

Managing Human Bite Injuries

Guidance for Health Protection Teams

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1. Acknowledgment

This document is based on guidance produced by the Health Protection Agency (HPA) in the North West of England published in October 2010. There is no intention by Public Health England (PHE), the successor organisation to the HPA, to update the guidance. Permission to use the original HPA document as a template for this updated document for Wales has been granted by one of the authors of the original HPA document.

2. Introduction

This document provides guidance to Health Protection Teams (HPT) when advising on the management of potential infections arising from significant human bite injuries where teeth have broken the skin. Occupational Health Departments are likely to have their own guidance or policies for biting incidents occurring in the workplace and the enquirer should be advised to consult these in the first instance if the biting incident has occurred in a work setting.

NOTE: Bites that do not break the skin are not classed as significant injuries for the purposes of this guidance and the recommendations in this document do not apply. However, it is still advisable to wash the skin with soap and water.

Human bites can occur in a range of settings, especially in care settings for children, people with learning disabilities, and during fights. Bites are most commonly reported on fingers and hands. As well as the trauma from a bite, wounds may be contaminated with pathogens even if there are no clinical signs of infection. Depending on the nature and severity of the bite, there is potential for transmission of bacterial pathogens and blood-borne viruses (BBV). Whilst BBV transmission from human bites has been reported in the literature^{1,2}, the risk is thought to be extremely low³, dependent on the BBV status of the injured person and the biter, and whether blood was present during the biting incident. Following a biting incident in which the skin is broken, the injured person is at risk of bacterial infection and both the injured person and the biter are at risk of BBV infection.

The risk of bacterial infection is greater than that of BBVs. It can be caused by the numerous bacteria naturally found in the mouth and by inoculation of bacteria colonising the injured person's skin as the biter's teeth penetrate the skin. If a bite wound becomes infected, the longer it remains untreated the greater the risk of severe local and systemic complications⁴.

This guidance document is not intended to provide detailed first aid advice, and referral to local protocols is recommended. Neither does it address wound closure. Bite wounds suitable for management in primary care do not usually require closure. Referral to an Emergency Department (ED) for further assessment and management is usually indicated if wound closure is thought to be necessary.

NOTE: If a bite has been inflicted on a child, consider child protection issues and follow local policies for referral of children considered at risk¹. A POVA (Protection of Vulnerable Adults) referral may need to be considered if a bite is inflicted on a vulnerable adult, in which case the local POVA policy should be followed.

3. Immediate assessment and care of the wound

- Bites that break the skin are classed as significant injuries. Bites that do not break the skin are not classed as significant injuries for the purposes of this guidance and the recommendations in this document do not apply. However, it is still advisable to wash the skin thoroughly with soap and water.
- A competent and appropriately trained person should determine whether the wound is sufficiently serious as to require further assessment in an ED or Minor Injuries Unit (MIU). So called “fight bites” whereby the teeth of a person being punched penetrate the hands of the puncher can cause deeper infections in the joints of the fingers and the need for surgical washout should be assessed in ED. If the wound is being managed in primary care:
- Follow local policy or guidance on administering first aid and on infection prevention, where these are available. Gloves should be worn, if possible, by anyone administering first aid.
- Encourage the wound to bleed
- Irrigate thoroughly with warm, running water or normal saline
- Cover with an appropriate clean dressing
- If a part of the body has been bitten off, for example part of an ear, it should be stored in a plastic bag wrapped in clean tissue surrounded with ice, for transport to hospital along with the injured person, where an assessment can be made about its re-attachment
- If the biter has blood in their mouth they should rinse it thoroughly with tap water and spit out.
- Collect as much relevant information as possible about the injured person, the biter, and the date, time and nature of the injury. Assess the severity of the injury, whether the skin has been broken and if blood is involved. See appendix 1 for an example of a form that can be used for collecting this information. If advice is sought from an expert about managing the injury, this information will be required by the person giving advice

4. Bacterial infection

Following a human bite, the risk of bacterial infection is greater than the risk of BBV infection. More than 42 different species of bacteria have been isolated in the human mouth and up to 190 when gingivitis or periodontitis are present. The most common organisms in human bites include *Streptococcus* spp, *Staphylococcus aureus*, *Haemophilus* spp, *Eikenella corrodens*, *Bacteroides* spp and other anaerobes. *E. corrodens* has been found in 25% of human bites to the hand¹. There is some limited evidence that antibiotics prevent infection after a human bite. Therefore, antibiotic prophylaxis should be prescribed for all human bite wounds under 72 hours old if there are no signs of infection. If a bite is 72 hours old or more and there is no sign of infection, the risk of infection is likely to be low and prophylactic antibiotics are probably not of value¹. If the wound appears infected, send pus or a wound swab for culture before cleaning the wound, and ideally before starting any antibiotics. State on the form that the swab is from an infected human bite. Consider hospital admission for anyone who has a severe infection or if there are signs or symptoms of sepsis, as intravenous antibiotics may be required¹. For both prophylaxis and treatment of an infected human bite, the following is currently recommended by the All Wales Medicines Strategy Group⁵ :

A 7-day course of oral co-amoxiclav (375mg-625mg tds)

For people who are allergic to penicillin, the following 7-day courses are alternative options:

- Metronidazole (200mg-400mg tds) PLUS doxycycline (100mg bd), or
- Metronidazole (200mg-400mg tds) PLUS clarithromycin (250mg-500mg bd)

For up-to-date advice on appropriate use of antimicrobials please refer to the online version of the [Primary Care Antimicrobial Guidelines](#) produced by the All Wales Medicines Strategy Group⁵.

5. Blood-borne virus (BBV) infection

As well as being blood-borne, Hepatitis B virus (HBV), Hepatitis C virus (HCV) and Human immunodeficiency virus (HIV) can also be found in saliva of infected people in low concentrations². Whilst there is a theoretical risk of BBV transmission through human bites, the risk is generally thought to be **very low** and reports of BBV transmission through human bites are rare³. It is important to note that the risk increases if blood is present during the biting incident. This could be blood from the biter or the injured person. In many biting incidents it isn't possible to identify the biter or approach them to offer/request testing, however where the biter can be identified, and where it is appropriate to do so, they should undergo the same risk assessment as the person they have bitten and their blood should also be tested if they consent. Before testing for BBVs following a biting incident, consider appropriate pre-test counselling and consult local policy on this where available. Whilst there is effective post-exposure prophylaxis (PEP) for HBV and HIV, there is no PEP effective against HCV. Although testing can be undertaken for all three BBVs (see below), assessment and pre-test counselling should determine whether testing for all three is necessary based on the risk posed by the incident. Bites that do not break the skin do not pose a risk of BBV transmission and there is no need for PEP or testing for BBVs.

Risk assessment

Where possible, the risk assessment should apply to both the injured person and the biter

- Record the date and time of the incident
- Is the BBV status of the biter and the injured person known? If BBV positive then specify which BBV and the current status of their infection if known (e.g. HIV Ag/Ab positive, HBsAg positive and HBV markers, HCV antibody positive, HIV/HCV/HBV viral load)
- Consider all people involved to be at risk unless their current status is known, however a risk assessment is required
- The following are considered to be high risk for HCV infection: Known positive HCV RNA or antibody (unknown RNA); history of injecting drug use (IDU); blood transfusion outside UK, US, Canada, Australia, New Zealand, and Western Europe; tattoos from unlicensed premises (including prisons); born or resident in a country of high HCV prevalence
- The following are considered to be low risk for HCV infection: unknown source patient or no history available
- If either is known to be HIV positive, seek advice from a HIV specialist immediately
- Is their Hepatitis B vaccination status and surface antibody response known?
- Is the identity of the biter known and can the injured person and the biter be approached for testing?
- Can they give informed consent to testing of their blood?
- Refer to local policy on gaining consent, or seek advice in situations where a person lacks capacity to give informed consent

Blood tests

The risk of acquiring a BBV infection during a biting incident is arguably greater for the biter than for the injured person given that the biter will be exposed to the injured person's blood and the injured person is exposed only to the biter's saliva (unless the biter also has blood in their mouth). Whilst the risk of acquiring a BBV infection in a biting incident is low it is not zero, therefore the default position should be to offer testing for all three BBVs (see Box 1). However, venepuncture can cause considerable anxiety for young children, therefore when a biting incident occurs for example, in a children's nursery, a robust risk assessment should dictate the necessity for blood testing as it may be possible to avoid testing the child. In these circumstances, a discussion of the risks with an expert (e.g. a consultant virologist or microbiologist) is useful.

If the biter* cannot be identified, then blood should be taken from the injured person for storage only; there is no need to test the injured person for current or past BBV infection at the time of the incident (knowing the injured person's BBV status at the time of the incident is only useful for managing the biter

if they can be identified). Box 1 lists the tests to consider for both the injured person and the biter (if the biter can be tested), otherwise only the injured person can be tested. Sequential testing over a six month period is necessary in order for potential seroconversion to be identified at any point during the incubation periods. Only after the final test can the patient be reassured that they have not acquired a BBV infection from the incident.

**In most reported biting incidents it is the injured person that seeks medical advice, however it could be the biter that seeks advice, and the recommendations in this guidance apply to both.*

Box 1. Blood tests to consider for both parties			
Time	Hepatitis B	Hepatitis C	HIV*
At time of incident (if both people are known/identifiable)	HBsAg	Ab	Ag/Ab combined test
At time of incident (if only one person is known/identifiable)	10ml clotted blood for storage		
6 weeks after bite incident (only needed if high risk for HCV, otherwise no testing needed at 6 weeks)	HBsAg	PCR	Ag/Ab combined test
3 months after bite incident	HBsAg	Ab (add PCR only if either person is high risk for HCV)	Ag/Ab combined test
6 months after bite incident	HBsAg	Ab	Only needed if person did not attend for testing at 3 months: Ag/Ab combined test

**Please see point 1 in the post-exposure prophylaxis (PEP) section below regarding timing of the follow-up HIV test if PEP is given*

Key:

HBsAg= Hepatitis B surface antigen

PCR= Polymerase chain reaction

Ag= Antigen

Ab= Antibody

If any of the tests are positive, ensure that the person is referred to a relevant specialist and provide appropriate public health/infection prevention advice. The Health Protection Team should follow-up newly diagnosed cases in the normal manner.

Post-exposure prophylaxis (PEP)

1. The risk of HIV from a human bite is very low and in most circumstances HIV PEP is not required (See BHIVA and BASHH guidance⁶). In extreme circumstances, if either person is known to be HIV positive and the bite draws blood, causes very deep wounds, or the viral load is high then PEP could be considered after discussion with a specialist. If HIV PEP is given, the follow-up blood test should be done 8-12 weeks after the incident.
2. There is no PEP available for HCV.
3. Box 2 lists the situations in which the Department of Health⁷ recommends Hepatitis B vaccine and/or Hepatitis B immunoglobulin (HBIG) following significant exposure incidents.

Box 2. Hepatitis B PEP			
HBV status of person exposed	HBsAg positive source	Unknown source	HBsAg negative source
≤ 1 dose of HB vaccine pre-exposure	Accelerated course of HB vaccine* and HBIG x1	Accelerated course of HB vaccine*	Initiate course of Hep B vaccine
≥ 2 doses of HB vaccine pre-exposure (anti-HBs not known)	One dose of HB vaccine followed by second dose one month later	One dose of HB vaccine	Finish the course of HB vaccine
Known responder to HB vaccine (Anti-HBs >10IU/ml)	Consider booster dose of HB vaccine	Consider booster dose of HB vaccine	Consider booster dose of HB vaccine
Known non-responder to HB vaccine (Anti-HBs <10IU/ml 2-4 months post vaccination)	HBIG x1. Consider booster dose of vaccine. Give 2 nd dose of HBIG after a month	HBIG x1. Consider booster dose of vaccine. Give 2 nd dose of HBIG after a month	No HBIG. Consider booster dose of HB vaccine

**An accelerated course of vaccine consists of doses spaced at 0, 1 and 2 months. A booster dose may be given at 12 months to those at continuing risk of exposure to HBV*

6. Tetanus infection

The risk of tetanus from a human bite is **very low** and in most circumstances Tetanus Immunoglobulin (TIG) **is not** required. Tetanus vaccine is not considered adequate for treating a tetanus-prone wound since tetanus vaccine given at the time of a tetanus-prone injury may not boost immunity early enough to give additional protection within the incubation period of tetanus. However, giving a dose of vaccine at the time of injury provides the opportunity to ensure that the individual is protected against future exposure, if they are not already fully vaccinated.

Tetanus infection is caused by the toxin of the tetanus bacillus, *Clostridium tetani* (*C.tetani*). Tetanus spores are present in soil or manure, but can also be found on human skin and in the human gastrointestinal tract. The bite itself does not usually introduce *C.tetani* into the wound but the break in the skin can allow *C.tetani* to enter the body⁸.

A total of five doses of tetanus vaccine, administered at the appropriate intervals, is considered to give lifelong immunity. The Department of Health⁹ includes the following as examples of a tetanus prone wound:

- wounds or burns that require surgical intervention that is delayed for more than six hours
- wounds or burns that show a significant degree of devitalised tissue or a puncture-type injury, particularly where there has been contact with soil or manure
- wounds containing foreign bodies
- compound fractures
- wounds or burns in patients who have systemic sepsis

If the injury fulfils any of the above criteria **AND** is considered to be high risk (i.e. heavy contamination with material likely to contain tetanus spores and/or extensive devitalised tissue), TIG should be given for immediate protection, irrespective of the tetanus immunisation history of the patient. However, most human bites **do not** fulfil the above criteria and TIG is not usually indicated. In the unlikely event that the injury does meet the above criteria, the following prophylaxis with vaccine and/or TIG is recommended by Public Health England¹⁰.

1. Person fully immunised (has received five doses of vaccine at appropriate intervals)

Tetanus vaccine booster not needed, but consider giving human tetanus immunoglobulin for tetanus-prone wounds where the risk of infection is especially high, for example those contaminated with manure or extensive devitalised tissue.

2. Primary immunisation complete, boosters incomplete but up-to-date

Tetanus vaccine booster not needed but may be given if booster is due and it is convenient to give now. Consider giving human tetanus immunoglobulin for tetanus-prone wounds where the risk of infection is especially high, for example those contaminated with manure or extensive devitalised tissue.

3. Primary immunisation incomplete, or boosters not up-to-date

Give tetanus vaccine booster and further doses as needed to complete the recommended schedule (note: if the primary course is interrupted it should be resumed but not repeated). Add human tetanus immunoglobulin if it is a tetanus-prone wound where the risk of infection is especially high, for example those contaminated with manure or extensive devitalised tissue.

4. Not immunised or immunisation status uncertain

Give an immediate dose of tetanus vaccine. Add human tetanus immunoglobulin if it is a tetanus-prone wound where the risk of infection is especially high, for example those contaminated with manure or extensive devitalised tissue. Arrange further doses of tetanus vaccine as needed to complete the recommended five-dose schedule.

7. Follow-up

Refer to local policy for the follow-up of people involved in biting incidents. In the absence of local policy, the following principles are useful and should be applied¹:

- If the person was seen in hospital, hospital staff are responsible for organising follow-up by an appropriate service
- 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
- Where testing for BBVs has been undertaken, follow-up appointments in an appropriate service (occupational health, general practice, etc) for sequential blood tests should be arranged by the person initiating testing, as detailed in Box 1 above
- Can actions be taken to prevent similar biting incidents from occurring in future?

8. References

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10. Immunoglobulin Handbook. Public Health England. IMW165.02. June 2015. Available at: www.gov.uk/government/uploads/system/uploads/attachment_data/file/441355/IMW165.02_Tetanus_Immunoglobulin_Handbook_v1.4.pdf

Is this a significant bite (broken skin) YES NO (if "No" then no need to continue)						
Details of the incident (include the following where possible: date, time, place, witnesses, skin broken, whose blood involved, is wound infected)						
Details of injured person						
Name						
Address						
Tel No						
DOB						
GP						
Known to have or be at risk of a BBV? Please mark as "positive", "high risk", or "unknown".		HBV	HCV	HIV	Comments:	
Vaccinated against Hepatitis B? If so, give dates in relevant box.		Not vaccinated	1 st dose	2 nd dose	3 rd dose	4 th dose 5 th dose
Hepatitis B surface antibody test result with date or state if not done:						
Summary of actions taken for injured person:						
Details of biter (or mark as "unknown")						
Name						
Address						
Tel No						
DOB						
GP						
Known to have or be at risk of a BBV? Please mark as "positive", "high risk", or "unknown".		HBV	HCV	HIV	Comments:	
Vaccinated against Hepatitis B? If so, give dates in relevant box.		Not vaccinated	1 st dose	2 nd dose	3 rd dose	4 th dose 5 th dose
Hepatitis B surface antibody test result with date or state if not done:						
Summary of actions taken for biter:						
Post-exposure prophylaxis (PEP)	Injured person	Biter	Date / Comments			
Antibiotics						
HB vaccine						
HBIG						
HIV PEP						
Tetanus vaccine						
Tetanus immunoglobulin (TIG)						