

How to Optimize Wound Closure in Thin Skin

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Cutaneous surgery often is performed in areas of extremely thin skin. Traditionally, wound closure in thin skin is complicated because the skin tears easily and wound breakdown can occur. Consequently, healing becomes a challenge. Our group of dermatologic surgeons has developed a novel effective technique that minimizes these problems, which we present step by step.

Cutis. 2023;111:43-45.

Practice Gap

Cutaneous surgery involves many areas where skin is quite thin and fragile, which often is encountered in elderly patients; the forearms and lower legs are the most frequent locations for thin skin.¹ Dermatologic surgeons frequently encounter these situations, making this a highly practical arena for technical improvements.

For many of these patients, there is little meaningful dermis for placement of subcutaneous sutures. Therefore, a common approach following surgery, particularly following Mohs micrographic surgery in which tumors and defects typically are larger, is healing by secondary intention.² Although healing by secondary intention often is a reasonable option, we have found that maximizing the use of epidermal skin for primary closure can be an effective means of closing many such defects. Antimicrobial reinforced skin closure strips have been incorporated in wound closure for thin skin. However, earlier efforts involving reinforcement perpendicular to the wound lacked critical details or used a different technique.³

The Technique

We developed a novel effective closure technique that minimizes these problems. Our technique has been used on the wounds of hundreds of patients with satisfying results. Early on, we used multiple variations to optimize

outcomes, including different sizes of sutures and reinforced skin closure strips, application of medical liquid adhesive, liquid adhesive, and varying postoperative dressings. For 3 years, we tracked outcomes in-house and gradually narrowed down our successes into a single, user-friendly paradigm.

Supplies—To perform this technique, required supplies include:

- 2-0 Polypropylene suture with a PS-2 needle, or the equivalent. Polyglactin or silk suture can be utilized if a less-rigid suture is desired; however, we primarily have used polypropylene for repairs with good results. Each repair requires at least 2 sutures.
- Reinforced skin closure strips (1×5 inches). This width affords increased strength.
- Conforming stretch bandage and elastic self-adherent wrap.
- Polysporin (bacitracin zinc, polymyxin B sulfate, and petrolatum)(Johnson & Johnson).
- All usual surgical instruments and supplies, including paper tape and nonadherent gauze (surgeon dependent).

Step-by-step Technique—Close the wound using the following steps:

1. Once the defect is finalized following Mohs micrographic surgery or excision, excise the ellipse to be utilized for the closure and perform complete hemostasis.
2. Place 2 layers of reinforced skin closure strips—one on top of the other—along each side of the defect, leaving approximately 1 cm of uncovered skin between the wound edges and the reinforced skin closure strips (Figure, A).
3. Take a big-bite pulley suture about one-third of the way from one end of the ellipse, with both punctures passing through the reinforced skin closure strips.

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The authors report no conflict of interest.

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doi:10.12788/cutis.0673

Leave that in place or have the assistant hold it and wait. Place a second suture immediately adjacent to the pulley suture. Once that suture is placed but still untied, have the assistant carefully pull the pulley suture outward away from the wound edge while you carefully bring the suture together and tie it off gently (Figure, B). Doing this utilizes the pulley ability of the suture to protect the skin from tearing and releases sufficient pressure on the single suture so that it can be easily tightened without risk to the fragile skin.

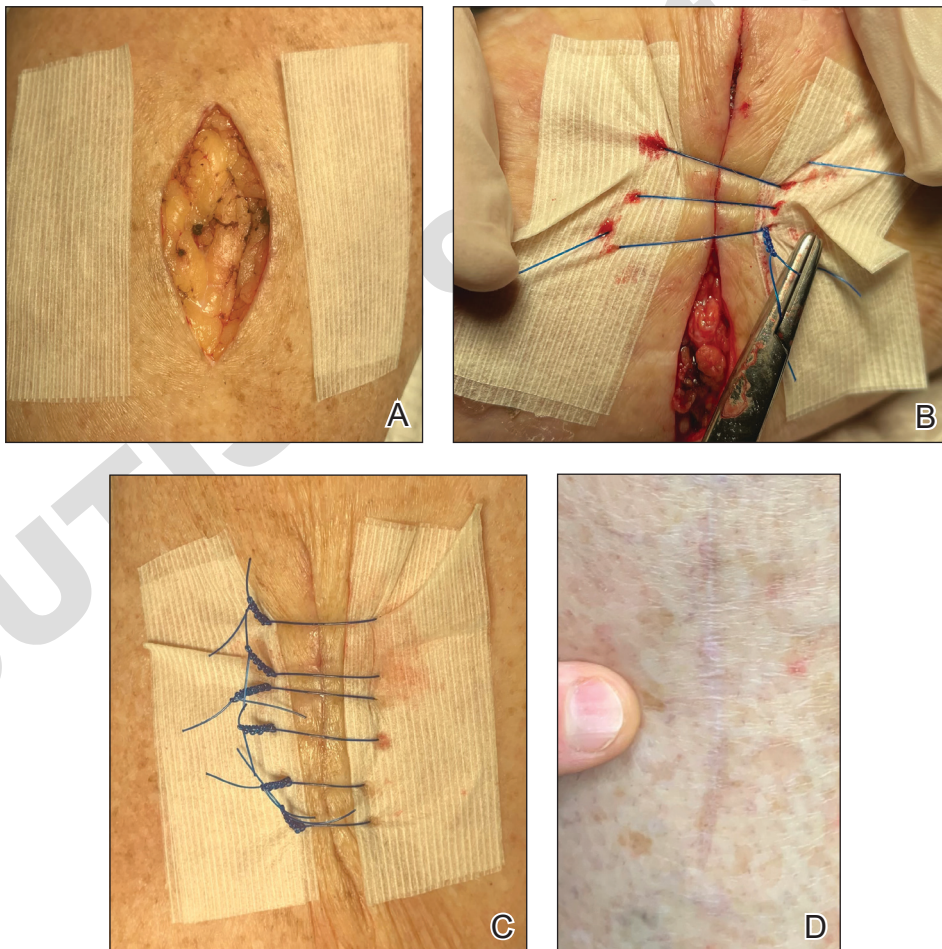
4. Repeat step 3, this time placing a pulley suture near the midline of the ellipse and the subsequent single suture adjacent to it.

5. Take pulley sutures repeatedly as in steps 3 and 4 until multiple sutures are secured in place. Replace the pulley sutures with single sutures because the double-pulley sutures in areas of lower vascularity tend to have, in our experience, a slightly increased incidence of focal necrosis in comparison to single sutures.

6. Make a concerted attempt to keep as much blood as possible off the reinforced skin closure strips throughout the procedure; the less dried blood on the reinforced skin closure strips, the cleaner and better the final closure (Figure, C).

7. Most of these cases involve the forearms and the legs below the knees. Because any increase in pressure or swelling on the wound can result in skin breakdown, postoperative dressing is critical. We use a layered approach; the following sequence can be modified to the preference of the surgeon: Polysporin (bacitracin zinc, polymyxin B sulfate, and petrolatum), nonadherent gauze, paper tape, conforming stretch bandage, and elastic self-adherent wrap. Minimizing swelling and infection are the primary goals. The wrap is left on for 1 week and should be kept dry.

8. Have the patient return to the office in 1 week. Unwrap the entire wound; trim back the reinforced skin closure strips; and have the patient utilize typical



A, A typical ellipse following skin excision. In the initial setup, 2 layers of reinforced skin closure strips are placed parallel to the defect, approximately 1 cm from the edge of the wound. B, A double-pulley suture is tied while a single suture is placed. Use the double-pulley suture to bring the wound edges together. Place a single suture interior to the double-pulley suture, then gently tie the single suture. C, For final wound closure, linear sutures pass through the reinforced skin closure strips, which provide added strength to the repair. D, Wound healing is typical of optimized linear repairs, with a faint linear scar remaining after healing.

wound care at home thereafter consisting of cleaning and application of Polysporin or plain petrolatum, non-adherent gauze, and a paper-tape bandage. Because liquid adhesive is not utilized in this technique, the reinforced skin closure strips can be carefully removed without tearing skin. Leave sutures in for 3 weeks for arm procedures and 4 weeks for leg procedures, unless irritation develops or rapid suture overgrowth occurs in either location.

Complications

Most outcomes after using this technique are typical of optimized linear surgeries, with reduced scarring and complete wound healing (Figure, D). We seldom see complications but the following are possible:

- Bleeding occurs but rarely; the weeklong wrap likely provides great benefit.
- Infection is rare but does occur occasionally, as in any surgical procedure.
- Breakdown of the entire wound is rare; however, we occasionally see focal necrosis near 1 stitch—or rarely 2 stitches—that does not require intervention, apart from

longer use of topical Polysporin or petrolatum alone to maximize healing by secondary intention in those small areas.

- Despite simple suture placement far from the edge of the wound, wound inversion is seldom a problem because these taut closures have a tendency to expand slightly due to postoperative swelling.

Practice Implications

Any experienced dermatologic surgeon can perfect this technique for closing a wound in thin skin. Because wound closure in areas of fragile skin frequently is encountered in cutaneous surgery, we hope that utilizing this technique results in an optimal outcome for many patients.

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