

# Management of Bites in Urgent and Primary Care



— B E L M A T T —  
HEALTHCARE TRAINING

# Aim and Objectives

- Aims:
  - To educate healthcare providers about the common types of bites encountered in primary care settings and improve the knowledge and understanding of healthcare providers regarding the assessment and management of different types of bites.
- Objectives:
  1. Understand the different types of bites commonly encountered in primary care, including animal bites, insect bites, and human bites.
  2. Identify the key signs and symptoms of infected bites, allergic reactions, and other complications that require immediate attention.
  3. Learn the appropriate initial assessment and management steps for different types of bites, including wound cleaning, pain management, and prophylactic antibiotic use.
  4. Discuss the indications and limitations of tetanus prophylaxis in bite injuries.
  5. Review the principles of wound closure and the use of sutures, staples, or adhesive strips in bite wounds.

# Incidence

- Dog bites 250,000 ED & UCC attendances per year in UK
- Dog bites 60-90%, cat bites 5-15%, human bites 4-23%.
- 2.3% incidence in other animals.
- More common in boys
- Severe bites more frequently in children <5yrs
- Increased incidence in summer
- Human bites commonly on hand and fingers
- 1:600 children with attend as a result of human bite.



# Dogbites

- According to the Health and Social Care Information Centre (now known as NHS Digital), in the year 2019-2020, there were approximately 6,600 hospital admissions in England due to dog bites or strikes. It is important to note that these statistics specifically refer to hospital admissions and may not capture all cases of bites treated in primary care or other healthcare settings.
- Additionally, the Royal Society for the Prevention of Accidents (RoSPA) reports that an estimated 250,000 people in the UK seek medical attention each year for dog bites, with children being more susceptible to such incidents.
- Regarding other types of bites, such as insect bites, the incidence can vary depending on factors like climate, geographic location, and seasonal variations. Insect bites, including those from mosquitoes, ticks, and other insects, are relatively common in the UK, particularly during warmer months.



# Definition and Prevalence

- A bite is an injury inflicted by the teeth of a human or animal
  - Bite wounds can take a number of forms including lacerations, puncture wounds, and crush or degloving injuries
- The most common mammalian bites are associated with humans, dogs, and cats
- **The true incidence of bites is probably underestimated** because some people will not report them or seek medical care
- Around half of people will be bitten by an animal during their lifetime, with domestic animals being responsible for more than 90% of these injuries.

# What are Bites

- Human bites are either:
  - Occlusal injuries (inflicted by actual biting), or
  - Clenched-fist injuries (sustained when a clenched fist hits a person's teeth, often during a fight, causing small wounds over the metacarpophalangeal joints).
- Dog bites characteristically involve puncture wounds from the canine teeth which anchor the victim whilst the other teeth bite, shear, and tear the tissues causing structural damage.
- Cats have fine, sharp teeth and, despite having a weaker bite than dogs, inflict deep puncture wounds inoculated with saliva, and are capable of penetrating bone, joints, and tendons.
- Dog bites are the most common mammalian bite.

# History taking

- Circumstances of the injury (provoked or unprovoked)
- Type of animal involved
- Current location of the animals/ ownership/ vaccination status
- Patient's underlying medical conditions
- Drug allergy
- Tetanus immunization status

# Managing a bite involves:

- Removal of any foreign bodies (for example teeth) from the wound.
- Encouraging a wound that has just occurred to bleed, unless it is already bleeding freely.
- Thorough irrigation with warm, running water.
- Considering the need for debridement.
- Advising appropriate analgesia (ibuprofen or paracetamol) for pain relief, if required.
- Referring to Accident and Emergency for further assessment and management if wound closure is thought to be necessary.
- For a human bite, prescribing prophylactic antibiotics if the wound is less than 72 hours old, even if there is no sign of infection.
- For an animal bite, prescribing prophylactic antibiotics if the wound is less than 24–48 hours old and the risk of infection is high.
- Empirical antibiotic treatment if the bite wound is infected.
- Seeking immediate advice from a consultant in infectious diseases for anyone considered to be at risk of HIV or hepatitis B.
- Considering the need for tetanus and rabies prophylaxis.

# TETANUS



**Enquire about tetanus immunisation status.**



**Determine whether the injury is considered to be a tetanus-prone wound, for example, there is:**

- A delay in surgical intervention for more than 6 hours.
- A significant amount of devitalised tissue or puncture wound (especially if in contact with soil or manure).
- A foreign body in the wound.
- A compound fracture.
- Systemic sepsis.



**Assess whether the wound is likely to be at high risk due to extensive devitalised tissue or contamination with material likely to contain tetanus spores.**

# RABIES

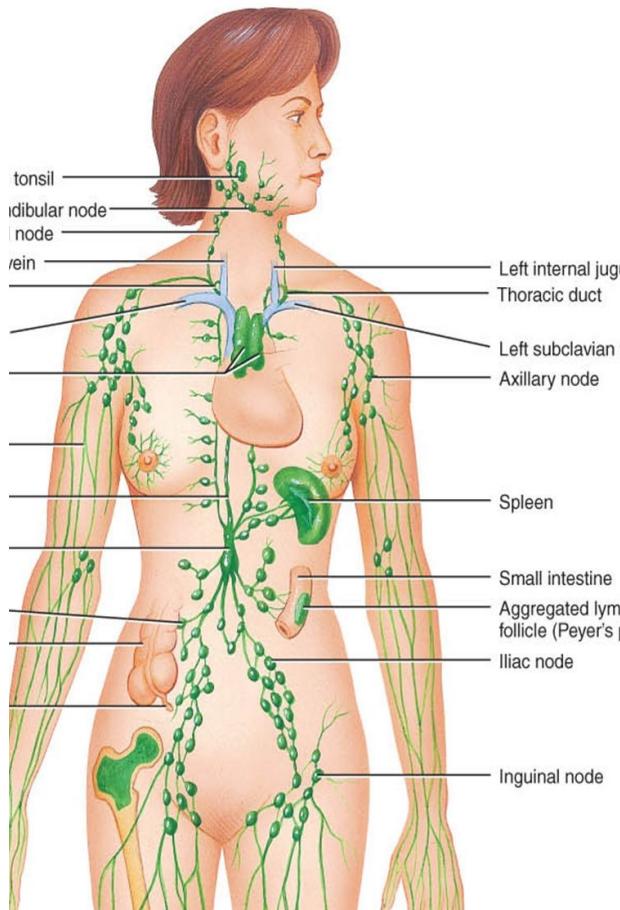
- Country in which the person was bitten and the origin of the animal.
  - The UK is considered to be a 'no risk' country, with no indigenous rabies in terrestrial animals. However, note that exposure to bats and their secretions is considered a potential rabies risk anywhere in the world. Certain groups of people in the UK are considered to be at increased risk of rabies (for example laboratory workers working with the rabies virus, or people handling bats or imported animals).
  - If the person was bitten abroad, Public Health England's guidance on [Rabies risks by country](#) (for terrestrial animals) categorises countries as no risk, low risk, or high risk.
- Site and severity of the wound — bites with broken skin, contamination of mucous membranes or skin lesions with an animal's saliva or body fluid, and proximal (head and neck) bites are considered to be high-risk.
- Circumstances of the bite — unprovoked bites are considered higher risk.
- Species of animal and its behaviour and health in the days and weeks after the biting incident — abnormal behaviour increases the risk of infection.
- Immune status of the person bitten based on history of rabies vaccination.

# CONTACT NUMBERS: RABIES REPORTING

- A risk assessment should be performed on anyone who is at risk of rabies exposure using the PHE [Rabies post exposure risk assessment form and calendar](#). In England, the risk assessment should be encrypted and emailed securely to the Rabies and Immunoglobulin Service.
- For more information on rabies risk assessment, see the Public Health England Collection on [Rabies: risk assessment, post-exposure treatment, management](#) (available at [www.gov.uk](http://www.gov.uk)) or seek specialist advice from:
  - England — Local [health protection team](#) or Public Health England's Rabies and Immunoglobulin Service, PHE Colindale (tel. 020 8327 6204).
  - Wales — Duty virologist, University Hospital of Wales, Cardiff (029 20 747 747).
  - Scotland — Local infectious diseases consultant on-call.
  - Northern Ireland — The regional virology service (028 9024 0503) or the Public Health Agency Duty Room (028 9055 3994[7]).

# Assessment of Bites

- Document how and when bite occurred
- Examine and document location, any damage to underlying structures
- Record positive/negative findings
- Assess for infection
- Tetanus, drug history and allergies
- Rabies risk



# Physical exam

- Location/type/depth of wound
- Range of motion, neurovascular function
- Signs of infection
- Lymph node
- X-ray if wound near joint or bone

# Infection Risk

- The infection risk is related to the type of bite wound, its site, the person's individual risk factors, and the species causing the bite.
- The risk of infection is high in deep or contaminated wounds; injuries with significant tissue destruction; in areas of poor perfusion; bites affecting the hands, feet, face, and genitals; and where there is bone, joint, or tendon involvement.
- **Human bites** are known to be at risk of infection and subsequent complications with an infection rate of 20–25% .
- Clenched fist injuries or 'fight bites' are particularly prone to infection.
- **Cat bites** are around twice as likely as dog bites to become infected .(infection rate of 30–50% for cats,
- **5–25% for dogs** because of the deep inoculation of bacteria into the puncture wounds caused by their small, sharp teeth

# Bacterial Infection

Infective complications resulting from a bite wound include abscesses, tenosynovitis, septic arthritis, osteomyelitis and systemic spread (for example sepsis, meningitis, endocarditis, and organ abscesses).

The longer an infected bite wound is untreated, the more likely severe local and systemic complications are to occur [

**Human bites** are most commonly infected by *Streptococcus* spp, *Staphylococcus aureus*, *Haemophilus* spp, *Eikenella corrodens*, *Bacteroides* spp and other anaerobes .

Most animal bite wound infections are polymicrobial and contain a mixture of aerobic and anaerobic organisms [

**Cat Bites** :*Pasteurella multocida* is commonly isolated from cat bites and can cause severe, fast-spreading infection in humans.

*canis*, and *P. multocida* are among the species affecting dog bites. *Capnocytophaga canimorsus* infection is rare after a dog bite but can have severe effects (particularly in elderly or immunocompromised people) such as sepsis, meningitis, disseminated intravascular

# Viral Infections

**Viral infections** There is the possibility of viral transmission through human bite wounds (for example hepatitis, HIV, herpes simplex virus), although the risk is low and depends on the nature of the bite, the status of the biter and the injured person, and the presence of blood in the biter's saliva. The estimated risk of HIV transmission from a human bite from a known HIV positive person not on anti-retroviral therapy is thought to be less than 1 in 10,000.

**Rabies** is an acute viral encephalomyelitis that is almost always fatal. It usually occurs after a person is bitten or scratched by an animal with rabies (most commonly a dog).

The risk of contracting rabies in the UK is very low, as there is no indigenous rabies in terrestrial animals, but bats anywhere in the world can carry rabies-like viruses, therefore are considered to be a rabies risk

# Other Infections



**Cat-scratch disease** is caused by *Bartonella henselae* and may follow a bite or scratch from a cat or dog. Cat-scratch disease presents with a mild infection at the wound site 3-14 days after the injury, followed by lymphadenopathy and symptoms including fever, malaise, headache, and poor appetite. Lymph glands near the scratch become swollen, and swelling may persist for several months. Occasionally the eyes, brain, heart, and other organs can be affected.



**Syphilis** transmission via a human bite has also been reported

# Structural Damage

- **Structural damage**

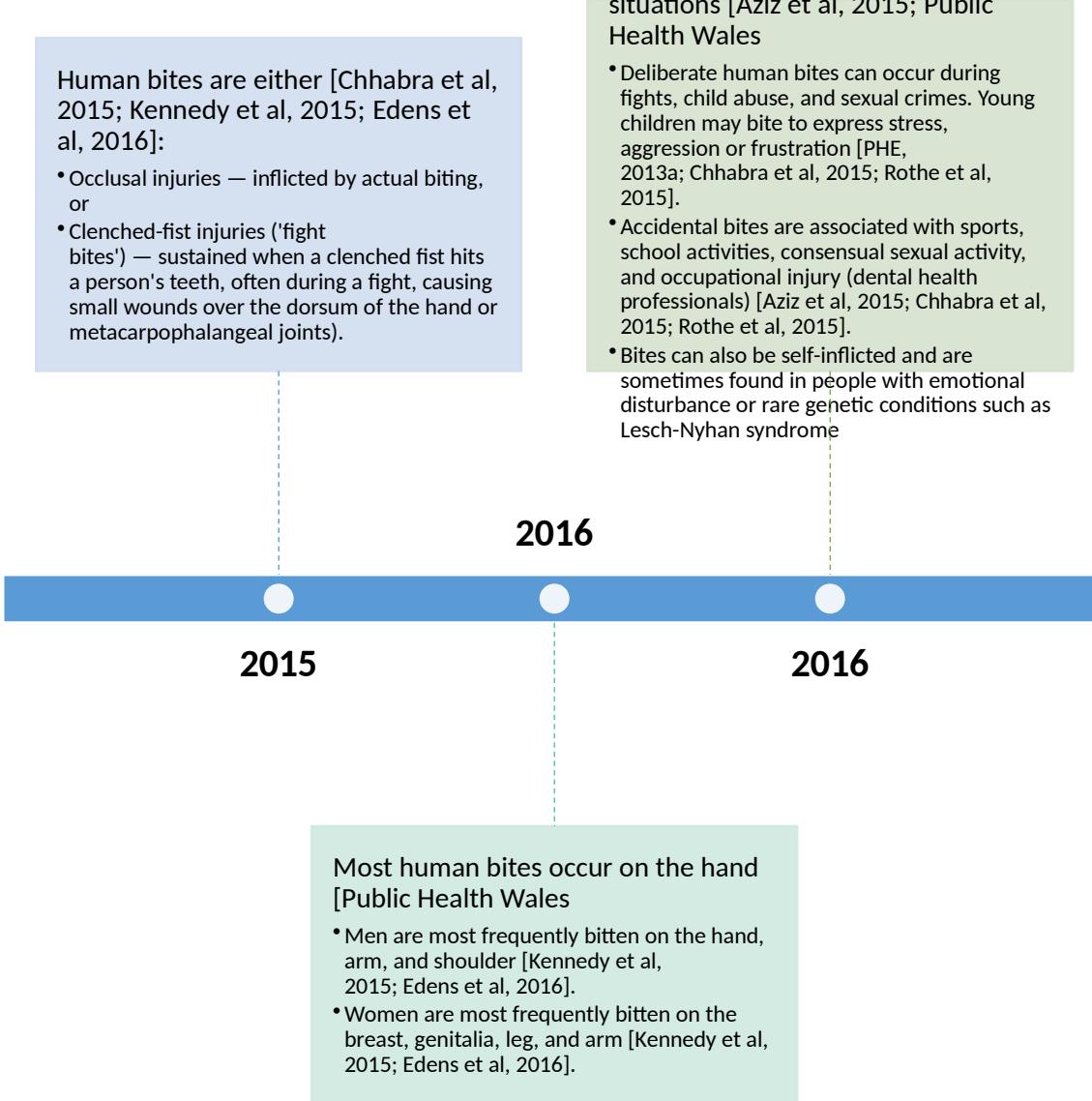
- Disfiguring wounds are often a complication of severe mauling [[Dire, 1992](#)].
- Traumatic amputation of body parts (for example fingers) can result from a severe bite [[Kennedy et al, 2015](#)].
- Tendons and joint capsule damage can occur during a clenched-fist human bite injury [[Edens et al, 2016](#)].
- Bite wounds can also cause fractures and neurovascular damage [[Evgeniou et al, 2013](#)].
  - Dog bite wounds to the heads of small children and infants can cause depressed skull fractures and traumatic brain injuries [[Edens et al, 2016](#)].
  - There are reports of fatal exsanguination from dog bites to the neck [[Edens et al, 2016](#)].

# HUMAN BITES

- Human bites are less common than those caused by domestic animals.
- They are the third most frequent cause of bites presenting to hospital emergency departments (after dog and cat bites) .
- Human bites are most commonly inflicted on fingers and hands
  - Around 1 in 600 children will attend an Accident and Emergency department as a result of a human bite injury

Kennedy et al 2015, Aziz et al 2015, PHW 2016  
RCPCH 2014

# Human Bites



# When to close a human bite.

- Irrigate and debride first.
- If <6hrs with no visible infection
- Cosmetic concerns, refer to plastic surgeons
- Bite wounds which are between 6 and 24 hours old where there are no risk factors for infection. However this is controversial and currently there is no consensus of opinion.

## **Allow the following bite wounds to heal without formal closure**

- Bite wounds over 24 hours old.
- Infected bite wounds.
- Deep puncture wounds.
- Bites to the hands and feet.

# Managing viral infection risks

- Seek advice from infectious disease consultant
- Consider post exposure prophylaxis
- Consider Hep B/C regime
- Seek advice from Health protection Agency

# Management of Human Bites

- If the wound has just occurred, encourage it to bleed, unless it is already bleeding freely.
- Irrigate thoroughly with warm, running water.
- Wound closure is rarely advised in primary care.
- Advise analgesia (paracetamol or ibuprofen) for pain relief, if required.
- Prescribe prophylactic antibiotic for all human bite wounds under 72 hours old, even if there is no sign of infection.
- Consider if tetanus prophylaxis is required.
- Where body tissue has been torn off as a result of a bite, wrap any torn off parts (e.g. part of an ear) in clean tissue and store in a plastic bag surrounded by ice for transport to hospital.

# Management of Infected Human Bites

## **How do I treat a human bite that has become infected?**

- Send pus or a deep wound swab for culture, before cleaning the wound. State on the form that the swab is from an infected human bite.
- Treat empirically for 7 days with oral antibiotics.

# When to Refer

- **Refer to secondary care** (with urgency depending on clinical judgement):
  - Severe bite injuries with heavy bleeding causing haemodynamic instability.
  - Penetrating wounds involving arteries, joints, nerves, muscles, tendons, bones, or the central nervous system, such as clenched-fist injuries to the hand. Note: penetrating bites to the hands, feet, or head are at particular risk of infection and serious complications.
  - Facial wounds (excluding very minor wounds) and bites to the eye or orbit.
  - Bites where there is a possibility of a foreign body (for example a tooth) in the wound.
  - Devitalized wounds where debridement is required, or wounds which might benefit from closure.
  - Injuries requiring reconstructive surgery.
  - People with abscesses, severe cellulitis, or with infected bite wounds that are not responding to treatment, or who are systemically unwell.
  - People with an increased risk of infection, for example, diabetes mellitus, asplenia, immunocompromised status, chronic liver disease, prosthetic heart valve or joint.
  - Bites to poorly vascularized areas such as ear cartilage/nose cartilage.
- **If bite wounds suggest possible child protection issues** or safeguarding issues for a vulnerable adult, refer for further assessment in line with local policy.
- **If the person is at risk of tetanus** and [assessment](#) suggests they may require tetanus immunoglobulin, seek specialist advice.
- **If there is a possibility that the person has been exposed to a blood-borne virus** such as hepatitis B or HIV, seek *immediate* advice from a consultant in infectious diseases, virologist, or the local Health Protection Team.

# DOG BITES

Dog bites are the most common mammalian bites treated in emergency departments .



In the UK, around a quarter of a million people per year present to minor injury and emergency departments with dog bite injuries.

Children are more often bitten by dogs than adults (with a peak incidence of 5–9 years of age), and boys and men are more frequently affected

Older children experience more bites to the arms and legs, whereas younger children have an increased likelihood of being bitten on the head, face or neck because of their short stature and relatively large head compared with their body

There is an increased incidence of admissions related to dog bites in the summer months compared with winter

Around half of dog bites are reported as provoked and 90% were inflicted on the owner of the dog or someone known to it

- **Dog** bites characteristically involve puncture wounds from the canine teeth which anchor the victim whilst the other teeth bite, shear, and tear the tissues, causing structural damage
- Adult dogs have very powerful jaws.
- These can inflict high pressures which, in addition to the shearing forces delivered during a bite can cause deep, open cuts, crush wounds, devascularization, and soft-tissue avulsion. In some cases, a body part may be torn off by a dog
- The severity of a dog bite depends on the type and size of dog, with breeds such as Rottweilers, German Shepherds, and pit bull terriers able to cause significant damage

## DOG BITES

dogs have titanium teeth, each  
3000. It can rip both metal and k



## Dog bites

- Usually contaminated
- Pasturella, strep, staphs, anaerobes
  - Low infection rates 20% (higher in the hand 36%)
  - Early infections tend to be pasturella (<12hrs)
  - >24hrs tend to be staph or anaerobes
- Rabies possible
- Capnocytophagia potentially fatal sepsis syndrome
- Can be incised
- Tend to be crush injuries
- ‘Hole and tear’ effect
- Underlying tissue injury

# ***Capnocytophaga canimorsus***

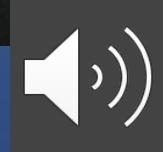
## **Infections from Dog Bites**

- Older reports quoted 25 % mortality rate
- Can cause septic arthritis, endocarditis, renal failure, D.I.C., sepsis, and / or meningitis
- Recent review of 19 meningitis cases noted only one death in this group
- Immunocompromised, post-splenectomy, and alcoholic patients at higher risk
- Usually sensitive to penicillin, rifampin, & quinolones

# Considerations About *Pasteurella multocida* Infections from Dog Bites

- Can cause very rapid cellulitis (erythema within 2 hours)
- Can cause complications in up to 40 % :
  - Local septic arthritis
  - Osteomyelitis
  - Tenosynovitis
  - Bacteremia
  - Rarely pneumonia or pulmonary abscess in immunocompromised patients
  - Disseminated pasteurellosis in patients with liver disease

**Figure 2.** Dog-bite wound infection due to *Pasteurella multivalida* and anaerobic bacteria. No pus or abscess was present under the eschar.



# Management



- **Document how and when the bite occurred.**
  - The type of animal (domesticated or wild) and its state of health or any unusual symptoms.
  - Whether the attack was provoked.
  - Mechanism of injury.
- **Monitor vital signs** if the bite is particularly traumatic, or sepsis is suspected.
- **Examine the bite** using gloves, bearing in mind that deep layers of tissue may move with positional changes after the bite injury, disguising the true depth of the wound. Document the following (record both positive and negative findings as there may be future litigation):
  - The location of the wound. Photographs or diagrams may be useful.
  - The size, extent, and depth of the injury.
  - The type of wound (for example laceration, puncture, abrasion, crush, haematoma, avulsion, amputation).
  - The degree of crush injury, devitalized tissue, nerve or tendon damage, and involvement of muscle, bones, joints, or blood vessels.
    - Examine wounds overlying a joint through the full range of motion to detect retracted injuries and tendon rupture.
  - Neurovascular function in the area distal to the bite — check pulses and sensation.
  - The range and movement of any adjacent joints.
  - Any lymphadenopathy.
  - The presence of any foreign bodies (for example teeth) in the wound.
  - Any signs of infection (for example redness, swelling, induration, necrotic tissue, purulent discharge, pain, localized cellulitis, lymphangitis, lymphadenopathy, or fever).
  - Facial bites: perform an intraoral examination to exclude cheek lacerations with an intraoral communication.

# Safeguarding

- **Although rare, consider the possibility of child neglect** if there is a report or appearance of an animal bite on a child who has been inadequately supervised. Refer for further assessment in line with local policy.

# When to X-Ray

- Large dogs can generate forces > 500 foot-pounds per square inch with their jaws
  - Therefore can cause extremity long bone fractures
- Also can cause dural penetration from scalp bites in small children (this can lead to fatal meningitis if missed in the E.D.)
  - So skull films may be needed to see if there is inner table penetration from teeth

# CAT BITES

- **Cat bites are the second most common animal bite**, accounting for 5–15% of animal bite wounds
- Older adult women are usually affected, with the upper extremities being most frequently bitten
- Around eight in ten cat scratch or bite incidents involve the owner of the cat and almost all are reported to be provoked [

# CAT BITES



**Cats** have fine, sharp teeth and, despite having a weaker bite than dogs, inflict deep puncture wounds inoculated with saliva, and are capable of penetrating bone, joints, and tendons.



Fluids can only drain from the small skin puncture wounds, therefore infections such as abscesses and osteomyelitis are more common with cat bites



Regional lymphadenopathy is shown in an 8-year-old patient with cat-scratch disease.

## ‘Cat Scratch Disease’

- Can occur from cat or dog bite
- *Bartonella Herselae*
- Erythematous papule 3-10/7 at site of injury
- Regional lymphadenopathy
- Prolonged non specific symptoms
  - Fever
  - Malaise
  - Headache
  - Ocular complications

# *Bartonella henselae* Cat Scratch Disease(CSD)

- **Treatment**
- Antibiotics are **not indicated** in most cases but they may be considered for severe or systemic disease.
- Reduction of lymph node size (no REDUCTION in the duration of symptoms) has been demonstrated with a 5-day course of azithromycin and **may be considered in patients with severe, painful lymphadenopathy**.
- **Immunocompromised patients** should be treated with antibiotics:
  - Trimethoprim-sulfamethoxazole, Gentamicin, Ciprofloxacin, Rifampin
- *B. henselae* is generally resistant to penicillin & amoxicillin

# MANAGEMENT OF CAT OR DOG BITES

- **For initial wound management:**
  - If possible remove any foreign bodies (for example teeth) from the wound.
  - Encourage the wound to bleed (if it has just occurred), unless it is already bleeding freely.
  - Irrigate thoroughly with warm, running water. It is usually not possible to irrigate small puncture wounds.
  - Consider the need for debridement (for example if the wound is dirty or there is non-viable tissue) and refer to Accident and Emergency if this is required and the skills and resources are not available in primary care.
  - Advise analgesia (paracetamol or ibuprofen) for pain relief, if required.
  - Where body tissue has been torn off as a result of a bite, wrap any torn off parts (for example part of an ear) in clean tissue and store in a plastic bag surrounded by ice for transport to hospital.

# Allow the following bite wounds to heal without formal closure:

- Bite wounds over 24 hours old.
- Infected bite wounds.
- Deep puncture wounds (for example cat bites).
- Crush injuries.
- Heavy contamination.
- Uncertain adequacy of debridement.
- Bites to the limbs, hands and feet.

# Treatment of established bite wound infection

## Treatment after wound swab for C/ST

depends on **the progress**; usually 7-14 days; extend if there are joint/ bone involvement

**Parenteral therapy** preferred for admitted patient with infected bites

- IV/Oral amoxicillin-clavulanic acid
- Other alternatives: second /third generation cephalosporin + antianaerobic agents OR carbapenems

**For patient with allergy history of life threatening reactions to penicillin:**

- Oral clindamycin + fluoroquinolone
- Oral clindamycin + tetracycline
- Oral clindamycin + Septrin ( paediatric)

**For patient with allergy history of non-life threatening reactions to penicillin:**

- Oral cefuroxime + metronidazole

# Patients with Penicillin allergy

- Pregnant women : tetracycline, Septrin ,Metronidazole contraindicated
- Children: tetracycline and fluoroquinolones contraindicated
- May consider Macrolide e.g. azithromycin 250mg - 500mg per day under such situation
- Patient observed closely for treatment failure

# Tetanus

- Tetanus only occurs when spores of *C. tetani* gain access into tissues.
- usual mode of entry is through puncture wound or laceration. Injury itself is often trivial and in 20% of cases there is no evidence of wound.
- spores germinate from wound and toxin tetanospasmin is released into blood stream. It is then taken up into motor nerve endings and transported into CNS.

# Tetanus management: **Active Immunisation with tetanus toxoid (TT)**

- Long lasting protection greater than or equal to 10 years for most recipients. Boosters are recommended at 10-year intervals.
- 3 doses of 0.5 ml (TT) by IMI
  - See local guidelines and protocols
- Complications:
  - Fever /painful local erythematous or nodular reaction at injection site
- Contraindications
  - Previous anaphylactic reaction
  - Acute respiratory infection or other active infection

# When to prescribe antibiotics

- Prescribe antibiotics for:
  - All cat bites,
  - animal bites to the hand, foot, and face;
  - puncture wounds;
  - wounds requiring surgical debridement;
  - wounds involving joints,
  - tendons, ligaments,
  - suspected fractures.
- Wounds that have undergone primary closure.
- People who are at risk of serious wound infection (e.g. those who are diabetic, cirrhotic, asplenic or immuno-suppressed).
- People with a prosthetic valve or a prosthetic joint.
- Antibiotics are not generally needed if the wound is more than 2 days old and there is no sign of local or systemic infection.

# Prescribing Prophylactic Antibiotics

- **Prescribe prophylactic oral antibiotics** for:
  - All cat bites; animal bites to the hand, foot, and face and genitalia; puncture or crush wounds; wounds requiring surgical debridement; wounds involving bones, joints, tendons, ligaments, or suspected fractures; bites on limbs with impaired circulation.
  - Wounds that have undergone primary closure.
  - People who are at risk of serious wound infection (for example those who are diabetic, cirrhotic, asplenic, immunocompromised, or at extremes of age).
  - People with a prosthetic valve or joint.
  - Delayed presentation (more than 8 hours but less than 24–48 hours).
- For animals not covered in this guidance (for example pigs), seek specialist advice for the most appropriate antibiotic.

# Infected Wounds

Send

- Send a pus or deep wound swab for culture, before cleaning the wound (state on the form that the swab is from an infected animal bite).

Treat

- Treat empirically with oral antibiotics.

Admit

- Admit anyone who has a severe infection or who is systemically unwell as intravenous antibiotics may be required.

# Safety Netting and Discharge Advice

- **Give follow-up advice** if the person has not been referred to hospital. If the bite wound is not infected — advise the person to check for signs of infection and if these develop to attend urgently for review.
- If the wound is infected — review at 24 and 48 hours to ensure the infection is responding to treatment. Advise the person to attend urgently for review if the infection worsens or if they feel increasingly unwell.
- Follow-up for people who require post-exposure prophylaxis for rabies should be as advised by a specialist.

# Managing Rabies Risk

- To manage a person's risk of rabies:
  - The need for treatment will be determined and organised by a specialist based on the person's [rabies risk assessment](#).
  - Treatment recommendations are grouped into the following categories:
    - No risk, therefore no treatment.
    - Vaccine and human rabies immunoglobulin (HRIG).
    - Vaccine only.
    - Vaccine and blood test 1 week after last dose.
    - Observation of animal (domestic cats and dogs only).
  - If treatment is required but has not been started, post-exposure treatment should be commenced as soon as possible. Initiating post-exposure treatment for rabies is not a medical emergency. Rabies vaccine/human rabies immunoglobulin (HRIG) can be sent out to be given the next day in most cases. However, for head and neck bites, treatment should ideally be started within 12 hours of reporting.
  - It is important to note that vaccination and human rabies immunoglobulin should *never* be given at the same anatomical site.

# When to Refer

- **Refer to secondary care** (with urgency depending on clinical judgement):
  - Severe bite injuries with heavy bleeding causing haemodynamic instability.
  - Penetrating wounds involving arteries, joints, nerves, muscles, tendons, bones, or the central nervous system. Note: penetrating bites to the hands, feet, or head are at particular risk of infection and serious complications.
  - Children with scalp wounds and potential penetrating wounds to the skull.
  - Facial wounds (excluding very minor wounds) and bites to the eye or orbit.
  - Serious hand bites.
  - Bites where there is a possibility of a foreign body (for example a tooth) in the wound.
  - Devitalized wounds where debridement is required or wounds which might benefit from closure.
  - Bites that might need reconstructive surgery.
  - People with abscesses, severe cellulitis, or with infected bite wounds that are not responding to treatment, or who are systemically unwell.
  - People with an increased risk of infection — for example, diabetes mellitus, asplenia, immunocompromised status, chronic liver disease, prosthetic heart valve or joint.
  - Bites to poorly vascularized areas such as ear cartilage/nose cartilage.

# Prophylaxis and Follow Up Advice

- **or prophylaxis and treatment of an infected dog or cat bite**, prescribe co-amoxiclav for seven days. For adults who are allergic to penicillin, prescribe metronidazole plus doxycycline for seven days (for children under 12 years old who are allergic to penicillin, seek advice from a microbiologist).
- **Give follow-up advice** if the person has not been referred to hospital. If the bite wound is not infected — advise the person to check for signs of infection and if these develop to attend urgently for review.
- If the wound is infected — review at 24 and 48 hours to ensure the infection is responding to treatment. Advise the person to attend urgently for review if the infection worsens or if they feel increasingly unwell.
- Follow-up for people who require post-exposure prophylaxis for rabies should be as advised by a specialist.

# Clarithromycin

- For prophylaxis or treatment of an infected bite wound, the dosage of oral clarithromycin is:
  - Adult: 250–500 mg twice daily for seven days.
  - Child 1 month to 11 years (bodyweight up to 8 kg): 7.5 mg/kg twice daily for seven days (note oral suspension is not licensed for use in infants under 6 months of age).
  - Child 1 month to 11 years (bodyweight 8–11 kg): 62.5 mg twice daily for seven days.
  - Child 1 month to 11 years (bodyweight 12–19 kg): 125 mg twice daily for seven days.
  - Child 1 month to 11 years (bodyweight 20–29 kg): 187.5 mg twice daily for seven days.
  - Child 1 month to 11 years (bodyweight 30–40 kg): 250 mg twice daily for seven days.
  - Child 12–17 years: 250 mg twice daily for seven days (increased to 500 mg twice daily in severe infections).
- [\[BNF 74, 2017; BNF for Children, 2017; PHE, 2017b\]](#)

# Co-Amoxiclav

For prophylaxis or treatment of an infected bite wound, the dosage of oral co-amoxiclav is:

- Adult: 250/125 mg every 8 hours for seven days, increased to 500/125 mg every 8 hours if severe infection.
- Child 1–11 months: 0.25 mL/kg of 125/31 suspension three times a day for seven days. Double the dose if severe infection.
- Child 1–5 years: 0.25 mL/kg of 125/31 suspension three times a day, or 5 mL three times a day, for seven days. Double the dose if severe infection.
- Child 6–11 years: 0.15 mL/kg of 250/62 suspension three times a day, or 5 mL three times a day, for seven days. Double the dose if severe infection.
- Child 12–17 years: 250/125 mg (tablet) every 8 hours for seven days, increased to 500/125 mg every 8 hours if severe infection.

# Doxycycline

- For prophylaxis or treatment of an infected bite wound, the dosage of oral doxycycline is:
  - Adults: 100 mg twice daily for seven days
  - Child: doxycycline is contraindicated (and not licensed) in children less than 12 years of age because of the risk of dental staining and hypoplasia

# Metronidazole

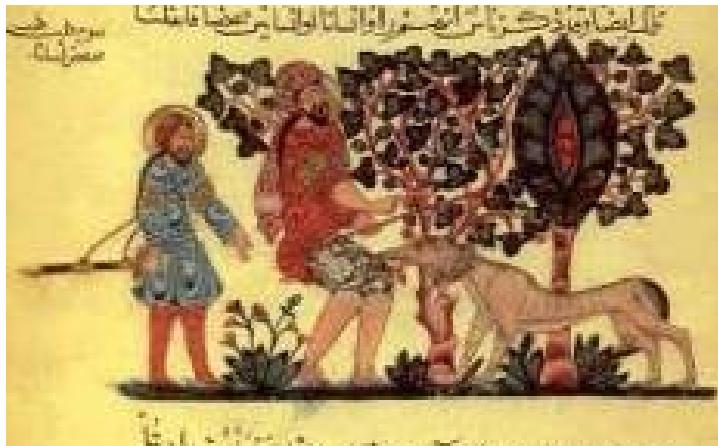
For prophylaxis or treatment of an infected bite wound, the dosage of oral metronidazole is:

- Adult: 400 mg every 8 hours for seven days.
- Child 1 month of age: 7.5 mg/kg every 12 hours for seven days.
- Child 2 months to 11 years: 7.5 mg/kg every 8 hours (maximum 400 mg per dose) for seven days.
- Child 12–17 years: 400 mg every 8 hours for seven days.

# Rabies

- Caused by an RNA rhabdovirus
- Transmitted by inoculation of infectious saliva
- Rarely can be transmitted by inhalation (from bats in caves)
- Causes a severe, uniformly fatal encephalitis
  - Only 5 documented survivors worldwide so far

# Rabies – The Disease



- Rabies has been around for centuries; described as early as 2300 B.C.
- Transmission is direct, primarily via inoculation by bite, with infectious virus present in saliva.
- The reservoir for rabies is the animal pool that circulates rabies virus (diverse species of mammals each with a specific strain).
- Rabies is >99% fatal once symptoms occur.

# Risk of Rabies Transmission

# from Animal Bite

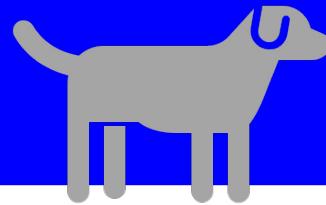


## High Risk

Bats  
Raccoons  
Foxes  
Coyotes / bobcats  
Other carnivores

## Intermediate Risk

"Outdoor" cats  
and dogs  
Cattle in Midwest  
USA



## Low Risk

Rodents  
Lagomorphs  
(hares & rabbits)  
Farm animals  
Indoor cats and  
dogs

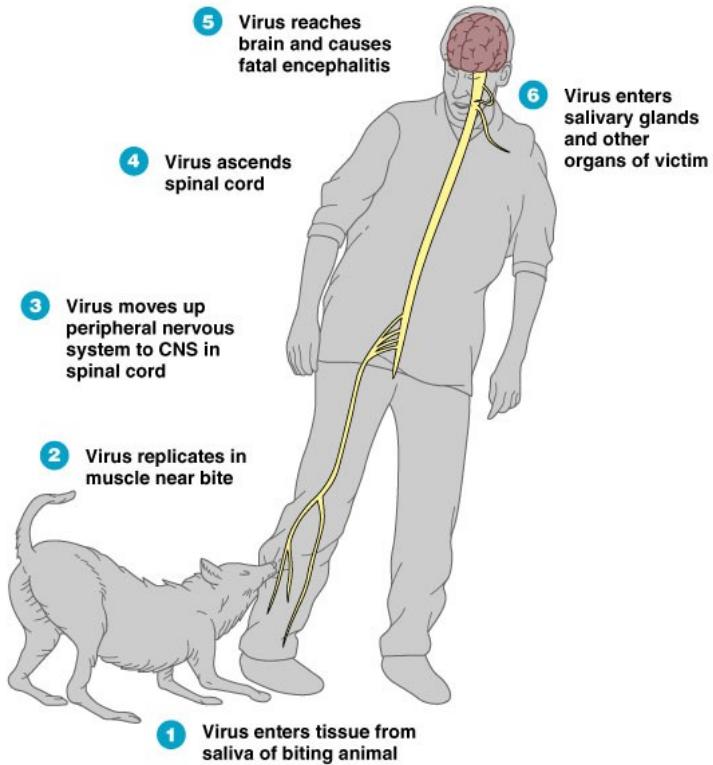
# Transmission/Pathogenesis

- Most commonly spread by bite contact between the rabid animal and the recipient
- Viral particles travel out from brain (centrifugal spread) ↴ nerve cells ↴ salivary glands ↴ excretion = infectious
- Virus in salivary glands means end stage of the disease: death usually occurs within several days
- Incubation period: Usually 4 weeks; can range from 10 days to a year or more (??)

# Rabies : Symptom Progression

- Prodrome phase : fever, malaise, headache, sore throat
- Neurologic phase : paresthesias at bite site, anxiety, restlessness, insomnia, dysphagia, hydrophobia (from fear of painful esophageal spasms), spasms, seizures
- Flaccid paralysis : leads to coma
- Cardiovascular collapse
- Supportive treatment generally ineffective to date

# Signs and Symptoms



# Pre-exposure Vaccination Protocol

- Three doses of vaccine administered on days 0, 7 and 21 or 28
- Dosage: 1.0 ml administered IM in the upper deltoid
- Recommendations encourage titer checks for those at high and medium risks, 6 mos. and 2 years respectively, no titer check for lower risk workers with pre-exposure series. If absent, administer booster

# Prevention steps after an animal bite or other exposure:

- Wash the wound/site well with soap and water.
- Have the animal tested for rabies or observed.
- See a Doctor, even if the bite is very small. For non-bite consult with Doctor or contact public health.
- Assess need for tetanus booster.
- Contact, or ensure your provider contacts, your **local health department** for recommendations.



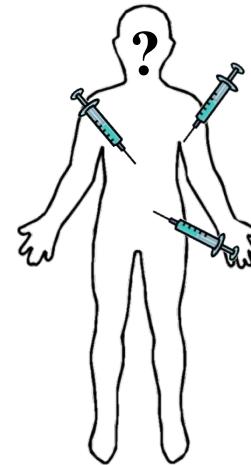
# Rabies Postexposu re (PEP)

Two biologics are administered:

1. Human Rabies Immunoglobulin (HRIG) - confers immediate protection with antibodies vs. rabies
2. Rabies Vaccine - patient develops antibodies over a 2 to 4 week period

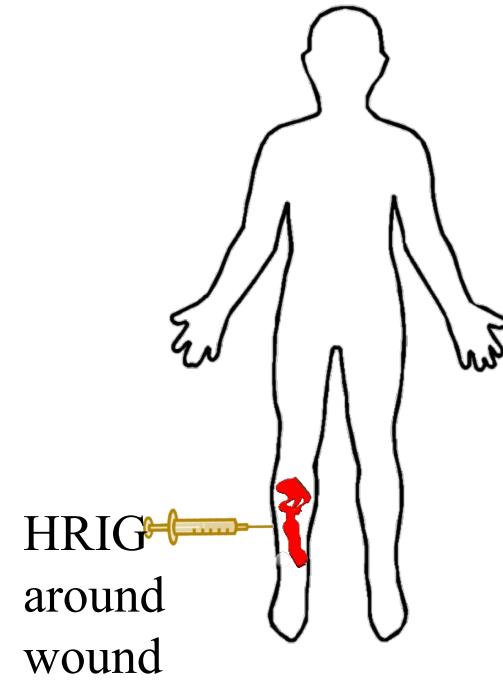
# Where do you administer Immunoglobulin?

- A. Inject most of the IG around the wound and rest away from vaccine site
- B. Inject half around the wound, half on opposite side of body
- C. IG is not site specific
- D. In at least one arm and one leg



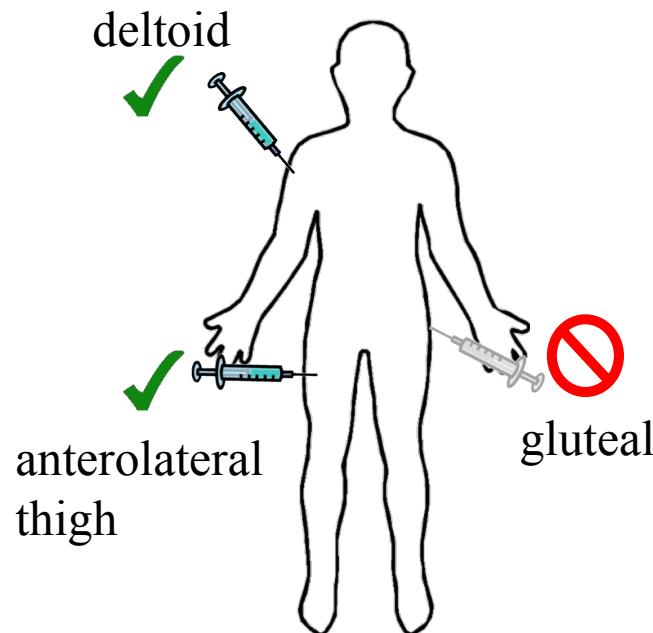
# Where to administer Immunoglobulin?

- HRIG around or inside wound
- Remaining volume IM at site distant from vaccine
- 20 IU/kg body weight
- Never use same syringe as vaccine
- Do not administer more than necessary
- Do not administer after day 7 or dose 3 of vaccine



# Where to administer rabies vaccine?

- Deltoid only acceptable site for adults and older children
- Younger children anterolateral thigh okay
- Opposite of HRIG site
- Never at same site of HRIG
- Never in gluteal area



# Managing risk of Rabies

Consider the need for post-exposure

Everyone who has been bitten by a bat in the UK needs post-exposure prophylaxis urgently.

Complete a Rabies Advice Record Form

# Conclusion

- Bites in primary care settings are a common occurrence, including animal bites, insect bites, and human bites.
- Effective management of bites requires healthcare providers to possess comprehensive knowledge and skills in assessment, treatment, and prevention.
- Timely recognition and appropriate management of complications associated with bites are crucial to optimize patient outcomes.
- Collaboration between primary care providers and specialists promotes holistic and comprehensive care for patients with complex bite injuries.
- Patient education on wound care, infection prevention, and follow-up instructions is essential for successful bite management.
- By adhering to evidence-based guidelines and best practices, primary care providers can play a vital role in reducing the morbidity and potential long-term complications associated with bites.
- Ongoing professional development and staying updated with current research are crucial for providing high-quality care in managing bites.
- Interprofessional collaboration, including infectious disease specialists and surgeons, enhances the multidisciplinary approach to bite management.
- Further research is needed to continuously improve the understanding and management of bites in primary care settings.
- By addressing bites effectively in primary care, we can improve patient outcomes, reduce healthcare costs, and promote overall community well-being



## CONTACT INFO



+44 207 692 8709



info@belmatt.co.uk  
admin@belmatt.co.uk



[www.belmatt.co.uk](http://www.belmatt.co.uk)



Suite 570, 405 Kings Road  
Chelsea  
SW11 3RY



[www.belmatt.co.uk](http://www.belmatt.co.uk)





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