

Presentation of Bites

Epidemiology of bites

- Common cause of presentation to accident and emergency department- account for approximately 1% of presentations, with over 250,000 attendances due to dog bites alone
- Suggested that up to 50% of children receive a dog bite at some point in their childhood
- Human bites most often 'fight bites'- bites over the dorsum of the hand/metacarpo-phalangeal joint (MCPJ) from punch to teeth
- Dog bites
 - Most common bite injury
 - Rarely become grossly infected
 - Larger teeth often causing significant soft tissue injury (laceration, avulsion, crush, degloving)
- Cat bites
 - Less common
 - High incidence of infection (50-80%)
 - Long, sharp teeth acting like puncture wounds with deep inoculum

Bites may be part of polytrauma and should be managed according to Advanced Trauma Life Support (ATLS) principles. Consider in all facial bites, particularly in children (may require C-spine immobilisation)

History in bites

- History of presenting complaint
 - Sites involved
 - Type of bite- piercing/ crushing (indicates likelihood of significant tissue damage)
 - Time since bite- delay with failure to washout increases likelihood of infection
 - Type of animal (domestic vs wild; breed, human!)
 - Pre-hospital management (did it bleed, washing/irrigation)
 - Features of systemic illness suggesting infection (fever, nausea/vomiting, rigors)
 - In human bites consider whether high risk for blood borne virus (BBV) transmission
- Past medical history
 - Immunosuppression (diabetes mellitus, HIV infection, rheumatoid conditions)
 - Vaccinations- tetanus, rabies (if appropriate)
- Medications
 - Immunosuppressant (steroids, monoclonal antibodies, chemotherapy)
- Allergies (relevant for antibiotic choice)
- Family History
 - Problems with anaesthetics (if likely to need surgery)
- Social history
 - Relationship to the animal (pet or stranger)
 - Important to document who else is at home, particularly children, if concerns regarding a dangerous animal
 - Smoking
 - For hand bites- hand dominance, profession, hobbies
 - Ideas, Concerns, Expectations

Examination of bites

- Depth of wound- skin, subcutaneous fat, fascia, muscle, bone
- Vital structure involvement- tendon, nerve, joint, vessel (clearly document neurovascular status where appropriate)
 - Particularly important in bites to the hand (full hand examination; look for features of tenosynovitis)
- Contamination/Foreign bodies
- Surrounding cellulitis

- Tracking lymphadenitis and regional lymphadenopathy
- Note- Significant infection is highly unlikely in bites which do not breach dermis
- Bites involving the face should include intra-oral examination if around lips/cheeks

Documentation of bites

- May become involved in police reporting e.g. if dangerous dog breed, alleged assault
- Clearly document events of bite according to patient
- Clearly document all injuries identified
- Draw accurate and easily interpretable diagrams of the injuries
- If available in your hospital arrange for medical photographs to be taken for storage in the patient's notes- remember to obtain formal consent (according to hospital/trust guidelines)

Initial investigation of bites

- Bloods
 - Full blood count, clotting, urea and electrolytes (liver function tests), group and save (significant bites likely to require debridement in theatre)
- Microbiology
 - Wound/Pus Swabs- if deep wound/frank pus (operative specimens should be taken later)
 - Blood cultures if sepsis present

Further investigation of bites

- Imaging- plain radiography is not required routinely however should be considered in bites close to bony prominences, scalp bites, suspected fractures, all bites to the hands and if there is suspicion of retained foreign body ie tooth/claw within a deep wound

Initial management of bites

- Ensure wound swabs are taken for microscopy, culture and sensitivities (MC&S)
- ALL bite wounds should undergo thorough washout/irrigation in the emergency department
 - Irrigate with at least 1L of sterile normal saline (saline should not cause pain and therefore should be used instead of water). Use a syringe or cannula to irrigate deep wounds effectively. If no saline available, copious washout with tap water is appropriate (“dilution is the solution to pollution”)
 - Deep puncture wounds may be difficult to wash thoroughly, if there is to be a delay in theatre consider betadine bath
- Antibiotic Therapy
 - Obviously infected wounds, deep injuries or suspected joint infection should be treated with intravenous antibiotics
 - e.g. Amoxicillin with clavulanic acid (Co-amoxiclav) 1.2g three times daily
 - Note covers *Pasteurella multocida*
 - Ciprofloxacin and Clarithromycin suitable in penicillin allergic patients
 - Antibiotic prophylaxis should be **strongly considered** if there is evidence of high risk bite injury
 - Bite wounds with primary closure
 - Crush injuries with non-viable tissue
 - Puncture wounds
 - Bites to the hand
 - Dog bites to the genitals
 - All other bite wounds which penetrate through the skin should be considered for antibiotic prophylaxis (consult local guidelines)
 - NOTE: Systematic review suggests there is a benefit in antibiotic prophylaxis for human bites and bites to the hand, however there is no evidence for recommending prophylaxis in cat or dog bites.
- Elevation
 - Extremities with bites (particularly hands) should be elevated to facilitate drainage and reduce swelling (Bradford Sling)
- Tetanus vaccination- see below (note in practice a Tetanus vaccination booster is given to nearly all patients who are either unsure of their tetanus status or if it is >10 years since their last booster)
- Referral to Plastic/Maxillo-Facial/General Surgery as appropriate

Further management of bites

- All but the most trivial & superficial bite wounds will require some form of operative management
- Devitalised tissues should be debrided
- Wound should be explored- identify any vital structures requiring repair. Note this can be done under local anaesthetic in the emergency department/ward/procedure room as a temporary measure if there is to be delay in attending theatre for formal debridement and washout
- Deep microbiology swabs should be taken for MC&S
- Further thorough washout
- If any concerns regarding infection, particularly involving joints, the wound should NOT be closed
 - Increasing litigation in the UK due to bite wounds being inappropriately closed leading to infection
- Further second look operations and washouts should be performed in grossly infected bite wounds and infections/bites extending to joints

Microbiology of bites

- Bites are penetrating wounds which will be contaminated by a polymicrobial flora containing a combination of the organisms present in the mouth of the biting animal, the skin of the person being bitten and the surrounding environment which the wound has been exposed to. Typical organisms include:
 - Human Bites
 - *Strep. pyogenes, Staph. aureus, Eikenella corrodens*
 - Dog Bites
 - *Staphylococcus, Strep. viridans, Anaerobes, Pasteurella multocida, Capnocytophaga canimorsus* (dysgonic fermenter 2, DF2)
 - Cat Bites
 - *Staphylococcus, Staphylococcus, Pasteurella multocida*
 - Other organisms: *Sintermedius*

Remember onset of infection is usually 24-72hrs after the bite. Early infection within 12hrs suggests *Pasteurella multocida* (note 30% mortality in cases of septicaemia)

Special considerations in bites

- *Rabies:*
 - Bites from animals in the UK do not require rabies treatment, unless from a bat
 - For bites from animals abroad, consult the Public Health England (PHE) rabies risk guidance country-by-country guide
 - Important questions to consider regarding rabies
 - Country animal resides in; health of animal; tetanus and rabies status of animal; severity of injury; vaccination status of bite recipient
 - Consult Health Protection Agency (HPA) guideline for rabies risk assessment, post-exposure prophylaxis and management
 - REMEMBER- Rabies is a notifiable disease and therefore must be reported to the HPA
- *Tetanus:*
 - See table below for guidance on use of tetanus vaccination (Guidance and Table adapted from PHE Tetanus: The Green Book, chapter 30 2013)
 - High risk wounds include: wounds requiring surgical managements with >6hour delay; puncture injuries or wounds with significant devitalised tissue; wounds in contact with soil or manure; wounds with retained foreign bodies; open fractures; wounds in patients with sepsis
 - Prophylaxis dose: 250IU IM or 500IU IM if >24hrs since injury, heavy contamination or burns

Common questions about bites

- What is the antibiotic of choice in animal bites?
 - Co-amoxiclav 625mg three times a day orally (prophylactic or mild infection) or Co-amoxiclav 1.2g three times a day intravenously (Infected bites) is the preferred antibiotic. In penicillin allergic patients the alternative antibiotic(s) chosen should cover gram positive, gram negative and anaerobic organisms to cover the likely polymicrobial inoculum
- Which animals bite is more likely to result in infection, a dog or cat?
 - Cat bites are more likely to result in infection due to the needle-like teeth and deep puncture wounds. Over 50% of cat bites result in infection (true full thickness skin bite is penetration through dermis)

- For references supporting this page please see Oxford Medical Education (www.oxfordmedicaleducation.com)

IMMUNISATION STATUS	CLEAN WOUND	TETANUS-PRONE WOUND	
	Vaccine	Vaccine	Human Tetanus Immunoglobulin
Full Immunisation (5 vaccinations in lifetime at appropriate intervals)	Not Required	Not Required	High risk wounds only
Primary immunisation completed, boosters incomplete but up-to-date	Not Required	Not Required	High risk wounds only
Primary immunisation incomplete or boosters not up-to-date	Single dose vaccine initially with further vaccinations to complete recommended schedule	Single dose vaccine initially with further vaccinations to complete recommended schedule	Yes- single dose of human tetanus immunoglobulin to separate site
Not immunised or immunisation status unknown	Single dose vaccine with completion of five vaccination course if required	Single dose vaccine with completion of five vaccination course if required	Yes- single dose of human tetanus immunoglobulin to separate site

Table 1. Guidance for tetanus immunisation and tetanus toxoid administration (Adapted from PHE Tetanus: The Green Book 2013)