

## DEFINITION

A bite is a wound to humans from dogs, cats, or other animals, including humans. In most cases bites result in puncture wounds, possible lacerations, and in some cases, crush injuries. All bites, regardless of the source, are considered to be contaminated wounds and have a substantial risk of infection.

## IMMEDIATE CONSULTATION REQUIRED IN THE FOLLOWING SITUATIONS

- Wounds are extensive and/or deep
- Muscle, tendon, nerve, or vascular compromise is present or suspected
- Significant edema or crush injury
- "Fight bite" (over a joint in the hand from hitting someone in the mouth)
- Significant blood loss
- Open fracture or amputation of digits
- Bites involving the face, genitalia, or deep abdomen
- Signs of sepsis (e.g., fever, tachycardia, hypotension, tachypnea, altered mental status)
- Fever
- Spreading cellulitis
- Immunocompromised client
- Bite from a potential rabid animal

## CAUSES

- Most bite wounds are from a domesticated pet known to the client.
- 89% of cat bites are provoked.
- Pit Bull Terriers, German Shepherds, Rottweillers, and mixed breeds are most commonly associated with bites.
- Human bites are often the result of one person striking another in the mouth with a clenched fist. They can also occur incidentally in the case of paronychia due to nail biting or thumb sucking, or "love nips" to the face, breasts, or genital areas.

### Dog bites:

- *Pasteurella* spp. is present in 50% of bites
- Also found: Viridins streptococci, *Staphylococcus aureus* (*S. aureus*), *Staphylococcus intermedius*, *Bacteroides*, *Capnocytophaga canimorsus*, *Fusobacterium*

**BITES ADULT & PEDIATRIC**

**Cat Bites:**

- *Pasteruella* spp. is present in 75% of bites
- Also found: *Streptococcus* spp. (including *Streptococcus pyogenes*), *Staphylococcus* spp. (including methicillin-resistant *S. aureus*), *Fusobacterium* spp., *Bacteroides* spp., *Porphyromonas* spp., *Moraxella* spp.

**Human Bites:**

- *Streptococcus* spp., *S. aureus*, *Eikenella corrodens*, and various anaerobic bacteria (e.g., *Fusobacterium*, *Peptosstreptococcus*, *Prevotella*, and *Porphyromonas* spp.)
- Although rare, case reports have suggested transmission of viruses such as hepatitis, HIV, and herpes simplex

**Rodent Bites:**

- *Streptobacillus moniliformis* or *Spirillum minor*, which causes rat-bite fever

**Reptile Bites:**

- In addition to snake venom tissue necrosis: *Pseudomonas aeruginosa*, *Proteus* spp., *Salmonella*, *Bacteroides fragilis*, and *Clostridium* spp.

**PREDISPOSING AND RISK FACTORS**

The risk of bite-wound infection depends on the wound location, tissue damage, client characteristics, time elapsed before treatment, and the type of animal that inflicted the wound.

**Other risk factors include:**

- Exposure to unfamiliar domestic animals
- Acts of violence
- Presence of male dogs, as they are more likely to bite
- Clenched fist human bites are frequently associated with the use of alcohol
- Clients presenting > 8 hours following the bite are at greater risk of infection

**HISTORY**

The circumstances of the bite injury should be determined. These include the following:

- Area(s) of the body injured
- Time elapsed since the injury

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- Type of animal (including breed)
- Current location of the animal
- Relationship of the animal to the client
- Vaccination and health status of the animal
- If the attack was provoked or unprovoked
- Loss of function in nearby tendons, ligaments, nerves (sensation)
- Medical history (diabetes, immunocompromised client, peripheral vascular disease, chemotherapy)
- Medication history
- Status of tetanus vaccination
- Allergies (drugs, dressings, local anesthetic)

**PHYSICAL FINDINGS**

Many of the bite wounds seen in clinic will be located in the extremities where the client handled or attempted to avoid the animal or another person.

Injuries to the head and neck are the next most common bite wounds.

The clinician should inspect the skin and soft tissues, note the presence or absence of lacerations, punctures, scratches, abrasions, swelling, crush injuries, and/or devitalized tissue. Amount of blood loss, if present, should be estimated.

All puncture wounds should be examined carefully and the likelihood of injury to structures under the skin should be considered.

A vascular examination should be performed, noting skin temperature, capillary refill time, and relevant pulses.

The range of motion of all affected areas should be assessed, evaluating the functional status of potentially involved tendons. Motor and sensory nerve function should be noted and compared to the uninjured side.

The client should be evaluated for a skeletal injury and carefully assessed for neurovascular, joint, tendon, and osseous injury.

If the client does not present with the bite wound until several hours or days following the injury, the clinician should perform a careful search for evidence of local or systemic infection and regional adenopathy. A high index of suspicion should be maintained for the possibility of a retained foreign body at a puncture wound site.

### **DIFFERENTIAL DIAGNOSIS**

- The diagnosis is typically straightforward by history. No differential diagnoses are indicated.

### **COMPLICATIONS**

- Septic arthritis
- Osteomyelitis
- Extensive soft tissue damage with scarring
- Hemorrhage
- Gas gangrene
- Sepsis
- Meningitis
- Endocarditis
- Post-traumatic stress disorder
- Death

### **INVESTIGATIONS AND DIAGNOSTIC TESTS**

- An x-ray should be done if a fracture is suspected, a foreign body is present, if a bone, joint, or tendon has been penetrated, or if a puncture wound has become infected.

### **MAKING THE DIAGNOSIS**

- Because organisms may be difficult to culture, the diagnosis of specific infections is often based on the type of animal bite (e.g., dog, cat, human).

### **MANAGEMENT AND INTERVENTIONS**

#### **Goals of Treatment**

- Restore function
- Minimize risk of infection

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- Repair tissue integrity

**Appropriate Consultation**

- Wild animal bites
- Unprovoked bites (domestic or wild)
- Bone and joint wounds
- If client is seriously ill with a bite wound infection

Consultation/referral with a physician/RN(NP) will be done for all clients who have moderate to severe tissue damage or have a wound that involves a tendon, bone, or joint.

**Non-Pharmacological Interventions**

- Do not attempt closure of bite wounds.
- Irrigate wound with normal saline (high-pressure irrigation is the most effective means of cleansing, use a 60 mL syringe with 16 or 18-gauge IV catheter).
- Remove superficial debris, necrotic tissue, and foreign bodies.
- Report all animal bites to public health.
- Check employer policy regarding completion of reports (e.g., animal bite report, rabies).

**Pharmacological Interventions**

Consider need for anti-rabies therapy.

Tetanus toxoid immunization for those whose last dose was > 5 years ago.

HIV post exposure prophylaxis is generally not recommended for human bites, given the extremely low risk for transmission.

Prophylactic antibiotic treatment for 3-5 days should be considered for clients with a fresh bite and any of the following:

- Bitten by a cat
- Hand, face, or upper limb bite
- Moderate to severe tissue damage
- One or more puncture wounds
- A suppressed immune system

**BITES ADULT & PEDIATRIC**

For prophylaxis of all types of bites (duration 3-5 days) and empiric treatment of established infection (duration 10-14 days), amoxicillin-clavulanate is considered first line:

- Adults: 875 mg orally q12h
- Children:
  - < 3 months of age: 30 mg/kg/day orally divided q12h
  - > 3 months of age and < 40 kg: 40 mg/kg/day orally divided q12h
  - > 40 kg: use adult dosing

Special Situations:

- Antibiotic recommendations in this section include both prophylaxis and established treatment.
- These situations include moderate to severe bites, antibiotic sensitivity, and pregnancy.

Cat bites:

- High rate of infection (up to 80%). Prophylaxis within 12 hours for all significant cat bites.
- For treatment of moderate to severe bites, consult a physician/RN(NP) who may recommend cefTRIAxone 1-2 g IM/IV q24h for 3 days plus metronIDAZOLE 500 mg orally q12h for 10-14 days.

Dog Bites:

- As the infection rate is approximately 5%, prophylaxis should only be prescribed if any of the following situations are present:
  - There is a moderate to severe crush injury/edema
  - Client is > 50 years of age
  - Puncture wound is present
  - There is bone/joint involvement
  - Injuries to the hand, face, or genitalia are present
  - The client has had his/her spleen removed

Human Bites:

- Rate of infection is approximately 50%

**BITES ADULT & PEDIATRIC**

- MetroNIDAZOLE 500 mg orally q12h for 10-14 days is added to amoxicillin-clavulanate 875 mg orally q12h. MetroNIDAZOLE is important since anaerobic coverage is required.
  - Contraindications to the use of metroNIDAZOLE include pregnancy, use of disulfiram within the last 2 weeks, and the use of alcohol.

If allergic to Beta-lactam antibiotics:

- Adult
  - Sulfamethoxazole/Trimethoprim (SMX/TMP) 800/160 mg (DS) 1 tab orally q12h for 10-14 days
  - Or
  - Ciprofloxacin 500 mg orally q12h plus metroNIDAZOLE 500 mg orally 12h for 10-14 days
  - Clindamycin 300-450 mg orally q6h for 10-14 days
  - For penicillin allergy: Azithromycin 250–500 mg orally daily for 10-14 days
- Children
  - Children < 8 years of age: Sulfamethoxazole/Trimethoprim (SMX/TMP) 4-5 mg/kg/day orally divided q6-12h plus clindamycin 10-30 mg/kg/day orally divided q6-8h for 10-14 days
  - Children > 8 years of age: Doxycycline 2-4 mg/kg/day orally divided q12h on first day, then 1-2 mg/kg orally q24h for 10-14 days
- Pregnancy - consult with a physician/RN(NP)

**Client and Caregiver Education**

- If the bite was inflicted by a wild animal or in an unprovoked attack by a domestic animal, the clinician should ask the client to have the animal restrained in case the animal needs to be examined for rabies. This incident must be reported to the Medical Health Officer (MHO). The MHO may direct that the animal be tested for rabies and euthanized.
- Clients should be advised to not shoot the animal.
- Clients should be reminded to elevate injured extremities to prevent swelling and to return for follow-up if signs of fever, redness, or swelling occur.
- Clients should be reminded of the importance of not petting or feeding strange or wild animals.

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#### BITES ADULT & PEDIATRIC

- Counsel client/caregiver about the appropriate use of medications (dose, frequency, compliance, etc.).

#### Monitoring and Follow-Up

- Instruct the client to return for reassessment if redness, swelling, discharge, pain, or fever develops.

#### Referral

- If there is suspicion of injury to major structures (e.g., tendons, ligaments, nerves, vessels)
- Bites that require plastic surgery (e.g., facial, head, neck, clenched fist injuries)

#### DOCUMENTATION

- As per employer policy

#### REFERENCES

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SASKATCHEWAN REGISTERED NURSES' ASSOCIATION

RNs WITH ADDITIONAL AUTHORIZED PRACTICE  
CLINICAL DECISION TOOL  
DECEMBER 1, 2016

**BITES ADULT & PEDIATRIC**

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