Postoperative Care of the Facial Laceration

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ABSTRACT

The purpose of this investigation is to examine factors involved in the postoperative care of traumatic lacerations. An evidence-based comprehensive literature review was conducted. There are a limited number of scientifically proven studies that guide surgeons and emergency room physicians on postoperative care. Randomized controlled trials must be conducted to further standardize the postoperative protocol for simple facial lacerations.

KEYWORDS: Laceration, wound closure, postoperative care

The management of facial lacerations is common for surgeons who take trauma call at their local hospitals and for emergency room physicians. In fact, we have more calls to the emergency rooms for treatment of soft tissue injuries at our hospitals than we do for bony injuries. Because of the visibility of the face, it should not be surprising that much attention has been given to the technique(s) for the closure of traumatic facial lacerations. Studies are plentiful that evaluate a host of factors, such as methods of cleansing and debridement, types of sutures, layered versus nonlayered closure, use of adhesives rather than sutures, and so on. There is a paucity of information, however, about what to do after the laceration has been closed. Most texts on the management of facial injuries mention very little regarding this topic.

Most of the aftercare recommended for facial lacerations seems to be based upon the varied opinions of the individual surgeon rather than on scientific factors. In fact, there seems to be no consensus, and often what is recommended by one surgeon is castigated by another.

The purpose of this article is to examine the factors involved in postoperative care of traumatic lacerations. We have tried to identify the most scientific information available to make treatment recommendations, but it should be realized that good evidence for much of what is currently being done is not based on science, and just as importantly, there is not much science on this topic to guide the clinician. Although we are discussing the treatment of traumatic facial lacerations, much of the studies that are available have been performed on lacerations elsewhere in the body. However, there is no reason to believe that they aren't applicable the facial region. The information presented here should also apply to incisions made on the face for any reason.

SURGICAL TAPE

Surgical tape to reinforce sutured lacerations at the time of closure and after suture removal is often used as adjunctive wound care. Surgical tape theoretically minimizes skin tension. In a cadaveric study, the reinforcement of surgical tape with mastisol over a sutured skin incision exhibited a slightly higher strength against separating forces when compared with sutures alone,

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Craniomaxillofac Trauma Reconstruction 2010;3:189–200.

Received: February 9, 2010. Accepted: May 7, 2010. Published online: November 10, 2010.
DOI: http://dx.doi.org/10.1055/s-0030-1268516.
ISSN 1943-3875.

but differences were not statistically significant (15.39 kg versus 14.17 kg).[1] Surgical tape also serves as a partially occlusive and microporous dressing, without increasing the risk of infection.[2,3]

Technique of Application

There are techniques to optimize the efficacy of surgical tapes. Skin preparation with mastisol provides markedly increased adhesive strength in comparison to tincture of benzoin and surgical tapes used without skin preparation.[4,5] Steri-strips (3M, Minneapolis, MN) with mastisol adhesive have the longest duration of effective adhesion among the various surgical tapes.[2] Steri-strips should ideally be applied in a parallel, nonoverlapping fashion over the mastisol-covered skin.[6]

Conclusion

To our knowledge, there are no studies evaluating tensile strength, cosmesis, and infection rates when Steri-strips are used as an adjuvant at the time of closure of lacerations and after suture removal. There is reason to believe that continued use of Steri-strips may provide some benefit up to 6 weeks.[7] In healing rat wounds, gains in wound strength from collagen formation are exponential up to 42 to 60 days, after which strength plateaus.[8] Due to the lack of documented, deleterious effects on wound healing and its speculated provision of tensile support, the application of Steri-strips seems prudent immediately after closure and also after suture removal for a period of time. The longer they can be used, the better the potential effect, at least until 6 weeks postoperatively. However, the duration of use will be based on convenience and compliance for lacerations on the face.

TOPICAL OINTMENTS

There are two main categories of ointments that have been applied to the sutured laceration: petrolatum alone or antibiotic-impregnated petrolatum. Any topical ointment provides a moist environment, whereas an antibiotic-impregnated ointment offers the additional potential benefit of antimicrobial activity. By far, the most commonly used ointment is the latter. The use of topical antibiotics is usually recommended for traumatic lacerations and surgical wounds.[9] Although the use of topical antibiotics in simple lacerations has been widely accepted by clinicians,[10] the effectiveness of topical antibiotics is still debated and therefore discussion is worthy.

Microbiology

Topical antibiotics aim to decrease infections from common skin pathogens. The most common pathogens for skin and soft tissue infections are *Staphylococcus* and *Streptococcus* species. In addition, *Corynebacterium*, *Pasteurella*, and *Pseudomonas* species and Enterobacteriaceae are frequent colonizers of skin infections. When infection occurs from soft tissue trauma, a mixed infection involving anaerobes is common.[11,12] Selection of a topical antibiotic should be directed toward these common pathogens (Table 1).

The process of re-epithelialization begins within the first 24 hours[13] and is completed in approximately 1 week for primarily closed wounds.[14] Wounds are most susceptible to infection within the first 2 days.[15] Schauerhamer et al inoculated wounds created on guinea pigs with *Staphylococcus aureus* and *Escherichia coli* at various time intervals.[15] Infections developed in wounds inoculated within the first 48 hours. After this 48-hour cutoff, no wounds became infected.

Table 1 Topical Antibacterial Activity[34]

Topical Antimicrobial	Target Bacteria	Limitations
Mupirocin	*Staphylococcus* species (including methicillin-resistant *Staphylococcus aureus*)	*Enterobacteriaceae* species
	Streptococcus species	
	Pasteurella species	
Neomycin	Gram negative aerobes	*Streptococcus* species Anaerobes
	Staphylococcus species	
Polymyxin	*Pseudomonas aeruginosa*	Gram-positive organisms
	Proteus mirabilis	
	Serratia marcescens	
	Escherichia coli	
	Enterobacter	
	Klebsiella	
Bacitracin	*Stapholycoccus* species	Gram-negative organisms
	Streptococcus species	
	Clostridia	
	Corynebacteria	
Silver Sulfadiazine	Gram-positive and gram-negative	

Maintenance of a Moist Environment

Topical ointments also maintain a moist healing environment, thereby minimizing scab formation. Winter's landmark article on porcine wounds established that the formation of a dry scab on the superficial surface of a wound impairs epithelization.[16] Furthermore, he determined that the maintenance of a moist environment without scab formation enhances wound healing. A year later in 1963, Hinman and Maibach confirmed this finding with cultured human cells.[17] Several contemporary studies have supported the benefit of a moist environment for optimal wound healing.[18–20] Last, topical ointments impair dressing adherence, preventing tissue damage upon removal of a dressing.

Effectiveness

Topical antibiotics, in comparison to plain petrolatum, decrease the incidence of infection in simple lacerations. In a prospective, double-blind, controlled trial, the efficacies of (1) bacitracin zinc ointment; (2) neomycin sulfate, bacitracin zinc, and polymyxin B sulfate combination ointment; and (3) silver sulfadiazine cream were compared against a control of petrolatum for 426 uncomplicated repaired lacerations at a military community hospital.[21] Patients were instructed to change dressings three times a day and apply topical ointment with both verbal and written instructions. Wound infection rates were 5.5% (6/109) for bacitracin zinc ointment; 4.5% (5/110) for neomycin sulfate, bacitracin zinc, and polymyxin B sulfate combination ointment; 12.1% (12/99) for silver sulfadiazine cream; and 17.6% (19/108) for petrolatum. When the petrolatum control was compared with all three antibiotics, the difference in infection rates were significant ($p = 0.0018$). When the antibiotics were compared with each other for infection rates, there were no statistically significant differences ($p = 0.14$). The fact that topical antibiotics have been proven to be effective in decreasing wound infections in comparison to petrolatum is further supported by their ability to decrease bacterial counts in open wounds.[22,23] The Dire et al. study (1995) did not compare the incidence of infection when lacerations were left dry or without dressings.[21] Another important aspect of the study is that no data were presented on the comparison of topical antibiotics to petrolatum specifically to the head and neck region, even though 54% (232/426) of lacerations involved the head and neck region in this study. As expected, the head and neck region had the lowest infection rate among anatomic locations at 6.0% (14/232).[21] It is therefore difficult to elucidate the antibacterial utility of topical antibiotics for head and neck lacerations because the infection rate is already low in this region.

The use of topical antibiotics in sterile dermatologic surgery has not been shown to decrease the incidence of infection in postoperative wounds. In a prospective, double-blind, controlled trial of 884 patients with 1207 sterile wounds from dermatologic surgery at a military institution, no statistically significant differences in infection rates between bacitracin zinc ointment to petrolatum were found ($p = 0.37$).[24] The overall incidence of infection was 3.8% (34/884) with a 4.5% (20/440) infection rate with petrolatum and 3.2% (14/444) infection rate with bacitracin. Again, in this study over 54% (659/1207) of wounds were in the head and neck region, but there was no analysis of infection rates specific to head and neck wounds after dermatologic surgery.[24]

The literature thus far provides evidence that there is a decreased incidence of infection with the application of topical antibiotics in lacerations, but not for sterile surgical wounds. However, evidence-based literature specific to the usage of topical antibiotics for lacerations and sterile surgical wounds in the head and neck region have not been thoroughly investigated.

Safety, Allergenic Potential, and Resistance

Topical antibiotics are safe to use on human skin and achieve high local concentrations with limited systemic toxicity. Multiple studies have failed to demonstrate any topical antibiotic-mediated toxicity on human keratinocytes and fibroblasts.[25–27] Though locally nontoxic, allergic potential exists.

Reports of contact dermatitis with the use of various topical antibiotics have been increasing over time. Historically, neomycin has been the most frequent culprit. In 1979, the incidence of neomycin contact dermatitis was reported to be 1% or less in the general population.[28] In 1992, a prospective follow-up study of 215 patients having undergone cutaneous surgery found the incidence of contact dermatitis was 5.3% for neomycin.[29] More recently, the North American Contact Dermatitis Group found the frequency of contact dermatitis with neomycin to be 10% in a population of 4454 patients referred for diagnostic patch testing.[30]

At one time, bacitracin was thought to have a low occurrence of contact dermatitis. A randomized controlled study of 922 patients in 1996 found 0.9% of the 444 patients in the bacitracin group to exhibit acute contact dermatitis.[24] In contrast, according to the North American Contact Dermatology group, in 2003 the incidence of bacitracin contact dermatitis increased from 1.5% in 1989t o 1990 to 9.2% in 1998 to 2000 when patch tested.[31]

Several authors agree that the incidence of contact dermatitis to polymyxin B is rare.[32,33]

To provide the most ideal environment for successful postoperative wound care, the potential for

allergic contact dermatitis (manifested as localized, cutaneous erythema and pruritus) and its effects on wound healing should be taken into account, especially in light of recent data supporting a rising incidence of contact dermatitis associated with the application of topical antibiotics. Though positive patch tests show an upward trend of allergic contact dermatitis, a positive patch test does not always correlate with clinical manifestations of allergic contact dermatitis in wounds.[24]

Antibacterial resistance to topical antibiotics has been reported and is a concern.[25] The potential for plasmid-mediated resistance to neomycin has been reported for both gram-positive and gram-negative organisms. Bacitracin-resistant strains to staphylococci have also been established.[34]

Conclusion

From this review, it seems that postoperative application of topical antibiotics deserves a role in infection prevention and wound healing during the first 48 hours of re-epithelialization.[13,15,35] Beyond this initial period, further use may be unwarranted and may lead to increasing resistance, allergy, and sensitivity. It has been proposed to use petrolatum after this initial period to maintain a moist wound and prevent scab formation.[35] Further evidence-based studies on the role of topical antibiotics in head and neck lacerations will be needed to confirm this conclusion.

DRESSINGS

There are many functions and potential benefits of dressings placed over facial lacerations (Table 2). However, a strict evidence-based guideline does not exist in the selection of a dressing. The decision should be based upon wound complexity, amount of exudate produced, and risk of infection.[7] Although a multitude of tailored dressings exist for specific wounds, our discussion will be limited to dressings used in the management of simple facial lacerations.

Table 2 Functions of a Dressing[14,36,38,50]

- Protect the wound from bacteria and foreign material
- Absorb exudate from the wound
- Prevent heat and fluid loss from the wound
- Provide compression to minimize edema and obliterate dead space
- Be nonadherent and removable without causing trauma
- Create a warm, moist occluded environment
- Cover an unsightly wound
- Minimize pain
- Splint or immobilizing the wound

Cotton Gauze

An argument is frequently made that gauze is more cost-effective and if kept moist with saline provides equal benefit as occlusive dressings. A survey of emergency room physicians shows that most clinicians still use gauze, taped over the topical ointment–covered wound.[10] However, the use of gauze makes wounds vulnerable to bacterial contamination from its meshlike nature,[36,37] disrupts the healing wound by becoming adherent,[38] sheds fibers into the wound,[39,40] and requires more frequent dressing changes.[41]

Fabric Dressings

Telfa (Kendall, Mansfield, MA) is a synthetic nonadherent dressing composed of a core of mildly absorbent cellulose sponge sandwiched between perforated polyester films. In combination with topical antibiotic ointment, Telfa helps to maintain a moist wound environment. Telfa can be used alone or as an interface material in combination with other dressings.[7] The main advantages of Telfa are its wide availability, low cost, nonadherence, mildly absorbent qualities, and the ease of custom fitting the material to the wound.[7,38] Disadvantages include the tendency to become adherent in highly exudative wounds[7] and the requirement for a secondary supportive dressing to maintain its position over the wound.[38]

The Case for Occlusive Dressings

Winter's discovery that moisture enhances wound healing prompted a paradigm shift toward the use of occlusive dressings.[16] Formerly (and often currently), dry gauze is applied, or the wound is allowed to heal exposed to air and protected only by the scab. The term *occlusion* implies creating a covered, moist wound environment, with the goal of accelerating wound healing. Authors typically do not classify topical ointments as an occlusive dressing.[36,38] However, being oil based, one would think that topical ointments provide some degree of occlusion.

Occlusive dressings are either fully occlusive (impermeable to fluid and gas) or partially occlusive (semipermeable to gases like oxygen and water vapor yet still retain fluid impermeability).[42] Occlusive dressings speed keratinocyte migration[16,43]; stimulate keratinocyte, fibroblast, and endothelial cell proliferation by retaining wound fluid[44,45]; sustain a level of hypoxia to induce angiogenesis and collagen synthesis[46–48]; lower the rate of infection[36]; and possibly improve cosmetic outcomes.[49]

Film Dressings

Polyurethane films (e.g., Tegaderm, 3M, Minneapolis, MN) are partially occlusive dressings, allowing gaseous exchange but not fluids. An advantage is that the transparency of film allows easy visualization of the wound.

There are three main disadvantages of films. Films cannot absorb fluids and thus fluids can build up under the film, which can break the peripheral seal. They can be difficult to handle because of their inherent stickiness, and this stickiness may also damage new epithelium during removal of the film if applied directly to the wound margins.[7,50]

Facial Dressing Options

Numerous combinations of dressings for simple sutured facial lacerations exist: topical ointment only, topical ointment and gauze supported by tape, topical ointment and Telfa, an occlusive dressing, and a four-layer technique with Steri-strips, topical ointment, interface dressing (Telfa), all covered by film (Tegaderm) or tape.[7,50] The relative advantages and disadvantages of these are presented in Table 3.

Conclusion

At this time, the literature does not show conclusive differences in infection rate and cosmesis between the dressings discussed above in relation to simple sutured facial lacerations closed primarily. Topical ointment alone is a reasonable choice because it is cost-effective, maintains moisture, provides direct visualization of the wound, and simplifies care. Additionally, no unsightly dressings are visible. Selection of a dressing becomes more critical when further cautionary efforts are warranted, such as with young children and dirty occupational environments. If a dressing is chosen, the necessity for occlusion in simple facial lacerations is unknown. However, Hutchinson and McGuckin found wound infection was lower in occluded (2.6%) than in nonoccluded wounds (7.2%).[36] Though untested, the four-layer technique (Steri-strips, antibiotic ointment, Telfa, and Tegaderm) seems to possess the most qualities of an ideal dressing, should the clinician prefer to use a dressing.

SYSTEMIC ANTIBIOTICS

It has been established by meta-analysis that systemic antibiotics do not reduce the incidence of infection for simple lacerations.[51] Furthermore, the head and neck region has a lower incidence of infection with soft tissue trauma.[21,52,53] Many consider that systemic antibiotics are ineffective for simple lacerations and that even if they were given, the potential benefits do not outweigh the associated costs and risks. However, certain subgroups of wounds and populations should receive greater consideration for systemic antibiotics. If the decision is made to provide systemic antibiotics, a first-generation cephalosporin or penicillinase-resistant penicillin is recommended. If allergic to penicillin, then clindamycin is recommended.[38,54]

Table 3 Properties of Dressings

	Protect the Wound from Bacteria and Foreign Material	Absorb Exudate from the Wound	Prevent Heat and Fluid Loss from the Wound	Provide Compression to Minimize Edema and Obliterate Dead Space	Be Nonadherent and Removable without Causing Trauma	Create a Warm, Moist Occluded Environment	Cover an Unsightly Wound	Minimize Pain	Cost-Effectiveness
Ointment only	+	−	−	−	++	+	−	−	+++
Ointment and gauze supported by tape	++	++	−	++	−	+	+	−	++
Ointment and Telfa	++	+	−	+	+/−	+	−	++	++
Films	+++	−	+	−	−	+	−	++	++
Four-layer technique with tape	++	+	++	++	+/−	+	+	−	+
Four-layer technique with film	+++	+	+++	+	+/−	+++	+	+	−

Bite Wounds

Dog, cat, and human bite wounds are typically polymicrobial, containing aerobic and anaerobic organisms.[55] The evidence for use of systemic antibiotics for mammalian bite wounds is conflicting. A meta-analysis of eight randomized trials revealed that systemic antibiotics reduce the incidence of infection in patients with dog bite wounds.[56] Although cat bite wounds are more prone to infection,[57] there are limited studies on the usage of systemic antibiotics for cat bite wounds.[58–60] In contrast, Medeiros and Saconato's Cochrane review states there is no evidence that use of systemic antibiotics is effective for dog or cat bite wounds.[61]

Rittner and colleagues reviewed the best available evidence for human bite wounds and recommended that systemic antibiotics should be given if bites penetrate deeper than the epidermal layer, especially those involving skin overlying joints or cartilaginous structures.[62]

The current literature on facial bite wounds is limited, and we are unaware of well-designed prospective studies. One retrospective study concluded that routine systemic antibiotic use is not justified for animal bite wounds to the face.[63] However, the data were of relatively low power without statistical significance and were generated from a series of case reports. Until further studies on head and neck bite wounds surface, we recommend systemic antibiotics for bite wounds.

The recommended antibiotic of choice is amoxicillin-clavulanic acid for dog, cat, and human bite wounds.[55,64–70] For patients allergic to penicillin, clindamycin in combination with ciprofloxacin for adults or trimethoprim-sulfamethoxazole for children can be used.[70] Moxifloxacin has also been shown to provide adequate coverage.[55,71,72]

Wounds Involving the Oral Cavity

Mark and Granquist performed an evidence-based review and found that at this time, studies have not shown statistically significant differences in the incidence of infection with systemic oral antibiotics versus placebo.[73] Studies on this issue have not had enough power to yield statistically significant differences, though trends indicate a decrease in the rate of infection if patients comply with antibiotic regimens.[74] There have been no specific studies on the necessity of systemic antibiotics for lacerations of the tongue, besides a report showing no infection in 28 children who did not receive antibiotics.[75] Evidence-based conclusions have not been made for through-and-through lacerations of the lips and cheeks. Traditional thought is that antibiotics should be considered when a superficial skin laceration extends into the oral cavity.[76] One commonly cited study for through-and-through lacerations only shows trends but does not provide conclusive evidence.[74] Treatment decisions for all types of lacerations involving the oral cavity therefore must be guided by clinical judgment.[73] If the oronasal mucosa is involved in the wound, the *Streptococcus viridans* group are the likely infectious organisms, and a first-generation cephalosporin or amoxicillin is recommended.[38]

Lacerations in Patients at Highest Risk of Adverse Outcomes from Infective Endocarditis or Those with Prosthetics Joints

According to the American Heart Association, those "patients with underlying cardiac conditions associated with the highest risk of adverse outcome from infective endocarditis . . . who undergo a surgical procedure that involve infected skin, skin structure, or musculoskeletal tissue," it is reasonable to provide systemic antibiotics.[77] Dermatologic literature goes on to recommend systemic antibiotics for contaminated wounds, such as traumatic lacerations, in those individuals at risk for infective endocarditis and with prosthetic joints.[78] The choice of antibiotics should contain an active agent against staphylococci and β-hemolytic streptococci, such as a first-generation cephalosporin or penicillinase-resistant penicillin.[77]

Additional Subgroups

Patients at higher risk for infection include those with increasing age, conditions associated with immunocompromise (i.e., diabetes mellitus, HIV, chemotherapy, etc.), puncture wounds, the presence of foreign bodies, heavy contamination, jagged wound edges, injury deeper than the subcutaneous layer, wide lacerations, and delayed closure and those involving open fractures and joint wounds.[53,79–84] One should *consider* the use of systemic antibiotics in such patients.

Conclusion

Systemic antibiotics should not necessarily be employed as a routine component of postoperative care of patients with facial lacerations. However, there are times when they may be required. Table 4 lists recommendations based upon what literature currently exists concerning their use.

CLEANSING

If the wound is kept moist to prevent formation of a scab and is not grossly contaminated with debris, cleansing has not been shown to have an effect on infection rates or wound healing[14,85] and therefore may not be necessary. The goal of cleansing the wound is to remove scab and debris and to decrease bacterial numbers to provide an optimal healing environment. If deemed necessary, the

Table 4 Systemic Antibiotic Recommendations

Type of Wound	Systemic Antibiotics
Simple laceration	Do not recommend
Bite wounds	Recommend
Wounds involving oral cavity and through-and-through lacerations	Employ clinical judgment
Patients at high risk of adverse outcomes from infective endocarditis or those with prosthetic joints	Recommend
High-risk category	Strong consideration

ideal cleansing agent should have a wide range of antimicrobial activity, persistent antibacterial effect, and minimum toxicity or adverse effects.[38] Unfortunately, none of the commonly used cleansing agents fulfill all three of these criteria.

Clinicians recommend various cleansing solutions including hydrogen peroxide, saline, and tap water. A sterile cotton-tipped applicator soaked in diluted hydrogen peroxide has traditionally been used[86] and is still employed by many (most?) clinicians today. Some prefer sterile saline or tap water, and others recommend that wounds healing by primary intention rarely require cleansing.[85,86] There is also debate on whether wounds can get wet in the immediate postoperative period.

What follows is a review of what has been scientifically demonstrated about the most commonly used cleansing agents for postoperative wound care of simple soft tissue lacerations.

Hydrogen Peroxide

Hydrogen peroxide is widely used by clinicians because of its effervescent and presumed antimicrobial effects. The effervescent action is the result of oxygen bubbles created by the breakdown of hydrogen peroxide to water and oxygen by tissue catalase.[87] The "bubbling" action may enhance mechanical cleansing of necrotic debris from wounds in inaccessible areas.[88] However, studies have shown that hydrogen peroxide has relatively weak antimicrobial activity.[26,87] Interestingly, methicillin-resistant *S. aureus* has been shown to be susceptible to 3% hydrogen peroxide in vitro.[89–91]

Recently, hydrogen peroxide has decreased in popularity due to its deleterious effects on wound healing.[92–94] Adverse effects include inhibition of keratocyte migration and proliferation,[95] formation of bullae under new epithelium,[88] decreased wound tensile strength,[17] and impaired fibroblast activity.[96] Hydrogen peroxide also can prematurely degrade fast-absorbing gut suture, which may subsequently lead to widened or hypertrophic scarring.[97]

Tap Water and Saline

Tap water and saline are two other commonly used cleansing agents. For cost-effective reasons, it has been debated whether tap water can be used as an alternative for saline without an increase in infection rates. The potential advantage of saline is that it is isotonic and it is usually sterile. Tap water is neither of these. Angerås et al compared infection rates in simple soft tissue wounds irrigated with tap water at 37°C and normal saline at room temperature prior to repair. There was a lower infection rate ($p = 0.04$) in the tap water group compared with the saline group, but it is unclear why this was found.[98] Theoretically, it could be a temperature-mediated change in local blood flow because the tap water was warmed to body temperature prior to use, whereas the saline was room temperature. It could also be the antimicrobial effect of chlorine in the tap water. Other studies in children and adults have found no statistically significant differences in infection rates between saline and tap water for irrigation of simple soft tissue wounds (prior to closure).[99–101] Meta-analysis of these studies report that the possibility of harm from the use of tap water cannot be completely excluded and that the quality of water, the nature of the wound, and the patient's general condition should be considered.[102] Although these studies evaluated cleansing with tap water and saline in open wounds *prior* to repair, it is reasonable to assume that continued use of tap water in the postoperative period is an acceptable alternative.

Showering

Showering in the postoperative period has been proven by meta-analysis to have no significant effect on infection rate and wound healing when compared with keeping the wound dry.[102] Goldberg and colleagues' study of head and neck lacerations and surgical wounds found no difference in wound healing and infection rates when patients were allowed to shower after the first night versus keeping the wounds completely dry.[85] Furthermore, a randomized controlled trial demonstrated that wounds allowed to get wet in the shower after the first 12 hours did not increase the incidence of infection.[103] Consideration should be given to the patient's feeling of well-being that is preserved with ability to shower.[85,104] Patients should be informed that showering after the first night is not detrimental to the healing wound. Currently, there are no studies to indicate if showering immediately is detrimental.

Conclusion

Hydrogen peroxide, saline, and tap water as cleansing agents have been used[85] and continue to be described in texts.[35,38,79,86,92–94] There is minimal literature to date that provides substantial evidence-based guidelines fa-

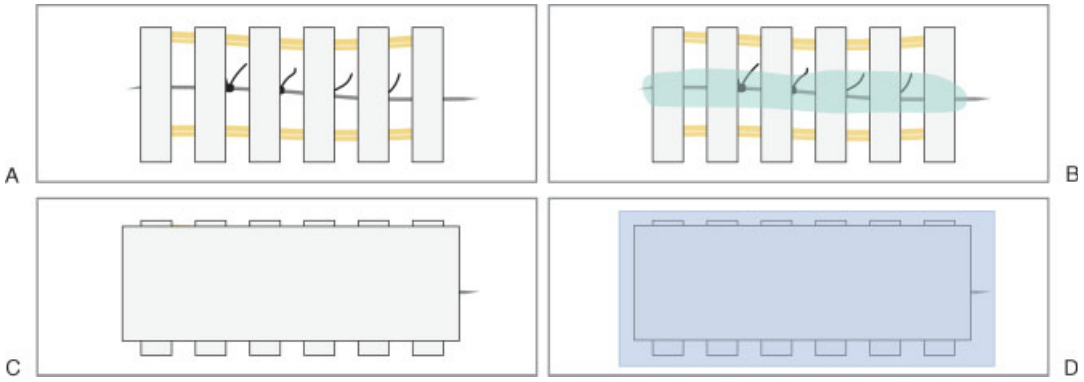

Figure 1 Illustrations demonstrating four-layer technique for dressing a simple laceration (or incision). (A) Mastisol (yellow) and nonoverlapping Steri-strips (3M, Minneapolis, MN) applied across the laceration. (B) Antibiotic ointment applied over the laceration. (C) Absorbent dressing (Telfa; Kendall, Mansfield, MA) applied. (D) A film (Tegaderm; 3M, Minneapolis, MN) is then applied.

voring one cleansing agent over another. To our knowledge, there have been no studies that have compared the difference between hydrogen peroxide, saline, tap water, and no cleansing on infection rates, wound healing, and cosmesis. The use of hydrogen peroxide seems to be driven mainly by clinical preference; however, the available evidence does not clearly show an optimal risk-to-benefit ratio. Tap water may serve as an alternative to hydrogen peroxide and saline because it is cost-effective, is readily available, simplifies postoperative wound care, and has no demonstrated difference on infection rates and wound healing. Prudence, however, would dictate that if the clinician chooses to cleanse a postoperative wound for the purpose of scab removal, debridement, and so on, one use a sterile solution. However, allowing tap water to rinse the area, such as with showering, is not detrimental.

FINAL CONCLUSIONS

Though based on known evidence, the following guidelines have not all been proven in multiple randomized clinical trials. For example, the four-layer dressing technique features many of the ideal characteristics of a dressing; however, it has not been compared with other options, including no dressing, for infection rates and optimal cosmesis. Randomized controlled trials must be conducted to further standardize the postoperative protocol for simple facial lacerations.

GUIDELINES

- Use proper primary closure technique.
- Apply Steri-strips with mastisol for the first several weeks if possible (Fig. 1A).
- Apply topical antibiotic ointment for the first 2 days, after which petrolatum should be used to maintain moisture (Fig. 1B).
- If using a dressing, then the four-layer technique dressing (Steri-strips, topical ointment, Telfa, and film) should be utilized (Figs. 1C and 1D).
- Only certain scenarios dictate prescription of systemic antibiotics for simple facial lacerations.
- Encourage daily showering after the first night.
- If cleansing is necessary, use sterile saline to remove debris and scab.
- Follow standard protocol for suture removal (4 to 5 days).

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