

# Cat and Dog Bites

The majority (80%) of the estimated 2 million annual mammalian bites are minor wounds; however, bite wounds account for approximately 1% of all emergency department visits: 10% of victims require suturing and 1-2% require hospitalization.

## I. Pathophysiology

- A. **Dog Bites.** Dog bites account for 80-90% of animal bites. Lacerations are seen in 31-45% of dog bites, puncture wounds in 13-34%, and superficial abrasions in 30-43%. Only 15-20% of dog bite wounds become infected.

### Breed of Dogs Involved in Dog Bite-related Fatalities

Breed	Number of Fatalities
Pit Bull	37
German Shepherd	9
Husky	7
Malamute	6
Doberman Pinscher	5
Rottweiler	5
Great Dane	4
St. Bernard	4

- B. **Cat Bites.** Cat bites account for 15% of animal bites. The teeth of a cat are slender, extremely sharp, and can penetrate bones and joints easily. Cat bites usually present as puncture wounds, of which 30-40% become infected.

## II. Clinical Evaluation of Bite Wounds

- A. The circumstances of the injury should be documented, and the animal's immunization status should be determined. It is important to determine if the animal was provoked and to record the time of the injury.
- B. The patient's tetanus immunization status, current medications and allergies, history of chronic illness, immunocompromising conditions, immunosuppressive therapy, or a prosthetic valve or joint should be assessed.

## III. Physical Examination

- A. The wound is measured and classified as a laceration, puncture, crush injury or avulsion. Wounds are evaluated for evidence of injuries to tendons, joint spaces, blood vessels,

nerves, and bone. A neurovascular examination and an assessment of wound depth is completed.

- B. Puncture wounds are often very deep and may develop significant complications. In facial and/or scalp wounds, central nervous system penetrated should be ruled out.
- C. Photographs of the wound are obtained if disfigurement has occurred or if litigation is anticipated.

#### IV. Laboratory and Radiologic Evaluation

- A. Radiographs should be taken if there is considerable edema and tenderness around the wound and if bony penetration or foreign bodies are suspected.
- B. Wounds seen within 8 to 24 hours after injury, that have no signs of infection, do not require culture. If infection is present, aerobic and anaerobic cultures should be obtained. The crust of the wound should be removed prior to culturing, and cultures should be taken prior to debridement or irrigation.

#### V. Microbiology

- A. Bite wounds usually have a polymicrobial contamination.
- B. **Pasteurella Multocida** is a gram-negative aerobe present in the oropharynx of dogs and cats. It is found in 20-30% of dog bite wounds and more than 50% of cat bite wounds. Cellulitis is the most common manifestation of *P. multocida* infection.

#### Microorganisms Isolated from Infected Dog and Cat Bite Wounds

**Aerobes.** *Afpia felis*, *Capnocytophaga canimorsus*, *Eikenella corrodens*, *Enterobacter* species, *Flavobacterium* species, *Haemophilus aphrophilus*, *Moraxella* species, *Neisseria* species, *Pasteurella multocida*, *Pseudomonas* species, *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Staphylococcus intermedius*, *Streptococci*: alpha-hemolytic, beta-hemolytic, gamma-hemolytic

**Anaerobes.** *Actinomyces*, *Bacteroides* species, *Eubacterium* species, *Fusobacterium* species, *Leptotrichia buccalis*, *Viellonella parvula*

**Unusual Pathogens.** *Blastomyces dermatitidis*, *Francisella tularensis*

#### VI. Management of Dog and Cat Bites

##### A. Wound Care

1. The wound should be cleansed with 1% povidone iodine solution (Betadine), and irrigated with normal saline with a 20- to 50-mL syringe with an angiocath. Devitalized, crushed tissue should be sharply débrided.
2. Deep puncture wounds, wounds examined more than 24 hours after injury, clinically infected wounds, and bites of the hand should not be closed primarily.
3. Low-risk wounds seen within 24 hours after injury may be sutured: uninfected high-risk wounds seen 72 hours after initial injury may undergo delayed primary

closure.

4. Bites to the face and head have a good outcome and may be closed primarily.
5. All bite wounds should be kept elevated.

## B. Antimicrobial Therapy

1. The majority of animal bites do not become infected. Prophylactic antibiotics are recommended for wounds that have a high risk of infection.
2. **High-Risk Bite Wounds Requiring Prophylactic Antibiotics**
  - a. Full-thickness puncture wounds, severe crush injury and/or edema, wounds requiring debridement
  - b. Cat bite wounds
  - c. Bite wounds to the hand, foot or face; bone, joint, tendon or ligament involvement; wound adjacent to a prosthetic joint
  - d. Underlying diabetes, liver or pulmonary disease, history of splenectomy, malignancy, acquired immunodeficiency syndrome, or other immunocompromising condition.
3. Prophylactic antibiotic treatment is given for 3-7 days.
4. Antimicrobial agents recommended for prophylaxis include Penicillin V potassium, amoxicillin, a first-generation cephalosporin in penicillin allergic patients, and doxycycline in patients allergic to penicillin and cephalosporin.

### Prophylactic Antibiotics for Dog and Cat Bites

#### Outpatient Antibiotics

Penicillin V	<b>Adults:</b> 500 mg qid <b>Children:</b> 50 mg/kg/day, in divided doses q6-8h
Amoxicillin	<b>Adults:</b> 500 mg tid <b>Children:</b> 40 mg/kg/d, in divided doses tid
Cephalexin (Keflex)	<b>Adults:</b> 500 mg qid <b>Children:</b> 40 mg/kg/d PO qid
Doxycycline (Vibramycin)	<b>Adults:</b> 100 mg bid <b>Children:</b> 2-4 mg/kg/day, in divided doses bid
Amoxicillin-clavulanate (Augmentin)	<b>Adults:</b> 500 mg tid <b>Children:</b> 40 mg amoxicillin/kg/day, in divided doses tid

Ceftriaxone (Rocephin)	<b>Adults:</b> 1 g every 24 hours IM or IV <b>Children:</b> 50 mg/kg/d qd
<b>Intravenous Antibiotic of choice</b>	
Cefoxitin (Mefoxin)	<b>Adults:</b> 1-2 g q4-8h <b>Children:</b> 25-50 mg/kg/day, in divided doses q6h
<b>Alternative Intravenous Antibiotics</b>	
Ampicillin-sulbactam (Unasyn)	<b>Adults:</b> 1.5-3.0 g q6h
Ticarcillin-clavulanate (Timentin)	<b>Adults:</b> 3.1 g q6h
Ceftriaxone (Rocephin)	<b>Adults:</b> 1-2 g q24h <b>Children:</b> 50-100 mg/kg/day, in divided doses q24h

5. Intramuscular or intravenous ceftriaxone may be useful when rapid achievement of a high serum level is needed.

C. **Treatment of Infected Wounds.** Infected bite wounds are treated with amoxicillin/clavulanate (Augmentin). Cellulitis is treated for 10-14-days.

D. **Indications for hospitalization** include systemic signs of infection, severe cellulitis, bone, joint, tendon or nerve involvement, lymphangitis, lymphadenitis, or failure of oral therapy.

E. **Rabies Immunoprophylaxis**

1. The incidence of rabies in persons who have been bitten by a dog is very low because most dogs have been vaccinated.

2. An untreated person has a less than 20% chance of contracting rabies from the bite of a rabid animal. However, if rabies is contracted, the mortality rate is 100%.

3. Wild animals (raccoons, skunks, bats) are the most common source of rabies. Rabies is transmitted when the saliva of an infected animal comes into contact with the broken skin or mucosa of another mammal. The incubation period ranges from 10 days to one year.

4. If a suspicion exists for rabies infection, rabies prophylaxis is administered as follows:

- a. **Rabies immune globulin (RIG)**, 20 IU/kg, IM (separate from human diploid cell vaccine below)
- b. **Human diploid cell vaccine (HDCV)**, 1 cc IM (not gluteal) given on days 1, 3,

7, 14, and 28

F. **Tetanus Immunization.** Animal bites should be regarded as tetanus prone, although tetanus infection resulting from cat and dog bites is rare. §

<b>Tetanus Prophylaxis</b>				
History of Adsorbed Tetanus Toxoid (doses)	Clean, Minor Wounds		All Other Wounds	
	Unknown or less than three	Td Yes	TIG No	Td Yes
Three or more	Td No §	TIG No	Td No	TIG No

Td = tetanus and diphtheria toxoids; TIG = tetanus immune globulin.

§--Yes, if it has been more than 10 years since the last dose. || Yes, if it has been more than 5 years since the last dose.