Office management of minor wounds

Serge Gouin, MDCM, FRCPC, FAAP  Hema Patel, MD, MSc, FRCPC, FAAP

Abstract

Objective To review office interventions for minor wounds not requiring sutures, such as abrasions, bites, and lacerations.

Quality of Evidence Most information on minor wound management comes from descriptive studies. Few comparative studies examine the effectiveness of topical antisepsis for minor wounds. Several clinical trials have demonstrated that tissue adhesives produce short- and long-term cosmetic results equivalent to those achieved with suture materials.

Main Message Sterile saline is the least toxic solution for wound irrigation. Chlorhexidine (2%) and povidone iodine (10%) have been the most investigated antiseptic solutions. Systemic antibiotics are unnecessary for wounds unlikely to be infected. All bite wounds require special attention. Primary closure of bite wounds is indicated in certain circumstances: less than 12-hour-old nonpuncture wounds, uninfected wounds, and low-risk lesions (such as on the face). In spite of their many advantages, skin tapes should be used for low-tension wounds only. The popularity of tissue adhesives has greatly increased. Since the advent of newer products (with increased bonding strength and flexibility), adhesives are used to manage most lacerations except those in areas of high tension (eg, joints) and on mucosal surfaces.

Conclusion Minor wounds not requiring sutures can be managed easily in the office.

Résumé

Objectif Passer en revue les interventions en cabinet pour les plaies mineures qui n’exigent pas de sutures, comme les abrasions, les morsures et les lacérations.

Qualité des données La majorité des renseignements sur la prise en charge des plaies mineures proviennent d’études descriptives. Quelques études comparatives examinent l’efficacité des agents antiseptiques topiques dans le cas de plaies mineures. Plusieurs essais cliniques ont démontré que les pansements de rapprochement (stéristrips) permettaient d’obtenir des résultats cosmétiques à court et long termes semblables à ceux que produit le matériel de sutures.

Principal message Une solution saline stérile constitue le produit le moins toxique pour l’irrigation de la plaie. La chlorhexidine (2%) et la polvidone iodée (10%) sont les solutions antiseptiques ayant fait l’objet d’un plus grand nombre d’études. Les antibiotiques systémiques sont inutiles pour les plaies qui ne sont pas propices à l’infection. Toutes les morsures méritent une attention particulière. Une suture primitive des blessures par morsure est indiquée dans certaines circonstances: les plaies non punctiformes de moins de 12 heures, les plaies non infectées et les lésions à faible risque (comme celles au visage). En dépit de leurs nombreux avantages, les bandages cutanés ne devraient être utilisés que pour les plaies assujetties à une faible tension. Les pansements de rapprochement sont de plus en plus populaires. Depuis l’avènement de nouveaux produits (ayant une propriété de liaison et une flexibilité accrues), les pansements de rapprochement servent à la prise en charge de la plupart des lacérations, sauf dans les régions où la tension est forte (comme les articulations) ou les surfaces muqueuses.

Conclusion Les plaies mineures qui n’exigent pas de sutures peuvent aisément être traitées en cabinet.

This article has been peer reviewed.
Cet article a fait l’objet d’une évaluation externe.
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Children’s minor wounds are frequently assessed in their primary caregiver’s office. For the purposes of this article, minor wounds are defined as simple wounds (such as abrasions, most bite wounds, and lacerations) that do not require sutures.

We briefly describe common minor wounds suffered by children and focus on evidence-based management principles. We review interventions that can be easily performed in the office. Prompt office management of minor wounds can reduce costs to the health care system, time lost by patients and their families, and patient load in already busy emergency departments (EDs). With a few key supplies and skills, minor wounds can be effectively managed in the office.

In particular, we review use of cleansing agents for wound care and management of bite and puncture wounds. Finally, use of skin tapes and tissue adhesives are addressed.

Quality of evidence

We conducted a MEDLINE database search of the English and French literature from 1976 to 2000. MeSH headings used for the search were Wounds and injuries; Anti-infective agents, local; and Bites and stings. Tissue adhesives was used as a text word. Clinical trials and review articles were sought.

Level 1 evidence (clinical trials) distinguishes between antiseptic solutions in management of minor wounds. No studies have clearly demonstrated how cleansing intact skin affects rates of infection when patients are not treated in hospital. Furthermore, several clinical trials (level 1 evidence) have evaluated cosmetic outcomes following laceration repair with tissue adhesives. Tissue adhesives provide short- and long-term cosmetic outcomes equivalent to those achieved with suture materials.

Main message

Cleansing agents for wound care. Appropriate care of all acute traumatic wounds includes cleansing and removal of foreign material as well as débridement when necessary. For effective skin antisepsis, organic matter (blood, pus exudates, loose crusts, dirt, etc) should be removed before an antiseptic solution is applied.

Sterile sodium chloride solution (0.9%) is preferred for wound irrigation. Saline is inexpensive, has low tissue toxicity, effectively decreases bacterial loads, and does not increase infection rates.

To complement saline wound irrigation, many antiseptic solutions are on the market. Antiseptic solutions are commonly used in clinical practice because they have been reported to reduce infection in some traumatic lacerations. Despite the results of many trials, whether adding antiseptic solution in wound cleaning is always necessary for wounds remains unclear. It is important to consider the potential tissue toxicity of antiseptic solutions. We discuss commonly used antiseptic solutions: chlorhexidine and iodine compounds.

Chlorhexidine: Chlorhexidine is a bactericidal agent with good coverage against Gram-positive and Gram-negative organisms. It also has antiviral and antifungal properties. Its main advantages are long-lasting antiseptic effect (hours) and continued effectiveness in the presence of soap, blood, and pus. No significant toxicity has been reported among neonates, infants, or children. Care should be taken to avoid contact with patients’ eyes so as to prevent serious irritation.

Chlorhexidine is available in several strengths. The 2% solution (2% aqueous base; preservative: 4% isopropyl alcohol) is appropriate for open wound surface disinfection and for mucous membrane disinfection (mouth, nasal passages, anus, rectum, vagina, stomas). This concentration is contraindicated for irrigation of the deep tissues of open wounds because it can induce local inflammation. Chlorhexidine (0.5% in 70% isopropyl alcohol) is indicated for closed wound surface disinfection only. A weaker solution of chlorhexidine (0.05% aqueous base; preservative: 4% isopropyl alcohol) is used for irrigation of or cleaning deep wounds (traumatic or not) and for burn wounds, if an antiseptic is required.

Iodine: Many preparations on the market contain iodine. The most commonly manufactured form is a 10% solution...
solution in water; povidone iodine solution (10% polyvinyl pyrrolidine complexed with 1% iodine). Povidone iodine is also available in a 7.5% concentration scrub with detergent. Surgical scrubs are not recommended for minor wounds because of their high tissue toxicity. Iodine compounds are bactericidal and effective against Gram-positive and Gram-negative organisms. Bacterial strains resistant to iodine solutions are unusual. Iodine products are recommended if patients have chlorhexidine allergy. In addition, povidone iodine 10% solution can be used for eye disinfection.

In spite of long use in preventing infection and treating wounds, povidone iodine has recently become less popular because of the theoretical risks of iodine toxicity and thyroid insufficiency in children. The association between the dose of iodine administered and thyroid dysfunction is controversial. Despite cytotoxicity documented by in vitro studies, results of in vivo studies suggest that povidone iodine does not interfere with healing, especially if it is used at concentrations of 1% or lower. Last, povidone iodine solution contains no added preservative agents while chlorhexidine solutions do. Thus, contamination of povidone iodine solution is possible and care should be taken when handling bottles.

Other agents: Other agents, such as hydrogen peroxide (3%), rubbing alcohol (isopropyl alcohol 70%), and detergents, should not be used to clean wounds because cytotoxic effects are possible and higher infection rates have been reported.

After the wound has been cleaned, a protective dressing should be applied. For the first 24 to 48 hours, most wounds should be covered with a dry, non-adherent dressing until there is enough epithelialization to protect the wound from gross contamination. As well, bandages of dry gauze absorb wound exudates to help manage copious drainage and débridement with gauze changes. Afterward, wounds may be gently washed. Wounds should not be scrubbed or soaked.

In summary, sterile saline appears to be a reasonable choice for wound irrigation. The issue of which antiseptic solution is best remains unresolved. It is difficult to recommend one agent above others while we are unsure of the balance between real or potential toxicity of iodine products and the efficacy of chlorhexidine products. These products are similarly priced.

Prophylactic antibiotics. Most uncomplicated wounds heal without systemic antibiotic therapy; clinical studies failed to demonstrate a lower infection rate among patients treated with prophylactic antibiotics than among control subjects. Systemic antibiotics are recommended in certain situations only:

- lapse of more than 3 hours since injury;
- presence of pus;
- contamination with saliva, feces, or vaginal secretions;
- preventing bacteremia in patients at risk for endocarditis;
- prosthetic joint involvement;
- lymphedematous tissues involvement; and
- immunocompromised hosts.

For most infections of traumatic wounds, antibiotic therapy should be directed against the most common skin pathogens, Staphylococcus aureus and streptococci. Cloxacillin and first-generation cephalosporins are appropriate as first-line therapy. If antibiotics are administered, they should be given promptly (in the first 3 hours after injury). Recently, application of topical antibiotic ointments had been proposed to help reduce infection rates and prevent scab formation. So far, the effectiveness of topical antibiotic ointments in managing minor wounds has not been properly investigated.

Bite wounds. All bite wounds require special attention. Even apparently minor wounds require careful exploration, because injuries that appear to be superficial can overlie fractures; involve lacerated tendons, vessels, or nerves; extend into body cavities; penetrate joint spaces; or damage such structures as the eye.

It is extremely important to cleanse and sponge away all visible dirt. Blind wound exploration for presumed foreign bodies is not recommended, as it can cause further tissue damage. The skin should be cleaned of foreign matter to avoid permanent tattooing. Irrigation with large volumes of sterile saline with a high-pressure syringe is recommended. This practice markedly decreases the concentration of bacteria in contaminated wounds and thus lowers the infection rate. The optimal therapeutic balance between appropriate decontamination and irrigation-induced inflammation appears to be around 8 pounds per square inch (psi). This amount of pressure is most easily generated using a 30- to 35-mL syringe equipped with an 18- to 20-gauge plastic catheter or needle. The tip of the syringe should be approximately 2 cm above the intact skin. Most wounds should be irrigated with at least 200 mL of saline.

Physicians should use plastic shield devices and protective goggles to avoid self-contamination through splashing of wound fluids. Devitalized tissue should be excised because débridement further decreases the likelihood of infection.
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A theoretical risk of infection exists if bite wounds are sutured. Primary closure is absolutely contraindicated for closed-fist injuries. As a general rule, wounds inflicted by humans should be initially left open. Primary closure is indicated in the following circumstances:

- less than 12-hour-old nonpuncture wounds to the arms and legs and less than 24-hour-old nonpuncture facial wounds;
- uninfected wounds; and
- low-risk lesions, such as on the face, as these seldom become infected.

For all other wounds, secondary closure will reduce the chance of infection. Cosmetic appearance can always be improved at a subsequent revision of the scar. Edges of small wounds can be approximated using skin tapes. Because any foreign material in a contaminated wound increases the risk of infection, subcutaneous sutures should be used sparingly. Proper positioning of wounds is important; elevation of injured areas can decrease swelling.

Tetanus immunization status should be assessed as for all wounds. As recommended in the 2000 Red Book (Report of the Committee on Infectious Diseases of the American Academy of Pediatrics), clean minor wounds should be approached differently from all the other wounds (ie, those contaminated with dirt, feces, soil, and saliva; punctures; avulsions; missiles; crushing; burns; frostbite). For clean minor wounds when the patient's immunization status is unknown or fewer than three tetanus toxoid doses have been given, tetanus-diphtheria toxoid should be given. If at least three doses have been given and it is more than 10 years since the last dose, tetanus-diphtheria toxoid should be given. For wounds that are neither clean nor minor (described above), for patients whose immunization status is unknown, or for patients who have received fewer than three tetanus toxoid doses, tetanus-diphtheria toxoid and also tetanus immunoglobulin should be provided. In these cases, it is important to offer both active and passive immunization. If at least three doses of tetanus have been given and it is more than 5 years since the last dose, tetanus-diphtheria toxoid should be given.

Special risk of infection must be considered for bite wounds. The associated risk of rabies should be evaluated for animal bites. Rabies is most common in raccoons, skunks, foxes, and bats. These animals should be regarded as rabid unless the geographic area is known to be free of rabies. Patients who might have contracted rabies should have immediate vaccination with human diploid cell vaccine as well as immunoprophylaxis with rabies immunoglobulin. Only when dogs and cats are rabid or suspected of being rabid should their bites be treated with immediate vaccination and immunoprophylaxis. The dogs or cats should be observed for 10 days. If in doubt about the prevalence of rabies in an area, contact the public health department. Human bites require consideration of hepatitis B, herpes simplex, and human immunodeficiency virus transmission.

Follow-up evaluation should be done within 48 hours to assess for signs of infection and also to reevaluate wounds that were initially left open to determine whether delayed primary closure would be appropriate. Infected wounds usually have 5 mm or more of redness that is painful or tender to touch, fever, erythematous streaking of the skin, or wound swelling; occasionally, pus can be expressed from the wound.

Prophylactic use of antibiotics for bite wounds is controversial. Reported rates of infection after bites are as high as 50%. Currently, antibiotics are not given routinely. Previous clinical trials did not conclusively show that prophylactic antibiotics reduce infections from bite wounds. For mild injuries with skin abrasion only, antibiotics are unnecessary. Systemic antibiotics are indicated for bite wounds if wounds are severe with edema or crush injuries; if skin was punctured (especially if bone, tendon sheath, or joints were penetrated); if bites were to the face, hand, foot, or genitals; if the patient has asplenia; and if the host is immunocompromised.

A recent prospective study of infected wounds secondary to dog and cat bites confirmed that infected dog and cat bites have a complex microbiologic mix of aerobes and anaerobes (median of five bacterial isolates per culture). Pasteurella species were the most common isolates, but other common aerobes included streptococci, staphylococci, moxarella, and neisseriae. Therefore, if antibiotics are prescribed, a β-lactam antibiotic with a β-lactamase inhibitor is appropriate. The oral antimicrobial of choice is amoxicillin–clavulanic acid. If patients are allergic to penicillin, trimethoprim-sulfamethoxazole, clindamycin, or a cephalosporin (possibility of cross-reactivity) is appropriate. A duration of 2 or 3 days only is recommended, especially if the antibiotic is started less than 8 hours after the wound is inflicted. If parenteral antibiotics are required, the first-line choice is ampicillin–sulbactam. For penicillin-allergic patients, cefotaxime or ceftriaxone and clindamycin or metronidazole may be substituted.

Skin tapes. Skin tapes (Steri-Strips) are ideal for wounds with low tension only (eg, abrasions, simple lacerations). They should be applied once hemostasis...
of the wound is achieved and the surrounding skin is dry. Skin tapes have many advantages: low tissue reactivity, low infection rates, rapidity and ease of application, patient comfort, low cost, no risk of needle injury, and no return visit for suture removal is required. Disadvantages include low tensile strength, high rate of dehiscence, cannot be used in hairy areas, and the wound must remain dry for 2 days. As well, tapes are not recommended over areas of high motion (eg, joints).

Application of skin tapes can be reinforced with benzoin tincture to prevent detachment. A dry dressing may be placed over skin tapes for 2 days. Skin tapes usually spontaneously detach within 7 days. They can be manually removed after that time if necessary.

Tissue adhesives. Cyanoacrylate tissue adhesives have gained in popularity over the last decade for management of pediatric traumatic wounds. Many randomized clinical trials involving children and adults demonstrate that tissue adhesives offer long-term cosmetic outcomes as good as those with sutures. Overall, rates of wound infection and dehiscence are similar for both tissue adhesives and sutures.

Tissue adhesives offer many advantages: rapidity of application, patient comfort, resistance to bacterial growth, no need for removal, low cost, and no risk of needle-stick injury. These products also have shown no toxicity when applied topically for skin closure. They polymerize via an exothermic reaction in the presence of skin moisture or tissue fluid. Therefore, a strong bond is formed with the skin.

In Canada, many products are available, including n-butyl 2-cyanoacrylate and 2-octyl cyanoacrylate. Recent emphasis is on the creation of single-use packages. To alleviate costs, many emergency departments use single packages on many patients. This practice is probably acceptable for infectious risk exposure as long as the applicator tip is changed for each patient. The Canadian Paediatric Society recommends use of n-butyl 2-cyanoacrylate products in the following situations: lacerations less than 4 cm, no gaping wound edges more than 0.5 cm, and low-tension wound location. Scalp lacerations may also be repaired with tissue adhesive. Hair should be trimmed around the laceration.

Several 2-octyl cyanoacrylate products (Dermabond from Ethicon Inc in Somerville, NJ) have recently been introduced in Canada. These products have four times the bonding strength of older products. As well, 2-octyl cyanoacrylate products offer increased wound flexibility. These advantages make these compounds useful for long lacerations. Not surprisingly, 2-octyl cyanoacrylate products are three to four times more expensive than n-butyl 2-cyanoacrylate ones. Specific indications for use are summarized in Table 1.

### Table 1. Indications for use of octyl cyanoacrylate

<table>
<thead>
<tr>
<th>ANATOMIC LOCATION</th>
<th>INDICATION</th>
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<tbody>
<tr>
<td>Face</td>
<td>Most cutaneous closures</td>
</tr>
<tr>
<td>Lips and mucosa</td>
<td>Not recommended</td>
</tr>
<tr>
<td>Extremities and torso</td>
<td>Cutaneous closures; deep sutures recommended if required for good approximation, not over joints</td>
</tr>
<tr>
<td>Hands and feet</td>
<td>Minor lacerations only; generally not recommended because tissue adhesives could wear off before wound heals completely in “high traffic” areas</td>
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</table>

Tissue adhesives have not been studied for animal or human bite wounds, stellate crush wounds, or wounds crossing the mucocutaneous junction. Some general guidelines of application exist for all tissue adhesives. They should be used topically only. Hemostasis of the wound should be obtained first. Once the tissue adhesive is applied, wound edges should be held together for at least 30 s. It is important to avoid excess glue and to avoid placing adhesive in the wound or between the margins. As the exothermic reaction occurs, children might feel the heat as a slight burning sensation. Wound stability could be reinforced with skin tapes once the tissue adhesive has dried (after 30 s). Caution should be used around the eyelids to avoid eye contact. If the eyelids are “glued” together, petrolatum products can be used to remove excess material. Excess glue can be carefully peeled off with forceps, if necessary.

Follow-up care for these wounds is similar to that for wounds closed by other methods. The wound should remain dry for 2 days. Dressings (if provided) can be removed after 2 days. After 48 hours, patients may shower but should avoid soaking or scrubbing the area. The tissue adhesive will disappear in 7 to 14 days.

**Conclusion**

This brief overview addresses management of minor wounds in the office. Careful irrigation with sterile saline is important for all wounds. Now that skin tapes...
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and tissue adhesives are available, many wounds can be treated effectively without sutures.

Competing interests
None declared

Correspondence to: Dr Serge Gouin, Assistant Professor, Division of Emergency Medicine, Department of Pediatrics, SainteJustine Hospital, 3175 Côte-Sainte-Catherine, Montreal, QC H3T 1C5; telephone (514) 345-4931, extension 3498; fax (514) 345-4965; e-mail sergegouin@aol.com

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For prescribing information see page 848