Faculty of Forensic & Legal Medicine

In conjunction with

The British Association for Forensic Odontology

Management of Injuries Caused by Teeth

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Many injuries do not have an immediately obvious cause. Be alert to the possibility of bite marks if the history or appearance is suggestive i.e. any injury which is curved, oval, circular, or shows what could be individual tooth marks.

In such cases, it is undoubtedly wise to contact an odontologist as soon as possible. If an odontologist cannot attend immediately, it is vital that, in addition to your normal examination and history taking, and prior to any treatment, the following steps are taken:

- Swabbing for DNA/saliva (within 48 hours of incident) prior to any recording or measuring if the bite appears to be on exposed skin. Swabbing is using the double swabbing moist and dry technique.
- An adjacent area to the bite mark should also be sampled, using the same swabbing technique.
- Skin swabbing, if the affected area has not been washed, may be relevant up to 7 days post assault.
- If the bite is through clothing, note the position of the clothing in relation to the bite prior to any photography. Double swab the area of interest for potential fibre trace evidence.
- An adjacent area to the bite mark again should be sampled using the same method of swabbing. Note: the forensic scientist would also examine the clothing for the presence of DNA/saliva in this situation.
- Recording and measuring – a full description, drawing and overall dimensions should be noted.
- Do not attribute the injury to an adult/child perpetrator on the basis of its size. This is unreliable and misleading.
- Arrange photography as soon as possible even if an expert photographer is not available. Bite mark analysis depends on the quality of the photographs.

Ideally, an odontologist should supervise the photography but if not available, the following points are essential:

Essentials of good bite mark photography

- See *FFLM PICS* guidance and obtain *consent*.
- Take a location view – no scale.
- A colour chart should also be used, which may be combined with the scale.
- Take close-ups preferably using a macro lens of each injury with and without scales, and with and without flash (low side-lighting may be useful).
- A rigid right-angled scale is required but it must not obscure any possible part of the injury. A date written on the scale can be useful.
- The scale **must** be parallel with and in the plane of injury.
- The camera must be directly over the injury and at right angles to it to minimise photographic distortion. Where there are two curves, each one should be photographed at right angles.
- If possible and practicable, and to minimise posture distortion, try to photograph the injury with the anatomical location positioned as it was at the time of alleged biting. If this is not known, consider photographing in a range of positions.
- It is necessary to take several views of a curved surface (e.g. opposing tooth marks on a limb).
- Some bite marks become clearer with time so repeat photography should be considered. The odontologist can advise the photographer.

Treatment of bites

Bites may be either from humans or animals, (particularly dogs). 10-30% of dog bites and 9-50% of human bites lead to infection. The risk of infection increases when bleeding occurs, with puncture wounds, hand injuries, full thickness wounds and those involving joints, tendons, ligaments or fractures. A delayed presentation of > 8 hours and certain and underlying medical conditions can also increase the risk of infection. Infection may spread beyond the bite, leading to a multitude of complications.

Pathogens

A wide range of bacteria may infect human and dog bites. Viral infections may also occur in human bites. Hepatitis B, C, HIV and Herpes Simplex should be considered. Only one case of rabies has occurred in the UK following a bat bite. However, it is possible that the bite might have been sustained abroad in which case rabies must be considered for any animal bite. Follow the Government Guidance *Rabies risk by country - GOV.UK (www.gov.uk)*.

Initial Management

Encourage wound to bleed unless it is already bleeding
Irrigate thoroughly with warm running water.

Refer to hospital emergency department (ED) if wounds:

- Are bleeding heavily and/or cannot be stopped with pressure;
- Involve arteries, nerves, tendons, muscles, hands, face or feet;

- Involve crush injuries;
- Foreign body in the wound;
- Where infection has already occurred and is serious e.g. septic arthritis, osteomyelitis, cellulitis etc.

Secondary Management

- Check current tetanus status, hepatitis B immunisation, and for allergies to antibiotics.
- Wound closure is rarely advised in primary care. Advice should be sought from ED.
- If referral to an ED is not possible then only consider closure for fresh bite wounds less than 6 hours old where there are no risk factors for infection.
- Advise analgesia for pain relief if needed.

Antibiotic treatment and prophylaxis

If wound is obviously infected, if possible take a swab then start empirical treatment. (See below)

Prophylaxis

- For all human and cat and dog bites where the skin has been punctured and blood has been drawn.
- For cat bites, when the skin has been broken, but there is no blood but the wound could be deep.
- Any bites penetrating tendons, ligaments, joints, bone, vascular structures, or have caused significant tissue damage or are visibly contaminated with dirt or a tooth.
- For people with underlying medical conditions that increase the risk of infection e.g. diabetes mellitus, immunocompromised, asplenic, extremes of age and those with prosthetic valves or joints.
- For prophylaxis give a 3 day course of antibiotics and for treatment of an already infected wound give 5 days.
- In both instances first choice of antibiotics is co-amoxiclav.
- For those who are penicillin allergic use metronidazole and doxycycline.
- For pregnant women use azithromycin and metronidazole. Always seek advice before prescribing.
- For children under 12 years of age who are allergic to penicillin seek advice from a microbiologist.
- Treatment for tetanus should be considered in all cases where the skin is breached.

Viral infections in human bites

- Penetrating wounds involving saliva only may present a risk of hepatitis B.
- Hepatitis C and HIV are only a risk if blood is involved.
- Consultation with a virologist is recommended at the earliest opportunity for management.
- The risk from saliva alone for HIV and hepatitis C is considered very small. When blood is present, the risk is taken as being that of a single needle-stick exposure.
- The latest guidance from the British Association of Sexual Health and HIV on HIV post-exposure prophylaxis, (2021), is '*Human bite – PEP is now 'generally not recommended'*.

Useful links and references

1. Clinical Knowledge Summaries and National Institute of Health and Care Excellence (NICE) *cks.nice.org.uk/bites-human-and-animal/management/*
2. The Green Book (immunisations) *immunisation-against-infectious-disease-the-green-book*
3. British Association of Sexual Health and HIV *UK guideline for the use of HIV Post-Exposure Prophylaxis, 2021*

The BAFO list

BAFO maintains a list of its members who are willing to undertake case-work at short notice on its website at *www.bafo.org.uk*

All BAFO members work to an agreed protocol for best practice in bite mark analysis and their charges will be in accordance with an agreed scale of fees. There is also a link to the BAFO website from the Faculty of Forensic & Legal Medicine website: *www.fflm.ac.uk*

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Send any feedback and comments to forensic.medicine@fflm.ac.uk