

## Bite marks – the criminal's calling cards

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Carnivorous animals, like dogs or tigers, use their teeth in two distinct ways. They kill their prey primarily using their canines and they tear and slice the flesh to produce digestible fragments. Human teeth are designed principally to cut and grind food which is usually previously prepared. Some people appear to revert to more primitive instincts and use their canines and incisors to inflict bites on unsuspecting victims.

There is a whole spectrum of biting activity in the human species ranging from so-called amorous activity to serious body injury resulting in loss of an ear (Fig.1) or nose or infliction of a deep and penetrating wound. The relationship of biter to victim is also complex. It may be adult to adult, adult to child, child to adult or child to child. Both adults and children may self inflict bites in a surprisingly aggressive manner. Adults biting other adults or children will almost inevitably constitute criminal activity and may be associated with actual or grievous bodily harm, rape, murder or child abuse. These are amongst the most serious crimes before the courts and it is in these areas that the forensic dentist is called upon to act as an expert witness.

Human bites on skin are difficult to interpret because skin is not a good 'impression' material. Moreover, victims may struggle and movement will distort the image of the bite. Skin surfaces are not flat and visual distortion may be present, often heightened by photographic distortion caused by inadequate imaging techniques. Human dentitions, whilst possibly being unique in the sense of small nuances of tooth size, shape, angulation and texture may not inflict unique bite marks which can only record gross and not fine detail. If the victim survives, the injury may change due to infection

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or subsequent healing and if the victim is deceased, putrefaction may introduce distortion.

The forensic dentist will be asked to determine whether or not the injury is, in fact, a human bite mark, is it compatible with an adult dentition and can the perpetrator be identified from the information present in the injury?

There has been a tendency in the past for expert witnesses to project an unwarranted degree of certainty whilst in the witness box. Bite marks are not in the same league as fingerprints let alone DNA evidence. Only a proportion contain enough information to warrant a positive identification. Even then,

words such as 'certain' or '100% sure' should never be used and the expert must qualify his opinions by explaining carefully to the jury some of the pitfalls of bite mark analysis and give good and clear reasons for his opinions. The severity of the offence is often such that a defendant, if found guilty, may be imprisoned for many years and the bite mark may be the only evidence linking the suspect to the crime. This places a serious responsibility on the forensic dentist, but current knowledge of the parameters of skin reaction to biting is sadly lacking. It therefore behoves us to be conservative in our opinions and conscious of an overriding concept of British justice – the defendant is innocent until proved guilty beyond reasonable doubt.

Techniques of imaging and computer modeling are being applied to the problem and bioengineering and finite analysis offer methods of study in an area where controlled experiments on human skin are neither ethically nor aesthetically acceptable. Until such time as dentists are in a position to better understand the dynamics and effects of biting, we must either adhere to earlier advice to only use bite marks to eliminate a suspect, or we must be careful not to attribute more to bite mark evidence than a 'best opinion' based on current understanding of a very difficult area of expertise.



Fig. 1 Human ear excised by biting

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