Journal of Hand Surgery Global Online 5 (2023) 740–743

Contents lists available at ScienceDirect

Journal of Hand Surgery Global Online

journal homepage: www.JHSGO.org

Original Research

Trigger Finger Release: Are Sutures Requiring Removal Necessary?

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ARTICLE INFO

Article history:
Received for publication May 31, 2023
Accepted in revised form June 10, 2023
Available online August 4, 2023

Key words:
Absorbable suture
Monocryl
Nonabsorbable suture
Prolene
Trigger finger release

Purpose: There is no consensus regarding optimal closure for trigger finger release (TFR) surgery. The purpose of this study was to compare the number of postoperative visits and complications following TFR closure with nonabsorbable sutures versus those following TFR closure with absorbable sutures and skin glue. The hypothesis was that wound closure with absorbable sutures and glue will result in fewer postoperative visits, while having similar complication rates as that with nonabsorbable sutures.
Methods: A retrospective review identified all patients undergoing open TFR over a 3-year period performed by two hand surgery fellowship–trained hand surgeons who adhered to an identical surgical protocol except for incisional closure. Patients were divided into two groups: a control group with nonabsorbable 4-0 monofilament sutures requiring removal ("suture" group) and a study group with buried absorbable 4-0 monofilament sutures not requiring removal as well as skin glue ("glue" group). The data collected included age, sex, number of postoperative visits, wound complications, infections, antibiotic use, prescribed hand therapy, hospital admission, and reoperation.
Results: A total of 305 open TFR surgeries in 278 patients were included in the study, with 155 digits in the "suture" group and 150 in the "glue" group. Both groups were similar in age and sex. The "suture" group had significantly more total postoperative visits (185 vs 42, respectively, $P < .001$) and postoperative visits within the first 2 weeks (155 vs 10, respectively, $P < .001$) than the "glue" group. Additional postoperative visits beyond 2 weeks of surgery were similar between the two groups. Three (1.9%) patients in the "suture" group and two (1.3%) patients in the "glue" group developed a superficial surgical site infection within 30 days after surgery. Neither had deep infections requiring hospitalization or reoperation. Both groups required similar rates of postoperative hand therapy.
Conclusions: Absorbable sutures afford fewer postoperative visits while having a similar complication rate as nonabsorbable sutures requiring removal.
Type of study/level of evidence: Therapeutic IV.

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Trigger finger release (TFR) is one of the most common procedures in hand surgery.[1] Traditionally, because of the location of incision on glabrous skin, TFR incisions have been closed with nonabsorbable transdermal sutures. Although nonabsorbable sutures require removal, they elicit less of an immunologic response.[2] Alternatively, absorbable subdermal sutures with or without skin glue have been used for TFR closure. Absorbable sutures avoid the need for postoperative suture removal, potentially minimizing patient discomfort, inconvenience, and cost.[2,3] However, there are concerns that absorbable sutures may induce an inflammatory response, leading to wound-healing complications and suboptimal outcomes.[2,3]

No consensus exists regarding optimal closure following TFR. The purpose of our study was to evaluate the number of postoperative visits and complications following two different suture techniques (nonabsorbable suture requiring postoperative suture removal and absorbable subdermal suture with glue not requiring postoperative suture removal). We hypothesized that wound closure with absorbable subdermal sutures and glue results in

Declaration of interests: No benefits in any form have been received or will be received related directly to this article.

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https://doi.org/10.1016/j.jhsg.2023.06.010
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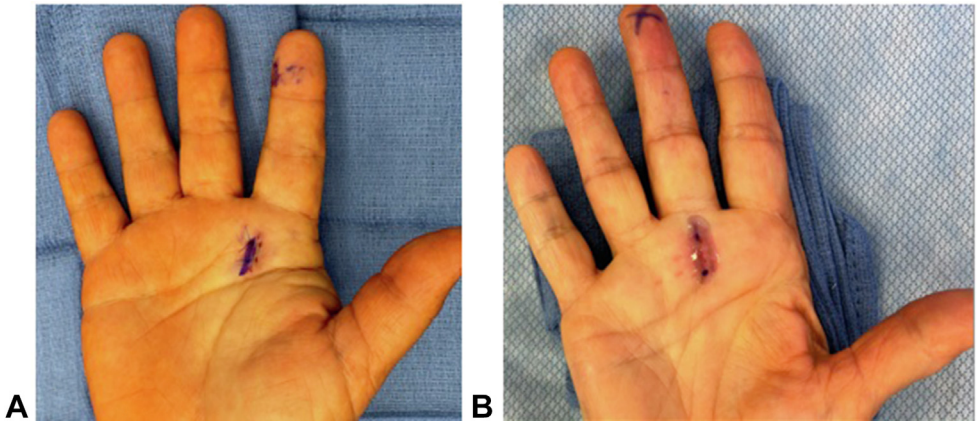

Figure 1. **A** TFR closure with nonabsorbable sutures. **B** TFR closure with absorbable sutures and skin glue.

fewer postoperative visits while having similar complication rates as that with nonabsorbable sutures.

Materials and Methods

Institutional review board approval was obtained, and informed consent was waived per our institutional protocol. A retrospective review was performed for all patients undergoing open TFR performed by two hand surgery fellowship–trained hand surgeons (A.M.I. and J.L.M.) at a single institution over a 3-year period (July 1, 2019, to June 30, 2022). The surgical database was queried for patients based on the Current Procedural Terminology code 26055 (tendon sheath incision, eg, for trigger finger). Only patients undergoing single-digit open TFR under wide-awake local anesthesia no tourniquet at an ambulatory surgical center were included in the study. Patients undergoing percutaneous TFR, TFR with flexor digitorum superficialis hemislip excision, revision TFR, TFR with any other concomitant procedure, and/or TFR under worker's compensation claims were excluded. Patients with multiple TFR were only included in the study if the procedure was performed on separate occasions.

Patients were divided into two cohorts based on surgeon practice. One surgeon closed all TFR incisions with two interrupted nonabsorbable 4-0 polypropylene (Prolene; Ethicon) sutures in a transdermal horizontal mattress fashion ("suture" group) (Fig. 1). The other surgeon closed all incisions with two interrupted absorbable 4-0 poliglecaprone 25 (Monocryl; Ethicon) sutures in a subdermal fashion, followed by Dermabond skin glue (Ethicon; Raritan) application ("glue" group) (Fig. 1). Aside from wound closure, the two surgeons performed all TFR surgeries in an identical manner. Specifically, they anesthetized the area of the incision with 5–10 mL of 1% lidocaine with 1:100,000 epinephrine. The incisions were made along the palmar crease at the level of the metacarpal head of the affected digit. Subcutaneous tissues were then dissected, and the flexor tendon sheath was identified. After protecting the neurovascular bundles with retractors, the A1 pulley and aponeurosis were divided sharply using a scalpel. If necessary, the proximal aspect of the A2 pulley was vented to avoid further triggering. Following release, the patient was asked to actively flex and extend the finger to confirm that there was no further triggering. Then, the wound was copiously irrigated. Each surgeon closed their respective incision using the technique described above.

Patients in the "suture" group were scheduled, during their preoperative appointment, to return within 7–14 days of surgery for suture removal. Patients in the "glue" group were allowed to resume normal activities of daily living and instructed to remove their soft dressing on postoperative day 2. They were advised to return only as needed, with no prescheduled postoperative visit.

Table 1
Inclusion Criteria for Superficial SSI[4]

Inclusion Criteria
The infection involves only the skin or subcutaneous tissue, occurs within 30 d after surgery, and involves one of the following:
Purulent drainage from the incision
Microbiological testing confirming an identified organism from the superficial incision or subcutaneous tissues
Superficial incision that is reopened in a patient with localized pain or tenderness, swelling, erythema, or heat
Diagnosis of a superficial incisional SSI by a physician

The electronic medical records of all patients meeting the inclusion criteria were reviewed. The data collected included baseline demographics (age and sex), number of postoperative visits, postoperative antibiotic prescriptions, hospital admissions within 3 months, emergency room visits within 3 months, hand therapy prescriptions, postoperative corticosteroid injections, postoperative infections, and other wound complications. Hand therapy prescriptions, antibiotic prescriptions, and postoperative corticosteroid injections were given at the discretion of the operating surgeon. Postoperative infections were classified as superficial based on the Centers for Disease Control and Prevention criteria for superficial surgical site infection (SSI) (Table 1).[4] Postoperative infections were defined as deep if they required surgical irrigation and debridement.[5] Wound complications included any wound issue occurring within 3 months after surgery that was not infectious in origin, such as wound dehiscence, aseptic drainage, keloid scar formation, and scar hypersensitivity.

Statistical analyses were performed using Mann-Whitney U tests and 95% CIs for continuous data. Categorical data were analyzed using 95% CI to compare the groups as well as the Fisher exact test when appropriate. P values of $<.05$ were deemed significant.

Results

A total of 305 digits in 278 patients underwent isolated TFR within the 3-year study period. The "suture" group consisted of 155 digits in 142 patients. The "glue" group consisted of 150 digits in 136 patients. The demographics were similar between both groups (Table 2).

For the "suture" group, there were a total of 185 postoperative visits, consisting of 155 visits for suture removal alone, which

Table 2
Outcomes of Incisional Closure Using Nonabsorbable and Absorbable Sutures

Outcomes	Total ($n = 305$)	"Suture" Group ($n = 155$)	"Glue" Group ($n = 150$)
Male sex (95% CI)	124 (40.7%) (35.1%–46.4%)	57 (36.8%) (29.2%–44.9%)	67 (44.7%) (36.6%–53.0%)
Age (y) (95% CI)	63.8 (62.5–65.1)	63.5 (61.7–65.3)	64.1 (62.3–65.9)
Complications (95% CI)	18 (5.9%) (3.5%–9.2%)	8 (5.2%) (2.3%–9.9%)	10 (6.7%) (3.2%–11.9%)
Superficial SSI within 30 d (95% CI)	5 (1.6%) (0.5%–3.8%)	3 (1.9%) (0.4%–5.6%)	2 (1.3%) (0.2%–4.7%)
Superficial SSI within 3 mo (95% CI)	7 (2.3%) (0.9%–4.7%)	3 (1.9%) (0.4%–5.6%)	4 (2.7%) (0.7%–6.7%)
Deep infection	0	0	0
Wound complications (95% CI)	4 (1.3%) (0.4%–3.3%)	2 (1.3%) (0.2%–4.6%)	2 (1.3%) (0.2%–4.7%)
ER visits (95% CI)	1 (0.3%) (0.01%–1.8%)	0	1 (0.7%) (0.02%–3.7%)
Hospital admissions	0	0	0
Return to OR	0	0	0
Antibiotic prescription (95% CI)	9 (3.0%) (1.4%–5.5%)	5 (3.2%) (1.1%–7.4%)	4 (2.7%) (0.7%–6.7%)
Hand therapy prescriptions (95% CI)	22 (7.2%) (4.6%–10.7%)	8 (5.2%) (2.3%–9.9%)	14 (9.3%) (5.2%–15.2%)
Corticosteroid injections (95% CI)	7 (2.3%) (0.9%–4.7%)	3 (1.9%) (0.4%–5.6%)	4 (2.7%) (0.7%–6.7%)

ER, emergency room; OR, operating room.

Table 3
Postoperative Visits for Nonabsorbable and Absorbable Sutures

PO Visits	"Suture" Group	"Glue" Group	*P* Value
Total PO visits	185	42	<.001
First PO visit (within 14 d)	155 (100%) Average, 6.5 d after surgery Range, 5–12 d	10 (6.7%) Average, 10.9 d after surgery Range, 5–13 d	<.001
Additional PO visits	30 (19.4%) Average, 53.9 d after surgery Range, 10–104 d	32 (21.3%) Average, 62.9 d after surgery Range, 18–87 d	.668

PO, postoperative.

occurred within 14 days after surgery (average, 6.5 days; range, 5–12 days) (Table 3). The "glue" group had a total of 42 postoperative appointments, with 10 occurring within 14 days (average, 10.9 days; range, 5–13 days), and involved two patients with SSI, one patient with wound dehiscence and stiffness, one patient with soreness, and six patients with normal postoperative examinations without a documented reason for the appointment. Overall, the "suture" group had significantly more total postoperative appointments ($P < .001$). When the initial postoperative visits within the first 14 days after surgery were excluded, the two groups did not significantly differ in the number of additional postoperative evaluations: 32 in the "glue" group (average, 62.9 days; range, 18–87 days) versus 30 in the "suture" group (average, 53.9 days; range, 10–104 days) ($P = .7$).

Overall, three cases (1.9%) in the "suture" group and two cases (1.3%) in the "glue" group developed a superficial SSI within 30 days. When expanded to 3 months after surgery, the two groups had a similar incidence of superficial SSI. Moreover, the groups had comparable rates of postoperative antibiotic use (five in the "suture" group vs four in the "glue" group). One patient in the "glue" group was evaluated in the emergency room for a superficial SSI and received intravenous antibiotics. However, there were no deep infections, hospitalizations, or reoperations in either group.

The incidence of postoperative wound complications was similar for the "suture" and "glue" groups. Two cases (1.3%) in the "glue" group developed wound complications: one with wound dehiscence and one with inflammation around the suture site requiring topical cortisone ointment. Likewise, two cases (1.3%) in the "suture" group developed wound complications: one with serous wound drainage and one requiring office debridement for scab formation around the suture site.

Overall, 22 cases (7.2%) (8 in the "suture" group and 14 in the "glue" group) were offered formal hand therapy for postoperative stiffness. Additionally, four cases (2.7%) in the "glue" group and three cases (1.9%) in the "suture" group received a postoperative corticosteroid injection for postoperative stiffness, pain, swelling, and/or persistent triggering.

Discussion

There is limited literature investigating incisional closure following open TFR. Our study demonstrated significantly fewer total postoperative follow-up appointments for incisions closed with absorbable sutures and skin glue than for those closed with nonabsorbable sutures ($P < .001$). Given that nonabsorbable sutures require a postoperative visit for suture removal, this finding was not unexpected. Moreover, it has been demonstrated throughout the literature that nonabsorbable sutures require more postoperative visits for wound management compared with absorbable sutures.[6–8] When visits for suture removal were excluded, the absorbable and nonabsorbable groups in our study had similar numbers of postoperative visits.

Eliminating postoperative visits for suture removal has many potential benefits. First, it may decrease postoperative costs. Although postoperative visits are covered in the 90-day global period, these visits have indirect costs such as transportation,

childcare, and lost wages.[2] Second, the use of subcutaneous absorbable subdermal sutures may eliminate any pain that patients may experience because of removal of nonabsorbable sutures.[3] Third, from the surgeon's perspective, it allows the surgeon to schedule other patients during these now-available visit slots.

The primary concern with absorbable sutures is that they may evoke an inflammatory response, which could lead to wound-healing complications.[2,3] However, in our study, absorbable and nonabsorbable sutures had similar rates of postoperative complications, including superficial SSI, deep wound infections, wound complications, antibiotic prescriptions, hand therapy prescriptions, and corticosteroid injections. In a prospective cohort study involving 20 patients undergoing open carpal tunnel release, Tzimas et al[9] found similar infection rates and cosmesis at 6 weeks after surgery in patients with incisions closed with nonabsorbable 3-0 Nylon (Ethicon) in an interrupted mattress fashion and in those with incisions closed with running subcuticular absorbable 3-0 Vicryl Rapide (Ethicon) sutures. In a randomized controlled trial of 38 patients undergoing open carpal tunnel release, Theopold et al[10] found a similar incidence of infections (defined as any inflammation along the incision requiring antibiotics) at 6 weeks after surgery when incisions were approximated with simple interrupted sutures of either 4-0 Vicryl Rapide or 4-0 synthetic polybutester (Novafil; Medtronic). Similar rates of wound infections and complications between absorbable and nonabsorbable sutures were also supported by Al-Abdullah et al[11] and Gillanders et al.[12]

In contrast, other studies have found notable differences in complication rates between absorbable and nonabsorbable sutures.[7,13] In a retrospective review of 133 patients undergoing carpal tunnel release and 179 patients undergoing TFR, Rochlin et al[7] found that incisions closed with interrupted deep dermal 4-0 Monocryl with Dermabond were significantly less likely to develop wound dehiscence, incur infection, and require postoperative antibiotics than those closed with mattress sutures with 4-0 Nylon and 4-0 Chromic Gut (Ethicon). However, the authors neither clearly documented variation in surgical protocol among surgeons nor detailed preoperative antibiotic use. Moreover, they broadly defined infection to include any concern of infection ranging from suture abscess to cellulitis, which may have led to overestimation of disease severity. We found no meaningful differences in infectious and noninfectious wound complications between 4-0 Monocryl with glue and 4-0 Prolene.

Postoperative pain, swelling, and stiffness can occur occasionally following TFR.[14] In our study, 22 (7.2%) trigger digits in total were prescribed formal hand therapy, and 7 (2.3%) digits received postoperative corticosteroid injections for pain, swelling, and/or stiffness. Theoretically, postoperative visit is a valuable opportunity to reinforce the surgeon's postoperative recommendations such as elevation, range of motion, and scar massage. Moreover, it allows the patients to ask questions regarding the postoperative protocol. However, the absorbable and nonabsorbable groups were similar in the number of therapy prescriptions and postoperative corticosteroid injections administered. This suggests that these complications are unlikely to be related to the type of suture material and are not meaningfully decreased by having a standard postoperative visit. The one caveat would be that all surgeries in this study were performed with the patients under wide-awake local anesthesia no tourniquet; hence, these recommendations were given by both surgeons during surgery. Postoperative visit may take on greater importance if the surgery is performed with the patient under sedation and the surgeon does not have an opportunity to communicate expectations.

Our study has several strengths. First, aside from the incisional closure, the surgical protocol was identical between the surgeons. This allowed us to directly compare the outcomes of the type of closure without introducing confounding factors from varied surgical techniques. Second, compared with similar studies for other procedures, we had a substantially greater number of patients. Third, we limited subjectivity in diagnosing infections using the Centers for Disease Control and Prevention criteria for superficial SSI and by defining deep infections as requiring formal irrigation and debridement in the operation room.

Our study has several weaknesses, which are mostly inherent to its retrospective design. First, given that complications were identified through chart review, it is possible that not all complications were captured. Although this is possible, we doubt that this would meaningfully change the results of the study. Second, some patients may have had complications that were treated at an outside institution. However, given that we were evaluating short-term complications in the early postoperative period, we think that this type of loss to follow-up would be limited. Third, we did not account for medical comorbidities, which could have confounded our results. Fourth, we did not include patient-reported outcomes. Although our patients had a similar rate of complications, it is possible that one suture technique resulted in better patient-reported outcomes. This was beyond the scope of our study.

Overall, TFR closure with absorbable subdermal sutures and glue results in similar complication rates but statistically significantly fewer postoperative visits compared with closure with nonabsorbable sutures requiring removal. These study findings may be able to inform surgeons on how to close TFR incisions.

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