.

Conflict of Interest:

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References:

1. A review of sutures and other skin closure materials. *J Am Acad Dermatol*. 2011;64(2):AB169. doi:10.1016/j.jaad.2010.09.692

2. Regula CG, Yag-Howard C. Suture Products and Techniques: What to Use, Where, and Why. *Dermatol Surg Off Publ Am Soc Dermatol Surg Al*. 2015;41 Suppl 10:S187-200. doi:10.1097/DSS.0000000000000492

3. Azmat CE, Council M. Wound Closure Techniques. In: *StatPearls*. StatPearls Publishing; 2025. Accessed March 17, 2025. http://www.ncbi.nlm.nih.gov/books/NBK470598/

4. Yag-Howard C. Sutures, needles, and tissue adhesives: a review for dermatologic surgery. *Dermatol Surg Off Publ Am Soc Dermatol Surg Al*. 2014;40 Suppl 9:S3-S15. doi:10.1097/01.DSS.0000452738.23278.2d

5. Byrne M, Aly A. The Surgical Suture. *Aesthet Surg J*. 2019;39(Supplement_2):S67-S72. doi:10.1093/asj/sjz036

6. Suture and Needle Characteristics in Orthopaedic Surgery. Accessed March 26, 2025. https://oce-ovid-com.ezproxy.rowan.edu/article/01874474-202007000-00005/HTML#context-tbl3

7. Zhou P, Tian J, Li C, Tang Z. Comparative Study of Durability Behaviors of Thermoplastic Polypropylene and Thermosetting Epoxy Exposed to Elevated Temperature, Water Immersion and Sustained Bending Loading. *Polymers*. 2022;14(14):2953. doi:10.3390/polym14142953

8. Seger EW, McClure SP, Neill BC, Jibbe A. Fast absorbing gut sutures in dermatologic surgery: a systematic review and meta-analysis. *Arch Dermatol Res*. 2024;316(7):1-7. doi:10.1007/s00403-024-02973-7

9. Jenkins LE, Davis LS. Comprehensive Review of Tissue Adhesives. *Dermatol Surg Off Publ Am Soc Dermatol Surg Al*. 2018;44(11):1367-1372. doi:10.1097/DSS.0000000000001576

11. Aboul-Fettouh N, Marzolf S, Smith JM, Srivastava D, Nijhawan RI. Patient satisfaction and preference for absorbable versus nonabsorbable sutures for linear repairs. *J Am Acad Dermatol*. 2018;79(3):561-562. doi:10.1016/j.jaad.2018.02.020

12. Comparison of absorbable with nonabsorbable sutures in closure of facial skin wounds - PubMed. Accessed March 17, 2025. https://pubmed.ncbi.nlm.nih.gov/14623686/

13. Moran B, Humphrey S, Seal A, Berkowitz J, Zloty D. Photographic assessment of postsurgical facial scars epidermally sutured with rapidly absorbable polyglactin 910 or nylon: A randomized clinical trial. *J Am Acad Dermatol*. 2020;83(5):1395-1399. doi:10.1016/j.jaad.2020.06.016

14. Rosenzweig LB, Abdelmalek M, Ho J, Hruza GJ. Equal cosmetic outcomes with 5-0 poliglecaprone-25 versus 6-0 polypropylene for superficial closures. *Dermatol Surg Off Publ Am Soc Dermatol Surg Al*. 2010;36(7):1126-1129. doi:10.1111/j.1524-4725.2010.01594.x

15. Eisen DB, Zhuang AR, Hasan A, Sharon VR, Bang H, Crispin MK. 5-0 Polypropylene versus 5-0 fast absorbing plain gut for cutaneous wound closure: a randomized evaluator blind trial. *Arch Dermatol Res*. 2020;312(3):179-185. doi:10.1007/s00403-019-02009-5

16. Majd A, Lim C, Zloty D. Quantification of Erythema Associated With Varying Suture Materials in Facial Surgery Repair: A Randomized Prospective Study. *Dermatol Surg Off Publ Am Soc Dermatol Surg Al*. 2022;48(12):1289-1293. doi:10.1097/DSS.0000000000003625

17. Kim J, Singh Maan H, Cool AJ, Hanlon AM, Leffell DJ. Fast Absorbing Gut Suture versus Cyanoacrylate Tissue Adhesive in the Epidermal Closure of Linear Repairs Following Mohs Micrographic Surgery. *J Clin Aesthetic Dermatol*. 2015;8(2):24-29.

18. Sniezek PJ, Walling HW, DeBloom JR, et al. A randomized controlled trial of high-viscosity 2-octyl cyanoacrylate tissue adhesive versus sutures in repairing facial wounds following Mohs micrographic surgery. *Dermatol Surg Off Publ Am Soc Dermatol Surg Al*. 2007;33(8):966-971. doi:10.1111/j.1524-4725.2007.33199.x

19. Kwapnoski Z, Doost MS, Vy M, Eisen DB. Aesthetic outcome of intermediate closure versus intermediate closure followed by 2-octyl cyanoacrylate: A randomized evaluator-blinded split-wound comparative effectiveness trial. *J Am Acad Dermatol*. 2024;90(3):577-584. doi:10.1016/j.jaad.2023.10.028

20. Handschel JGK, Depprich RA, Dirksen D, Runte C, Zimmermann A, Kübler NR. A prospective comparison of octyl-2-cyanoacrylate and suture in standardized facial wounds. *Int J Oral Maxillofac Surg*. 2006;35(4):318-323. doi:10.1016/j.ijom.2005.10.003

21. Zhuang AR, Beroukhim K, Armstrong AW, Sivamani RK, Eisen DB. Comparison of 2-Octylcyanoacrylate Versus 5-0 Fast-Absorbing Gut During Linear Wound Closures and the Effect on Wound Cosmesis. *Dermatol Surg Off Publ Am Soc Dermatol Surg Al*. 2020;46(5):628-634. doi:10.1097/DSS.0000000000002076

22. Bartenstein DW, Cummins DL, Rogers GS. A Prospective, Randomized, Single-Blind Study Comparing Cyanoacrylate Adhesives to Sutures for Wound Closure in Skin Cancer Patients. *Dermatol Surg Off Publ Am Soc Dermatol Surg Al*. 2017;43(11):1371-1378. doi:10.1097/DSS.0000000000001200

23. Toriumi DM, O'Grady K, Desai D, Bagal A. Use of octyl-2-cyanoacrylate for skin closure in facial plastic surgery. *Plast Reconstr Surg*. 1998;102(6):2209-2219. doi:10.1097/00006534-199811000-00062

24. Saxena A, Dubey M, Saha GK, Tiwari D, Tyagi S, Singh RA. A Prospective Comparison of Octyl-2-Cyanoacrylate and Suture in Facial Wounds. *J Pharm Bioallied Sci*. 2023;15(Suppl 2):S1145-S1148. doi:10.4103/jpbs.jpbs_187_23

25. Balkawade R, Asnani U, Natarajan S, Baviskar P, Ahuja S, Patkar N. Comparative Evaluation of the Aesthetic Outcomes of Octyl-2-Cyanoacrylate Skin Adhesive and Ethilon Suture in Maxillofacial Surgery - A Randomised Clinical Study. *Ann Maxillofac Surg*. 2024;14(1):10-14. doi:10.4103/ams.ams_182_23

26. Tierney EP, Moy RL, Kouba DJ. Rapid absorbing gut suture versus 2-octylethylcyanoacrylate tissue adhesive in the epidermal closure of linear repairs. J Drugs Dermatol JDD. 2009;8(2):115-119.

27. Bernard L, Doyle J, Friedlander SF, Eichenfield LF, Gibbs NF, Cunningham BB. A prospective comparison of octyl cyanoacrylate tissue adhesive (dermabond) and suture for the closure of excisional wounds in children and adolescents. *Arch Dermatol*. 2001;137(9):1177-1180. doi:10.1001/archderm.137.9.1177

28. Fosko SW, Heap D. Surgical pearl: an economical means of skin closure with absorbable suture. *J Am Acad Dermatol*. 1998;39(2 Pt 1):248-250. doi:10.1016/s0190-9622(98)70084-2

29. Walkosak CC, Jennings T, Coriell P, et al. Infection rate using tissue adhesive versus suture for epidermal closure in dermatologic surgery: A retrospective cohort study. *J Am Acad Dermatol*. 2025;92(3):579-582. doi:10.1016/j.jaad.2024.10.039

30. Economic comparison of methods of wound closure: wound closure strips vs. sutures and wound adhesives. Accessed March 17, 2025. https://onlinelibrary.wiley.com/doi/10.1111/j.1742-4801.2005.00130.x

