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Article Citation:
Joel W. Beam (*2008*) Tissue Adhesives for Simple Traumatic Lacerations. Journal of Athletic Training: March/April 2008, Vol. 43, No. 2, pp. 222-224.

doi: 10.4085/1062-6050-43.2.222

Evidence-Based Practice

Tissue Adhesives for Simple Traumatic Lacerations

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Abstract

Reference/Citation: Farion K, Osmond MH, Hartling L, et al. Tissue adhesives for traumatic lacerations in children and adults. *Cochrane Database Syst Rev.* 2001 (4);CD003326.

Clinical Question: What is the clinical evidence base for tissue adhesives in the management of simple traumatic lacerations?

Data Sources: Studies were identified by searches of the following databases: Cochrane Wounds Group Specialized Trials Register (September 2003), Cochrane Central Register of Controlled Trials (CENTRAL) (CDROM 2003, issue 3), MEDLINE (1966 to September 2003, week 1), EMBASE (1988 to 2003, week 36), Web of Science Science Citation Index (1975 to September 13, 2003) and various clinical trials registers (September 2003). Investigators and product manufacturers were contacted to identify additional eligible studies. The search terms included *wounds and injuries, laceration, face injury, nose injury, tissue adhesives,* and *acrylates.*

Study Selection: Each study fulfilled the following criteria: (1) The study was a randomized controlled trial that compared tissue adhesives with standard wound closure (SWC) (sutures, staples, adhesive strips) or tissue adhesive with tissue adhesive. (2) The wounds were acute, linear lacerations less than 12 hours old, resulting from blunt or sharp trauma. (3) The wound length, width, and depth allowed for approximation of the edges with minimal tension after deep sutures were placed, if required. Studies were included with no language or publication status restriction, with participants of any age recruited in an emergency department, outpatient clinic, walk-in clinic, or other primary care setting. Studies were excluded if the wounds were stellate lacerations, puncture wounds, mammalian bites, infected, heavily contaminated or devitalized, crossing joints or mucocutaneous junctions, in hair-bearing areas, or in patients with keloid formation or chronic illness.

Data Extraction: The characteristics of the study and participants, interventions, outcome measures, and findings were extracted by one author and verified by a second using a standard form. The primary measure was cosmetic outcome. Secondary measures were pain with the procedure, time to complete the procedure, and complications (erythema, infection, discharge, need for delayed closure, and dehiscence). Studies were divided into 2 groups as follows: group 1,

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Current Issue
Available Issues

Journal Information

Print ISSN 1062-6050
eISSN 1938-162X
Frequency Bimonthly:

January/February
March/April
May/June
July/August
September/October
November/December

comparisons among tissue adhesives with SWC, and group 2, comparisons among different tissue adhesives. All eligible studies were assessed for methodologic quality independently by 2 investigators using the Jadad Scale, which evaluates randomization, double blinding, withdrawals, and dropouts and is scored on a 5-point (maximum) scale. The data from the tissue adhesive and SWC studies were pooled and analyzed with a random-effects model. The I^2 statistic was used to determine heterogeneity among the studies. χ^2 analysis was performed to compare participant age, wound location, and type of tissue adhesive among the studies. The data from the studies comparing tissue adhesives were pooled and analyzed using a fixed-effects model.

Main Results: The search criteria identified 39 eligible studies, of which 11 met the inclusion criteria. In 10 studies, a tissue adhesive was compared with SWC. Five groups used butylcyanoacrylate, and 5 used octylcyanoacrylate. For SWC, 6 groups used sutures, 2 used adhesive strips, and 2 used a combination of methods, although most used sutures. Six studies were limited to pediatric patients and 2 to adult patients; 2 included patients of any age. Wounds were limited to facial lacerations in 2 pediatric studies and 1 group with patients of any age. Lacerations requiring deep sutures were excluded in 4 studies. One group compared tissue adhesives (butylcyanoacrylate and octylcyanoacrylate) among pediatric patients with facial lacerations not requiring deep sutures. In the 11 included studies, authors of 9 randomized and evaluated 1 laceration per patient, whereas 2 groups included patients with more than 1 laceration. In 1 group, each laceration was independently randomized and evaluated, and the other group randomized the patient and assigned all lacerations to a treatment group (tissue adhesive with SWC or tissue adhesive with tissue adhesive). The sample sizes ranged between 60 and 163 lacerations, and all 11 studies were performed in emergency departments.

The primary measure in all included studies was cosmetic outcome. The majority of groups used the Cosmetic Visual Analogue Scale, the Wound Evaluation Score, or a combination of these measures. Three groups measured cosmetic outcome with nonvalidated scoring systems. Assessment time periods were grouped and reported at (1) 5 to 14 days, (2) 1 to 3 months, and (3) 9 to 12 months after wound closure. Secondary outcomes were pain (as noted on visual analogue scale) and time to complete the procedure (as mean number of minutes). The 11 studies scored from 1 to 3 on the Jadad Scale. Adequate allocation concealment was reported in only 1 group.

Examining cosmetic outcome, 8 groups (565 lacerations) used the Cosmetic Visual Analogue Scale to compare tissue adhesives and SWC. The authors reported no significant differences in scores at the time periods of 5 to 14 days, 1 to 3 months, and 9 to 12 months. A subgroup analysis showed a significant (P = .005) superiority of butylcyanoacrylate over SWC at 1 to 3 months. Using the Wound Evaluation Score, 4 studies (364 lacerations) compared tissue adhesives with SWC. No significant differences in cosmetic scores were found at 5 to 14 days, 1 to 3 months, or 9 to 12 months. One group (83 lacerations) compared butylcyanoacrylate with octylcyanoacrylate and reported no significant differences in cosmetic scores using the Cosmetic Visual Analogue Scale at 1 to 3 months and the Wound Evaluation Score at 5 to 14 days and 1 to 3 months.

Examining secondary outcomes, 6 groups (570 lacerations) compared tissue adhesives with SWC using the visual analogue scale for pain. Scores reported by parents, patients, physicians, and nurses significantly favored tissue adhesives. In 6 studies (584 lacerations), tissue adhesives were significantly favored over SWC in time to complete the procedure. For complication outcomes, 8 groups (727 lacerations) demonstrated significantly fewer incidences of erythema and an increased risk of dehiscence with tissue adhesives compared with SWC. No significant differences were shown for infection, delayed closure, or discharge. Among 83 lacerations, 1 group compared butylcyanoacrylate with octylcyanoacrylate and reported no significant differences in combined patient-reported and parent-reported visual analogue pain scores, time to complete the procedure, dehiscence, or infection.

Conclusions: This review provides evidence that tissue adhesives are an option to SWC (sutures, staples, adhesive strips) for the management of simple traumatic lacerations. Overall, no significant differences were found in cosmetic scores at the reported assessment periods between tissue adhesives and SWC. At 1 to 3 months, a subgroup analysis significantly favored butylcyanoacrylate over SWC. Tissue adhesives significantly lowered the time to complete the procedure, levels of pain, and rate of erythema. However, the data revealed a significant increase in the rate of dehiscence with the use of tissue adhesives when compared with SWC. The low methodologic quality of the evidence should be considered in the interpretation of the findings.

Keywords: wound closure, tissue bonding, open wounds

Joel W. Beam, EdD, LAT, ATC, provided conception and design; acquisition and analysis and interpretation of the data; and drafting, critical revision, and final approval of the article.

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