

Suturing versus conservative management of lacerations of the hand: randomised controlled trial

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Abstract

Objective To assess the difference in clinical outcome between lacerations of the hand closed with sutures and those treated conservatively.

Design Randomised controlled trial.

Setting Emergency department in a tertiary hospital.

Participants Consecutive patients presenting between 16 February and 30 November 2000 with uncomplicated lacerations of the hand (full thickness < 2 cm; without tendon, joint, fracture, or nerve complications) who would normally require sutures. 154 patients were eligible, 58 refused, and 5 were missed; 91 patients with 95 lacerations were enrolled.

Intervention Participants were randomised to suturing or conservative treatment.

Main outcome measures Primary outcome was cosmetic appearance after three months, rated on a previously validated visual analogue scale. Duration of treatment, pain during treatment, patients' assessment of their outcome, and the time for patients to resume normal activities were also measured.

Results Participants treated with sutures and those treated conservatively did not differ significantly in the assessment of cosmetic appearance by independent blinded doctors after three months: 83 mm *v* 80 mm, (mean difference 3 (95% confidence interval -1 to 8) mm) on the visual analogue scale. The mean time to resume normal activities was the same in both groups (3.4 days). Patients treated conservatively had less pain (difference 18 (12 to 24) mm) and treatment time was 14 (10 to 18) min shorter.

Conclusion Similar cosmetic and functional outcomes result from either conservative treatment or suturing of small uncomplicated lacerations of the hand, but conservative treatment is faster and less painful.

Introduction

Lacerations are common simple problems; their treatment requires tremendous resources. Every doctor is asked, "Will this cut need stitches?" with the expectation that the answer is determined using some scientific knowledge. In truth, we give an opinion based on experience. The value of closure and whether it is even needed have never been objectively studied.

This randomised controlled trial aims to determine whether the conservative management of hand lacerations produces similar clinical outcomes to wounds that are sutured.

Patients with lacerations of the hand—that is, lacerations distal to the volar wrist crease—that would normally be treated with sutures were eligible for the study. Patients were excluded if their lacerations were longer than 2 cm; they presented more than eight hours after the injury; haemostasis could not be attained after 15 minutes of pressure; their lacerations had associated or suspected neurovascular, tendon, or bone injury; their lacerations were of the nail bed, were puncture wounds, or were secondary to a bite from any source. Patients with complications from diabetes, receiving anticoagulants or prolonged chronic steroid use (defined as continuous use for more than 14 days, three times a year) were also excluded, as were patients unable to participate in the follow up.

Patients and methods

The study took place in the Emergency Department of the University of California, San Francisco Medical Center during the hours of operation of the clinical research unit (11 am to 11 pm).

After lacerations were irrigated under tap water for 1-2 minutes the patient applied direct pressure.

Patients randomised to receive sutures had the area of laceration anaesthetised and cleansed, at the health-care providers' discretion. We closed the skin with monofilament suture (United States pharmacopoeia sizes 4-0 or 5-0), using standard sterile techniques, and applied polymyxin B antibiotic ointment containing bacitracin with a gauze dressing to last 24-48 hours.

Patients randomised to receive conservative treatment had the same ointment and dressing applied to last 48 hours.

In both groups, use of ointments after 48 hours was discouraged, and patients were given written instructions to keep their wounds clean and dry.

Clinical outcomes

The duration of the procedure, from the start of cleaning the wound, after randomisation, until a dressing was in place, was recorded. Patients rated the pain of their treatment on a standard 100 mm visual analogue scale for pain, with 0 mm corresponding to no pain and 100 mm to the worst pain possible.¹

We asked patients to return in 8-10 days for their sutures to be removed or their wound to be assessed.

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We considered wounds to be infected if they had been treated for an infection with antibiotics. We assigned a wound score using a previously validated clinical wound scale.² This scale combines six observations: irregularities of contour, separation of wound margin >2 mm, edge inversion, excessive distortion, the absence of step-off borders, and overall cosmetic appearance. Each category is graded 0 or 1. The total is the sum of the scores for each category; 6 is optimal, and 5 or less is suboptimal. We compared the percentage of wounds from each group that scored 6.

Also, in early follow up, we asked patients if and when they had been able to return to normal daily activities, with full normal use of their injured hand.

At three month follow up the research assistant took a digital photograph of patients' healed wounds.³ Two independent doctors, who were unaware of the method of treatment, rated the photographs for cosmetic appearance, on a previously validated visual analogue scale.⁴ This scale is 100 mm long with "best scar" written at 0 mm and "worst scar" written at 100 mm. A difference of 12-15 mm is clinically important. Patients rated their own scars on a similar scale.

Sample size

We designed the study to determine clinical significance at the $P=0.05$ level with 95% power. This allows a difference of at least 10 mm on the visual analogue scale, using an estimated standard deviation of 12.5 mm (estimated 41 lacerations per group).

Results

During the study period, 16 February to 30 November 2000, 58 (38%) patients refused enrolment, 5 (3%) patients were missed, and 91 (59%) patients with 95 lacerations were enrolled. More than 80% (154/192) of all lacerations seen during the study period were eligible. At the end of the trial we evaluated photographs of 41 lacerations treated with sutures and 40 treated conservatively.

Patients treated with sutures and those treated conservatively had similar baseline demographic and clinical characteristics (see bmj.com). The mean scores for cosmetic appearance assigned by doctors blinded to whether treatment had been with suturing or not were not significantly different (table). Patients' ratings of their wound at three months were also similar.

At 8-10 days follow up, optimal wound scores in the sutured and non-sutured groups were similar, and patients in both groups stated similar mean times to return to normal activities. One sutured wound was

What is already known on this topic

Sutures provide secure and meticulous wound closure, but their placement is not without associated pain, fear, and increased risk of infection

Wounds heal by second intention if treated without sutures and left open

What this study adds

Non-suturing of hand lacerations of <2 cm produced similar cosmetic and functional outcomes to suturing and was faster and less painful

treated with antibiotics for an infection. No infections were treated in any of the conservatively treated wounds.

Patients' mean rating on the visible analogue pain scale was lower for lacerations treated conservatively. The mean time to treat with sutures was greater than for conservative treatment.

Discussion

The goal of wound care and closure is to have a resultant functional and cosmetically acceptable scar, with low morbidity and high patient satisfaction and comfort. These goals can be achieved by treating simple lacerations of the hand conservatively instead of with sutures. The time saving has implications for health policy.

Large gaping wounds should be closed, after meticulous wound care, and our results cannot be generalised to cosmetically sensitive areas such as the face.

This is the first randomised controlled trial to determine whether the conservative management of hand lacerations produces similar clinical outcomes to wounds that are sutured. We expected to obtain these results because, in our experience, wounds that are dehiscence or those treated with delayed primary closure usually heal without complication: the three phases of wound healing—*inflammation, epithelisation, and maturation*—occur whether or not wounds are securely closed. We were impressed with how inconspicuous most scars were after three months and at the high level of patients' satisfaction with the appearance of their wound.

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- Huskisson EC. Visual analog scales. In: Melzack R, ed. *Pain measurement and assessment*. New York: Raven, 1983:33-7.
- Hollander JE, Singer AJ, Valentine S, Thode HC, Henry MC. Wound registry: development and validation. *Ann Emerg Med* 1995;25:675-85.
- Storror AB, Stack LB, Peterson P. An approach to emergency department photography. *Acad Emerg Med* 1994;1:454-62.
- Quinn JV, Drzewiecki AE, Stiel IG, Elmslie TJ. Appearance scales to measure cosmetic outcomes of healed lacerations. *Am J Emerg Med* 1995;13:229-31.

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Clinical outcomes. Values are means (SD) unless stated otherwise

Clinical outcome	Treatment		Mean difference (95% CI)
	Suture	Conservative	
Cosmetic appearance at 3 months (mm)*:			
Assigned by doctor	83 (10.0)	80 (11.3)	3 (-1 to 8)
Self assigned by patients	83 (18.1)	82 (19.5)	1 (-7 to 9)
Time to resume normal activities (days)	3.4 (3.4)	3.4 (2.9)	0 (-1.4 to 1.3)
% (No) of optimal early wound scores	92 (34/37)	89 (31/36)	3 (-11 to 17)
Pain during treatment (mm)*	31 (16.4)	13 (12.0)	18 (12 to 24)
Duration of treatment (min)	19 (12.8)	5 (4.6)	14 (10 to 18)
No of infections	1	0	—

*Cosmesis and pain were scored on a visual analogue scale ranging 0-100 mm.