Management of Dog Bites

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Purpose and Epidemiology

Dog bites represent a **significant and preventable source of trauma, morbidity, and healthcare utilization**. In the United States, an estimated **4.5–4.7 million people sustain dog bites annually**, with **885,000 seeking medical attention**, **370,000 requiring emergency department care**, and approximately **30,000 undergoing reconstructive surgery** (CDC, 2020; Garvey et al., 2021). Children, particularly those aged 5–9 years, are at greatest risk, often sustaining injuries to the face, head, and neck (Presutti, 2001). **Over 75% of bites occur in the home** and typically involve a **family or known dog** (Ozanne-Smith et al., 2001).

Globally, the burden of dog bites varies, with a UK study reporting an annual incidence of **1,870 per 100,000 persons** (Duncan-Sutherland et al., 2022). Higher bite rates correlate with **lower socioeconomic status, poor canine supervision, and lack of public education** (Westgarth et al., 2012).

Among emergency presentations, **infection develops in 10–20% of dog bite wounds** and **20–40% of high-risk injuries** (Brook, 2009; Medeiros & Saconato, 2001). **Hand wounds carry infection rates of 28–36%**, while **facial wounds are <10% due to rich vascularity** (Goldstein, 1992). Roughly **5–10% of cases require hospitalization**, with a mean inpatient stay of 3–4 days (Rothe et al., 2015).

Mortality is **extremely rare (<0.001%)**, but documented fatalities are typically associated with **fulminant sepsis (often Pasteurella multocida bacteremia), intracranial complications from facial bites, or rabies** (Talan et al., 1999; Thomas et al., 2018). The **case fatality rate for untreated rabies approaches 100%**, underscoring the critical role of post-exposure prophylaxis (Hankins & Rosekrans, 2004).

Risk Stratification

Infection risk is significantly increased in the following settings:

- **Host Factors**: Immunocompromised state (HIV/AIDS, chemotherapy), uncontrolled diabetes, chronic lymphedema, liver dysfunction or cirrhosis, asplenia, systemic lupus erythematosus, or presence of prosthetic joints or heart valves (Brook, 2009).
- **Wound Characteristics**: Deep puncture or crush injuries, wounds near joints or tendon sheaths, devitalized tissue, or delayed presentation (>12 hours post-injury) (Callaham, 1980).
- **Anatomic Location**: Hand, foot, and genital injuries are associated with **infection rates exceeding 25–35%** (Talan et al., 1999).

Initial Assessment and Triage

Primary Survey

- For severe trauma, hemorrhage, or airway compromise, initiate **Advanced Trauma Life Support (ATLS)** principles, securing airway, breathing, and circulation prior to wound evaluation.

Focused History

- Time, location, and circumstances (provoked vs. unprovoked).
- Dog information: breed, ownership, vaccination status, rabies risk.
- Prior first aid measures (irrigation, dressings).
- Patient's tetanus and rabies immunization history.

Physical Examination

- Document **precisely**: wound depth, length, tissue layers involved, contamination, and involvement of tendons, nerves, or vasculature.
- **Photographic documentation** and diagrammatic mapping are recommended for medical and legal purposes.
- Assess for **foreign bodies or retained teeth fragments**, which occur in up to **10% of cases** (Goldstein, 1992).

Wound Management

Irrigation and Debridement

- **Immediate copious irrigation** with **≥250–500 mL sterile saline per wound** (1–2 L for complex or highly contaminated injuries).
- Avoid high-pressure devices to reduce deep bacterial inoculation (Goldstein, 1992).
- Meticulous **sharp debridement** of devitalized tissue is critical, preserving viable structures.
- **Surgical exploration** is warranted for **deep wounds, those involving fascia, tendon sheaths, or joints, or when foreign bodies are suspected** (Rothe et al., 2015).

Imaging

- Plain radiographs for **fractures, air, or radiopaque foreign bodies**.
- **Ultrasound or CT** when deep space infection, abscess, or vascular injury is suspected.

Wound Closure

Wound Type	Closure Recommendation
Clean facial wounds	Primary closure (plastic surgery consult if cosmetic concerns)
Hand or deep puncture wounds	Leave open; allow secondary intention healing
Wounds >24 hours old	Secondary intention
Infected or grossly contaminated	Delayed primary closure after infection control

Facial wounds may undergo **primary closure within 6–8 hours**, given low infection risk and high cosmetic priority (Presutti, 2001).

Antibiotic Prophylaxis

Infection rates are **15–20% without prophylaxis**, rising to **30–40% for high-risk wounds** (Brook, 2009; Medeiros & Saconato, 2001). Prophylaxis is **mandatory** for:

- Puncture or crush injuries
- Hand, foot, or genital bites
- Deep or complex facial wounds

- Immunocompromised hosts
- Delayed presentation (>12 hours)

Recommended Regimens (5–7 days)

Route	Drug	Dose
PO	Amoxicillin-clavulanate	875/125 mg BID
PO (PCN allergy)	Doxycycline	100 mg BID
PO (pregnancy/children)	Erythromycin	250–500 mg QID
IV	Ampicillin-sulbactam (Unasyn)	1.5–3 g Q6H
IV (PCN allergy)	Ciprofloxacin + Clindamycin	400 mg BID + 600 mg Q8H

Reevaluate need for ongoing antibiotics at **48–72 hours** based on wound evolution.

Tetanus and Rabies Prophylaxis

- Administer **Tdap or Td** if >5 years since last booster.
- **Tetanus immune globulin (250 IU IM)** for uncertain or incomplete immunization.

Rabies Post-Exposure Prophylaxis (PEP)

Indicated for bites from **unprovoked, stray, or unvaccinated dogs**, or if the animal cannot be quarantined for 10 days (CDPH, 2014).

- **Not previously vaccinated:** 1 mL IM (days 0, 3, 7, 14, 28).
- **Previously vaccinated:** 1 mL IM (days 0, 3).
- **Human Rabies Immune Globulin (HRIG):** 20 IU/kg at presentation, infiltrated into wound; remaining volume IM at a distant site (omit if previously vaccinated).

Complications to Monitor

- **Cellulitis and abscess formation** (Pasteurella multocida most common pathogen).
- **Septic arthritis or osteomyelitis**, particularly in hand/wrist injuries (infection rates up to 30%) (Talan et al., 1999).
- **Tendon rupture, nerve injury, or compartment syndrome**.
- **Disfigurement or contracture**, particularly in pediatric patients.

Follow-Up and Monitoring

- **Reassess at 24–48 hours** for wound healing, infection, or need for surgical intervention.
- Refer to **plastic or orthopedic surgery** for complex injuries, tendon involvement, or poor healing.
- Ensure **reporting and documentation** for legal and public health requirements.

Public Health Reporting

- Report all dog bites to **San Bernardino County Animal Care & Control (1-800-472-5609)**.
- Per **California law**, all biting dogs must be **quarantined for 10 days** (CDPH, 2014).
- Local health officers may mandate **euthanasia and rabies testing** for high-risk animals.

Quality Improvement

- Enter qualifying cases into the **Trauma Registry**.
- Monitor **infection rates, hospitalization, return visits, and antibiotic utilization quarterly**.
- Provide **community outreach** (school education, public campaigns) to reduce bite incidence.

Version Control Record			
Version	**Date**	**Author/Reviewer**	**Description of Changes**
1	10/30/2025	Paul Wisniewski, D.O.	Initial review and update to reflect latest evidence/practice

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