Comparison of Absorbable With Nonabsorbable Sutures in Closure of Facial Skin Wounds

G. Joseph Parell, MD; Gary D. Becker, MD

Background: There is long-standing disagreement among facial plastic surgeons as to the ideal suture material for closing skin wounds of the face. Many surgeons believe that nonabsorbable suture material is preferable, as it is easier to tie, is unlikely to break prematurely, and elicits a minimal inflammatory response. Others feel that these issues are of minor importance and prefer absorbable sutures because they do not have to be removed, thus saving the surgeon time and decreasing patient anxiety and discomfort.

Patients and Methods: Facial skin cancers were removed from 41 patients. The length of closure ranged from 3.5 to 12.0 cm. All wounds were closed with rotational advancement flaps. Deep tissues were closed with 4-0 polyglactin 25 (Monocryl; Ethicon Inc, Somerville, NJ). One half of each wound was randomly closed with 5-0 coated polypropylene (Prolene; Ethicon Inc), while the other half was closed with 5-0 coated irradiated polyglactin 910 (Vicryl Rapide; Ethicon Inc). No wound infections or premature rupture of sutures occurred. All patients were followed up for 6 months after surgery. The photographs of the results were reviewed, and no difference was noted in scar formation.

Conclusions: In adults with clean wounds of the face or neck, there is no difference in long-term cosmetic results of repairs with permanent or absorbable suture material. We prefer absorbable sutures, as they do not have to be removed, saving the surgeon time and lessening patient anxiety and discomfort.

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Wound closure using suture material is an ancient art that was alluded to in Egyptian scrolls circa 3500 BC. Animal hair, vegetable fibers, silk, leather, and gut have been used with varying degrees of success. Not surprisingly, there is no consensus among facial plastic surgeons as to the best material for closing skin wounds of the head and neck. Monofilament sutures glide easily through tissue and cause minimal reaction. Some monofilament sutures, such as nylon, are springy, making them difficult to tie, with a tendency to unravel. Also, if they are tied under tension, they may cut tissue. Braided sutures have less memory, making them easier to tie. However, bacteria can be wicked into the interstices, promoting infection. In addition, these sutures expand as they absorb fluid, sometimes causing knots to untie. Many surgeons believe that nonabsorbable suture material is preferable, because it is easier to tie, it is unlikely to break prematurely, and it elicits a minimal inflammatory response. Others prefer absorbable sutures because they do not have to be removed, saving time and decreasing patient anxiety and discomfort. Labagnara has written a good review of absorbable sutures. The ideal suture would be a flexible monofilament with adequate tensile strength that holds knots well and absorbs in 7 to 10 days. No such suture material is available today.

Both of us have large facial reconstructive surgical practices. The first author (G.J.P.) reconstructs approximately 400 defects after skin cancer removal each year. Before this study, the skin was closed exclusively with nonabsorbable polypropylene (Prolene; Ethicon Inc, Somerville, NJ). Gut sutures were avoided as they caused a significant inflammatory reaction, with unreliable absorption. Synthetic absorbable sutures remained too long, promoting infection or unraveling. The advent of coated irradiated polyglactin 910 (Vicryl Rapide; Ethicon Inc) prompted this study. This suture material is derived from ordinary polyglactin 910 (Vicryl; Ethicon Inc), which undergoes ionization to speed its absorption, without changing its mechanical proper-
ties. It dissolves in 7 to 10 days and holds well if 4 square knots are tied.

**METHODS**

The first author resected 44 skin cancers from the head and neck area in 41 adult patients. The length of the closure ranged from 3.5 to 12.0 cm, with an average length of 7.5 cm. Four wounds were on the neck and 37 were on the face. The wounds were closed with standard rotational advancement flaps. The subcutaneous tissue was closed with an absorbable suture (polyglactin 910 (Vicryl Rapide; Ethicon Inc)). Simple interrupted sutures were used to close one half of the wound with 5-0 Vicryl Rapide and the other half with 5.0 Prolene. The Prolene sutures were removed 1 week after surgery, and the Vicryl Rapide sutures were allowed to dissolve. Patients were followed up at regular intervals, and the wounds were photographed at 3 and 6 months with a commercially available 35-mm camera (Olympus), 105-mm lens, flash attachment, and color film (Kodakchrome ASA 64). The second author (G.D.B.) reviewed the photographs. Comparison of inflammatory response and stitch scarring was made between the Prolene- and the Vicryl Rapide-sutured wounds. Inflammatory response was graded 0 through 3 (0, none; 1, hyperemia; 2, hyperemia with swelling; and 3, purulence). Scarring was also graded 0 through 3 (0, none; 1, barely visible stitch scars; 2, obvious stitch scars; and 3, hypertrophied stitch scars). One gram of ceftriaxone sodium (Rocephin) was intravenously administered to all patients at the time of wound repair.

**RESULTS**

Specific wound sites are noted in the Table. In the present series, the only complications were mild scarring (grade 1) and inflammation (grade 2). Railroad tracking was only visualized when the skin was stretched. Inflammation was minor, did not require treatment with antibiotics, and was generalized rather than localized around individual sutures. Railroad tracking occurred in 3 areas closed with Prolene and in 2 areas closed with Vicryl Rapide. In 1 of these wounds, tracking occurred with both Prolene and Vicryl Rapide. All tracking occurred in the transitional area between the mandible and the neck. Overall, no significant difference was noted between the areas closed with Prolene and those closed with Vicryl Rapide. Wound infection did not occur.

**COMMENT**

Comparison of our results with those of other studies would not be accurate because of differences in methodology. Other studies comparing Vicryl Rapide with non-absorbable sutures have seldom included the head and neck. Also, the wounds in other studies were lacerations and were closed primarily by either residents or experienced surgeons. Our patients' wounds required rotational advancement flap closure with inherent increased wound tension. The first author performed all closures. In addition, each patient acted as his or her own control, as both suture materials were used on the same wound.

It is most important to minimize wound tension when repairing skin wounds. This is accomplished by following the relaxed skin tension lines and placing all tension on the subcutaneous closure. Skin margins are minimally undermined (approximately 3 mm). Wider undermining increases ischemia, which slows healing and increases swelling and risk of infection. Horizontal mattress sutures using 4-0 Monocryl were passed through the subcutaneous tissue immediately deep to the separated margin of the skin and subcutaneous tissue. The sutures were tightened until the skin edges were slightly averted. Monocryl is ideally suited for use in the head and neck because it maintains strength for about 14 days and is well absorbed in about 30 days. It rarely extrudes or forms a suture abscess. Other factors affecting scarring include elasticity of the skin, postoperative wound edema, infection, local muscle tension, and location of the wound over a bony prominence, all of which are associated with increased wound tension.

Children and young adults have very high skin elasticity. Because of this, pediatric wounds have a much greater tendency to stretch into a wider scar over time. Since all our patients were adults, high skin elasticity was not a factor. Nevertheless, it is worth noting that children's wounds must be closed with extra care to avoid excess tension. Subcuticular closure or tissue glue (Dermabond) may be preferable in selected cases. Generally, we do not recommend glue, as it does not lend itself well to precise skin apposition.

Skin sutures are tied without tension to allow for postoperative edema; otherwise, railroad track suture scars may result. Railroad tracking occurred in a mild form (grade 1) in 5 patients and was located at the transitional area from the cheek to the neck. Location of a wound where there is significant movement or over a bony prominence increases wound tension, resulting in widening of the scar and/or railroad tracking. Increased wound tension occurred most commonly over the man-

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*Inflammation and scarring with polypropylene (Prolene; Ethicon Inc, Somerville, NJ) and coated irrigated polyglactin 910 (Vicryl Rapide; Ethicon Inc) occurred in the same wound.
dible, where there is both movement and a bony prominence. An extra-strong subcutaneous closure is helpful in preventing widening and railroad tracking of the scars. Also, there is excess tension at the face-neck junction, where the relaxed skin tension lines are 90° opposed. We have not seen epithelial cyst or sinus formation with Vicryl Rapide or Prolene. Contrary to the observations of Webster et al,9 we have seen such formation occur with fast-absorbing catgut, especially when it is used on the eyelid.

In adults with clean skin wounds of the face or neck, there is no difference in long-term cosmetic results of repairs between nonabsorbable and synthetic absorbable sutures. The use of absorbable material may be preferable because the sutures do not have to be removed, which saves the surgeon time and may lessen patient anxiety and discomfort.

CONCLUSIONS

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Corresponding author and reprints: G. Joseph Parell, MD, 330 W 23rd St, Panama City, FL 32405.

REFERENCES


Quotable

Flowers changed the face of the planet. Without them, the world we know—even man himself—would never have existed. Francis Thompson, the English poet, once wrote that one could not pluck a flower without troubling a star. Intuitively he had sensed like a naturalist the enormous interlinked complexity of life. . . . The weight of a petal has changed the face of the world and made it ours.

Loren Eiseley (1907-1977) 
US Anthropologist