

DOG, CAT AND HUMAN BITE

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Dog bite



An adult dog can exert 200 pounds per square inch (psi) of pressure, with some large dogs able to exert 450 psi.

Such extreme pressure may damage deeper structures such as bones, vessels, tendons, muscle, and nerves.



Dog bites typically cause puncture wounds, lacerations and crush injuries caused by rounded teeth and strong jaws.



Dog Bite - Microbiology

- *Staphylococcus* species
- *Streptococcus* species
- *Eikenella* species
- *Pasteurella* species (*multocida*, *canis*)
- *Proteus* species
- *Klebsiella* species
- *Haemophilus* species
- *Enterobacter* species
- DF-2 or *Capnocytophaga canimorsus*
- *Bacteroides* species
- *Moraxella* species
- *Corynebacterium* species
- *Neisseria* species
- *Fusobacterium* species
- *Prevotella* species
- *Porphyromonas* species

Dog bites contain *Pasteurella multocida* in about 25% of cases, other *Pasteurella* species in up to 25% of cases, as well as mixed anaerobes and *Staphylococcus aureus*

Cat bite



The sharp pointed teeth of cats usually cause puncture wounds and lacerations that may inoculate bacteria into deep tissues. Infections caused by cat bites generally develop faster than those of dogs.



Cat bite - Microbiology



Pasteurella species**
Actinomyces species
Propionibacterium species
Bacteroides species
Fusobacterium species
Clostridium species
Wolinella species
Peptostreptococcus species
Staphylococcus species**
Streptococcus species

Cat bites also typically cause puncture wounds and contain *Pasteurella multocida* in about 50% to 75% of cases, as well as other aerobes and anaerobes, including *S aureus* .

28% to 80% of cat bites become infected

Finger infection from cat bite.

Animal and Human Bites of the Hand. American Society for Surgery of the Hand. Accessed 01/05/15 . Available on <http://www.assh.org/handcare/hand-arm-injuries/animal-bites>

What Is the Role of Preemptive Antimicrobial Therapy to Prevent Infection for Dog or Cat Bites?

Preemptive early antimicrobial therapy for 3–5 days is recommended for patients who

- (a) are immunocompromised,
- (b) are asplenic,
- (c) have advanced liver disease,
- (d) have preexisting or resultant edema of the affected area,
- (e) have moderate to severe injuries, especially to the hand or face, or
- (f) have injuries that may have penetrated the periosteum or joint capsule

Dog and cat bites in pediatric

Situations for which prophylactic antibiotics* are recommended within 8 to 12 h of dog and cat bites

- Bites with a high risk of infection, such as deep punctures from cats that may have penetrated joint spaces, bones or tendons
 - Wounds requiring surgical repair
 - Attacks involving immunocompromised or asplenic hosts
 - Bites involving hands and feet
 - Facial bites
 - Bites involving genitalia
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1. Management of dog bites in children. Canadian Family Physician October 2012 vol. 58 no. 10 1094-1096
2. When your best friend bites: A note on dog and cat bites. Can J Infect Dis. 2000 Sep-Oct; 11(5): 227–229.

What Is the Treatment for Infected Animal Bite–Related Wounds?

An antimicrobial agent or agents active against both **aerobic and anaerobic** bacteria such as amoxicillin-clavulanate should be used (strong, moderate).

Types of wound

Purulent, abscess

- Usually polymicrobial (mixed aerobes and anaerobes)
- *Pasteurella* species are commonly isolated from both nonpurulent wounds with or without lymphangitis and from abscesses.

Nonpurulent

Staphylococci, streptococci, polymicrobial

Antibiotic of choice?

Antibiotics	Comment
Amoxicillin-clavulanate	Covers the most likely aerobes and anaerobes
Second-generation cephalosporins	plus anaerobic coverage (clindamycin or metronidazole)
Carbapenem	
Moxifloxacin	
Doxycycline	
SMX-TMP or levofloxacin	plus anaerobic coverage (clindamycin or metronidazole)
Microlides	avoid due to variable activity against <i>Pasteurella multocida</i> and fusobacteria

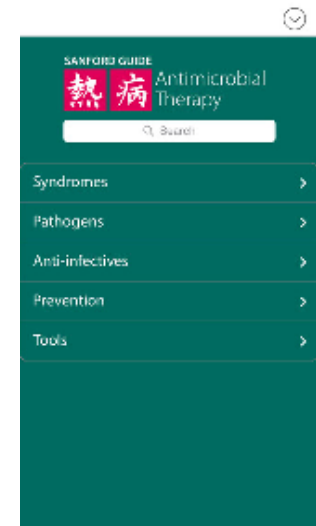
Practice Guidelines for the Diagnosis and Management of Skin and Soft Tissue Infections. Clin Infect Dis. (2014)doi: 10.1093/cid/ciu296. First published online: June 18, 2014

Sanford Guide Antimicrobial Therapy 2015

	Sensitive	Resistance
<i>P. canis</i> (dog)	Ceftriaxone, Cefuroxime, Fluoroquinolone	Dicloxacillin, Cephalexin, Clindamycin, Erythromycin
<i>P. multocida</i> (cat)	Penicillin 2 nd -3 rd Gen Cephalosporin Fluoroquinolone Azithromycin???	Dicloxacillin, Cephalexin, Clindamycin, Erythromycin



If culture is + for only *P. multocida*, switch to Pen VK PO or Pen G IV.



Human bite

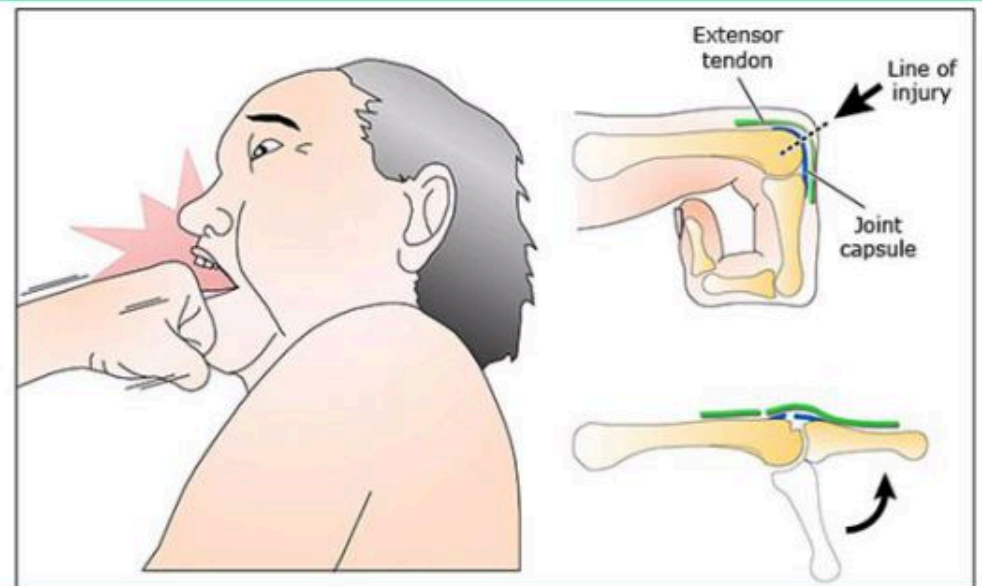


Severe puncture wounds and bruising

Clenched fist injuries occur when a closed fist impacts another individual's teeth, leaving an injury over the dorsal aspect of the third, fourth or fifth metacarpophalangeal (MCP) joints, most classically over the third MCP.

Occlusion bites occur when the teeth are sunk into the skin with sufficient force to breach the integrity of the skin.

Mechanism of a clenched fist injury



Occlusive bites

- Occur when there is sufficient force to break the skin.
- Hands have a higher infection rate than similar bites to other parts of the body because of the thinness of the skin in this area.



Clenched-fist injury

- most common ,greater clinical significance.
- small wound, usually 3-8 mm in length.
- As the fingers extend following injury, the bacterial inoculum may be carried proximally with the extensor tendons.
- This makes adequate irrigation of the wound more difficult.
- These are the most serious human bite wounds, and they require the most aggressive treatment.



Human bite- Microbiology & Etiology

- *Eikenella corrodens* -30%
- *Staphylococcus aureus*- 30%
- *Staphylococcus epidermidis*-53%
- *Viridans Streptococcus*-100%
- *Corynebacterium* sp -41%
- *Bacteroides* sp – 82%
- *Fusobacteria* sp ?
- *Prevotella* species ?
- *Peptostreptococcus* sp- 26%
- Hepatitis B (75% in saliva, 100x>HIV)
- HIV

- Aggressive behavior,
- Rough sexual play or sexual assault
- Domestic violence
- Child abuse
- Occupational injury to dental personnel
- Seizure-related tongue lacerations
- Nose biting
- Accidents during sporting events
- Aggressive play of children in daycare centers
- Self-inflicted wounds in persons who are emotionally disturbed or mentally handicapped

Antibiotic of choice?

	Antibiotics	Comment
IDSA	Amoxicillin-clavulanate	
	Unasyn	
	Ertapenam	
	Ciprofloxacin plus Metronidazole	Hypersensitivity to β -lactams
	Levofloxacin plus Metronidazole	
	Moxifloxacin	
NAG	Amoxicillin-clavulanate	
	Clindamycin + Ciprofloxacin	Hypersensitivity to β -lactams
	Clindamycin + Bactrim	
Sanford	Amoxicillin-clavulanate	Early, not yet infected
	IV Unasyn, Tazocin Carbapenem can be used if IV is required	Later, sign of infection

Eikenella corrodens

S: Fluoroquinolones, beta-lactam-beta-lactamase inhibitor combination

R: first-generation cephalosporins, macrolides, clindamycin, metronidazole, Bactrim, and aminoglycosides

Table 5. Recommended Therapy for Infections Following Animal or Human Bites

Antimicrobial Agent by Type of Bite	Therapy Type		
	Oral	Intravenous	Comments
Animal bite			
Amoxicillin-clavulanate	875/125 mg bid	. . .	Some gram-negative rods are resistant; misses MRSA
Ampicillin-sulbactam	. . .	1.5–3.0 g every 6–8 h	Some gram-negative rods are resistant; misses MRSA
Piperacillin-tazobactam	. . .	3.37 g every 6–8 h	Misses MRSA
Carbapenems		See individual info.	Misses MRSA
Doxycycline	100 mg bid	100 mg every 12 h	Excellent activity against <i>Pasteurella multocida</i> ; some streptococci are resistant
Penicillin plus dicloxacillin	500 mg qid/500 mg qid	. . .	
SMX-TMP	160–800 mg bid	5–10 mg/kg/day of TMP component	Good activity against aerobes; poor activity against anaerobes
Metronidazole	250–500 mg tid	500 mg every 8 h	Good activity against anaerobes; no activity against aerobes
Clindamycin	300 mg tid	600 mg every 6–8 h	Good activity against staphylococci, streptococci, and anaerobes; misses <i>P. multocida</i>
Second-generation cephalosporin			Good activity against <i>P. multocida</i> ; misses anaerobes
Cefuroxime	500 mg bid	1 g every 12 h	
Cefoxitin	. . .	1 g every 6–8 h	
Third-generation cephalosporin			
Ceftriaxone	. . .	1 g every 12 h	
Cefotaxime	. . .	1–2 g every 6–8 h	
Fluoroquinolones			Good activity against <i>P. multocida</i> ; misses MRSA and some anaerobes
Ciprofloxacin	500–750 mg bid	400 mg every 12 h	
Levofloxacin	750 mg daily	750 mg daily	
Moxifloxacin	400 mg daily	400 mg daily	Monotherapy; good for anaerobes also
Human bite			
Amoxicillin-clavulanate	875/125 mg bid	. . .	Some gram-negative rods are resistant; misses MRSA
Ampicillin-sulbactam	. . .	1.5–3.0 g every 6 h	Some gram-negative rods are resistant; misses MRSA
Carbapenems			Misses MRSA
Doxycycline	100 mg bid	. . .	Good activity against <i>Eikenella</i> species, staphylococci, and anaerobes; some streptococci are resistant

Abbreviations: bid, twice daily; MRSA, methicillin-resistant *Staphylococcus aureus*; qid, 4 times daily; SMX-TMP, sulfamethoxazole-trimethoprim; tid, 3 times daily.

Dose in Sanford Guide

Animal	First choice	Alternative
Dog	PO Augmentin 875/125mg BD or 500/125 mg TDS	<p>Adult: PO Clindamycin 300mg QID + Fluoroquinolone</p> <p>Pediatric: Clindamycin + Bactrim</p>
Cat	PO Augmentin 875/125mg BD or 500/125 mg TDS	<p>PO Cefuroxime 500mg Q12H or Doxycycline 100mg BD</p> <p>If culture is + for only P.multocida, switch to Pen VK PO.</p>
Human	<p>Early (not yet infected) Augmentin 875/125mg BDx5/7</p> <p>Later (Sign of infection,3-4H) IV Unasyn 1.5-3g Q6H IV Tazosin 4.5g Q6-8H</p>	<p>Penicillin allergic</p> <p>Clindamycin+ (Ciprofloxacin or Bactrim)</p>

Conclusion

- Antibiotic prophylaxis is warranted if the wound is believed to be at higher risk for infection (eg, significant contamination is present; bone, tendon, or joint space is involved; the bite is on the hand; deep puncture wounds are present; or bites occurring in high-risk patients).
- The clinician should be aware that the Infectious Diseases Society of America (IDSA) clinical practice guidelines state that all human bite wounds require antibiotic prophylaxis.¹
- However, a large clinical trial showed that prophylaxis of human bites that do not penetrate the epidermal layer or are not in high-risk areas is probably unnecessary
- Cloxacillin, Cephalexin???