



How should dog bites be managed to reduce risk of infection?

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Most of the estimated 5 million bites that occur each year in the U.S. are dog bites, and children are more likely than adults to be bitten by a dog, according to the 2018 AAP *Red Book* and the Centers for Disease Control and Prevention.

Meticulous cleaning with extensive irrigation with sterile normal saline is the cornerstone for post-exposure management of a bite to reduce the risk of infection. Some evidence suggests high-pressure irrigation may reduce bacterial counts more effectively than simple irrigation, although other recommendations suggest avoidance of high-pressure irrigation because of concern that infectious agents will be driven into deeper tissue locations.

Devascularized tissue should be debrided, and foreign material should be removed. Surgical exploration may be needed if extensive tissue damage has occurred. Bites on the hand and foot have a higher risk of infection, especially if the wound penetrates multiple tissue planes. Bite wounds of the face are associated with a lower risk of infection because of a rich vascular supply and perhaps because these wounds come to medical attention sooner than bites in other anatomic areas. Increasing time to medical attention is associated with increasing risk of infection.

The role of wound closure is controversial. Infectious Diseases Society of America guidelines state that primary closure is not routinely indicated following a dog bite, except for bites to the face (*Clin Infect Dis.* 2014;59:e10-52). Other wounds may be approximated. Primary closure may increase the risk of infection, even when prophylactic antimicrobial therapy is administered.

Which of the following statements are true?

- a) Commonly isolated anaerobic bacteria from a dog bite include *Fusobacterium*, *Bacteroides*, *Prevotella* and *Peptostreptococcus* species.
- b) *Eikenella corrodens* and group A streptococcus are frequently associated with dog bites.
- c) *Pasteurella canis* is a frequently isolated organism from a dog bite, and *Pasteurella multocida* is frequently isolated from cat bites.
- d) The highest risk of a dog bite is outside the home.
- e) The majority of dog bites are from dogs owned by the family or friends of the family.

Answer: a, c and e are true

A bite wound generally becomes colonized or infected with bacteria from the animal's mouth rather than by bacteria colonizing the victim's skin. Oftentimes, multiple bacteria including both aerobes and anaerobes can be isolated from the site of injury. Despite numerous studies, the role of presumptive antimicrobial therapy to prevent infection is not clear. Prophylactic therapy for three to five days appears to have some benefit in reducing infection if initiated within 12 to 24 hours after injury.

Antibiotic prophylaxis commonly is recommended for moderate to severe wounds of the face, hands (bites tend to involve the dominant hand), feet or genital area. Bites involving tendon, bone or joints and bites resulting in devascularized tissue generally are treated with antibiotic prophylaxis. All immunocompromised children are candidates for post-exposure prophylaxis following a dog bite. *Capnocytophaga canimorsus* is recognized to



cause bacteremia and sepsis after a dog bite, especially in children with asplenia.

If wound prophylaxis is indicated, amoxicillin-clavulanate is recommended. For a child truly allergic to penicillin, trimethoprim-sulfamethoxazole plus clindamycin may be used for oral therapy.

Infected animal bite wounds should be treated with an empiric antimicrobial agent, such as amoxicillin-clavulanate, that is active against both aerobic and anaerobic bacteria. For intravenous therapy, ampicillin-sulbactam or piperacillin-tazobactam may be used. If indicated, doxycycline can be administered orally or intravenously regardless of patient age.

Aerobic and anaerobic cultures are recommended prior to antibiotic therapy if the bite appears infected or systemic signs of infection are present. Culture of wounds that appear uninfected is not recommended.

When examining the wound of a dog bite, it is important to determine the depth of penetration and injury to deeper structures; the risk of involvement of the joints, tendon or bone; range of motion of the involved limb; type of drainage, including purulence or malodor; nerve involvement; lymphangitic streaking; regional lymphadenopathy; and the possibility of a foreign body such as a tooth. Wounds contaminated with soil may involve atypical mycobacteria or fungi.

Vaccine considerations following a dog bite should include evaluation of need for tetanus prophylaxis. Dog bites generally are not considered to be tetanus prone unless they are contaminated with soil. If tetanus prophylaxis is indicated, an appropriate tetanus-containing vaccine (Tdap, DTaP, DT) should be administered based on the child's age and vaccination history. Tetanus immunoglobulin should be considered in a child who is incompletely vaccinated.

Tetanus toxoid should be administered to patients following a high-risk bite and without vaccination within 10 years. Tdap is preferred if this vaccine has not been given previously. A booster dose of tetanus toxoid vaccine should be administered for dirty wounds if more than five years has elapsed since the last dose and for clean wounds if more than 10 years.

Assessment for rabies risk will determine the need for rabies immunoglobulin and the rabies vaccine series. Public health personnel in a state health department can assist in determining the need for post-exposure rabies prophylaxis. The potential for rabies infection is highest after a bat or carnivore bite or from a dog with uncertain rabies vaccination status that cannot be captured for adequate quarantine.

Eikenella corrodens and group A streptococcal infections are rarely associated with dog bites. They are constituents of normal human mouth flora and often are associated with human bites. Most dog bites to young children occur in the home.

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Resources

- [AAP Red Book chapter on bite wounds](#)
- [Additional ID Snapshot columns](#)