

Human Bite Injury In North East England – The Impact Of Alcohol Intake On A Mode Of Violent Assault

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ABSTRACT

Ninety-two retrospective cases of human bite injury referred to a Plastic Surgery department are presented. Particular emphasis is placed on the relationship of alcohol intake to these injuries, their distribution and subsequent management. A review of the literature is conducted.

The human bite is a leisure time injury of the young single male in the North East. It has been shown that there is a clear link to alcohol and in particular weekend drinking. Prompt operative intervention and wounds located at the head and neck have been shown to be associated with a decreased risk of subsequent infection, which reflects findings in the earlier literature.

Fifteen cases were infected. One was the result of a postoperative complication. The remainder were infected on admission. The majority of infected cases were upper limb bites and were associated with a delayed presentation.

Introduction

Our national drug is alcohol. We tend to regard the use any other drug with special horror.

William S. Burroughs

I try not to drink too much because when I'm drunk, I bite.

Bette Midler

The effect of alcohol consumption and in particular the impact of binge drinking on society is a common theme across the scientific and popular press.

One of the consequences of such intoxication is an increase in violence between groups of individuals. Amongst the spectrum of injuries seen as a consequence of such alcohol driven aggression is the human bite.

The significant aesthetic impact of bite injury and the management of the consequent disfigurement are well described in the literature. The aim of this study is to provide a retrospective review of human bite injury within a regional population and its impact upon a reconstructive plastic surgical unit. We wish to highlight the socio-economic and demographic features particular to these injuries. The management options are highlighted and complications discussed.

Methods

One hundred and fifty case notes were identified as bite injuries (ICD-10 W50 codes for bites and stings – non-human bites were removed from the study) and seen as inpatients between 1994 and 2003.

A standardised data collection sheet was devised, which was used to retrospectively extract data from patient case notes.

Key points looked at were the relationship between the bitten individual and alcohol consumption, the location of the bite, management taken and any subsequent complications.

Within the management options, the number requiring reconstructive surgery, and also whether or not their tetanus and Hepatitis B status was recorded, were addressed.

The data was analysed across the board and also within specific subsets i.e. infection and reconstruction.

Results

Patient demographics

The majority of injuries were recorded between 1995 and 2000 with the modal year being in 1996 at 27%.

Patients seen within this study had ages ranging between infancy and forty-eight years of age. The majority of cases were seen in the age 21-25 group (at 26% of the total). 87% of patients were male and 83% of patients were single. 46% of patients were cigarette smokers. Of the smokers, there was no statistically significant increase in healing difficulties. 53% of patients bitten were unemployed at the time of their injury. It is seen that those bitten were not likely to be in a relationship with their assailant as only 15% of patients claimed that their assailant was one of their relatives or a partner.

Admission details

The majority of referrals from Accident and Emergency departments came from the base unit at The James Cook University Hospital (53%). The remainder came from peripheral hospitals in the region in equal measure. (Darlington Memorial Hospital 13%, Hartlepool 13%, Bishop Auckland 8% and North Tees 7%.) A small percentage were referred from a hospital outside the region or from a General Practitioner (4%). The majority of injuries were facial (82%). The remainder were seen in the limbs, mainly upper (18%).

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The upper limb injuries were actual intentional bites to the limb not closed fist tooth lacerations as a result of punching the mouth (These were not included as not being strictly intentional bite injuries). Within the facial bites, the left ear formed 47% of bites, the remainder being right ear (27%), nose (16%), lip (8%) and eyebrow (2%).

Alcohol plays an important role with 75% of patients documented to be under the influence of alcohol at time of injury, and 74% of injuries occurred at the weekend. (Friday midnight to Sunday midnight.) 5% of patients had drug misuse documented in their A&E clerking. None of the patients were bitten during sporting activities.

75% of cases had their tetanus status addressed on admission. Only 5% of cases – those being the most recent – 2000 onwards – had their Hepatitis B status recorded or addressed.

The majority of patients presented within 24 hrs of their injury (89%) and were admitted under the care of Plastic Surgery as their bite wound was their primary complaint. A small proportion of patients had additional injuries requiring the primary input and admission under other specialties (2%). 43% of patients were admitted on attendance to the A&E department or were transferred straight over to the ward from another hospital. The remainder (57%) were seen and admitted at the triage system used in the department the morning after their injury.

35% of patients were managed and discharged in the same day with 53% of patients remaining in hospital overnight. The remainder were admitted for 2 days or longer.

Management

52% of patients were administered antibiotics of varying nature at the Accident and Emergency department. The majority of these were patients that were returning to triage the next day.

81% of patients underwent an operative procedure as their management. Of those undergoing an operation, 27% of these were under general anaesthetic, the remainder under local anaesthetic. The procedures carried out were mainly debridement and primary closure (71%). A smaller number had primary reconstruction such as a local flap or grafting (26%). Of those requiring an operative procedure, the majority (85%) underwent surgery within 24hrs. 13% of all the patients required reconstructive surgery of some sort, either as a delayed follow on from their original procedure or as a primary event.

All patients were offered follow up in both the plastic surgery dressing clinic and in the outpatients at a later date. There was a high rate of non-attendance with 27% of patients not attending their initial follow up, and

33% not attending their subsequent outpatient appointment.

17% of the cases examined had documented infection as a complication. This was recorded by both a positive culture taken from the wound and associated with clinical evidence of infection.

Of these cases, the infection was noted on admission – i.e. presented with infection already manifest, apart from one case of a bitten ear, which returned to clinic after debridement with obvious infection that was not apparent at the time of the procedure. This settled on a change of antibiotic.

Of those cases that were infected, 47% of these were bites of the upper limb compared with only 15% in the same location in the non-infected group (statistically significant to $p < 0.05$). Another difference between the infected and non-infected groups was the difference in presentation time. Overall 89% presented within 24hrs of their injury. 4% presented between 25 to 48 hrs after. 7% presented after two days. The infected group had a longer interval between injury and presentation, with 33% of infected bites presenting 48 hrs or longer after their injury which was statistically significant ($p < 0.001$) when compared to the non infected group.

Discussion

A human bite injury can be graded into three main categories:

- Class I: puncture wound or linear tear.
- Class II: separation of a pedunculated flap of tissue.
- Class III: complete avulsion of an area of tissue (1).

Of all the bite wounds in this study, 48% were class III, 36% were class II and 14 % were class I.

Human bites are further broken down into actual bites and closed fist injuries (traumatic laceration to Metacarpal – Phalangeal region following a punch blow to the mouth). The latter were not included in this study due to there being a marked difference between the intentional bite and the rather more coincidental punch related injury.

In 1936 Lowry reported 122 cases of human bites (2), some 8% of which were facial wounds. Subsequently, Boland in 1941 reported 60 cases, 40% of which were the head and neck (3).

The largest series presented in the head and neck was by Crikelair and Bates - which was of some 52 cases (4).

These early studies established the anatomical basis for differing infection rates between facial and limb injuries. It was demonstrated that limb wounds carried a higher risk of becoming clinically infected compared with similar bite wounds of the head and neck, with the differing vascularity of the regions proposed as accounting for this difference.

Our study has also shown that limb wounds carried a higher risk of becoming clinically infected compared with similar bite wounds of the head and neck although this is perhaps more a function of their late presentation. Traditionally, infection in all sites was a common long-term complication, and again it was these early works that recommended the use of antibiotics. Due to infection fears, early treatments included radiotherapy, electrocautery of the wound edges and administration of nitric acid to the wound (5).

The second difference between the infected and non-infected groups in this study was the difference in presentation time. The infected group had a longer interval between injury and presentation, which was statistically significant ($p < 0.001$). This is in agreement with earlier literature that early debridement is beneficial to outcome.

Early attempts at isolating infective agents concentrated mainly on *Staphylococcus Aureus*.

Goldstein presented 73 cases in 1978, looking specifically at the microbiology of bite wounds. In this study he demonstrated that there was a wider spectrum of infective agents, including Group A Streptococci, *Eikenella corrodens* and *Bacteroides* species (6).

Most recently, in the mid eighties, Earley presents 41 cases of bites to the head of which only 2.5% became infected – this reflecting modern management of early surgery and antibiotic therapy (7).

With the advent of HIV and Hepatitis B as complications of skin breaching injury, the literature was also searched for documented evidence regarding transmission of the viruses by bite injury. There was little direct evidence in the literature of transmission of HIV through bite wounds with only two reported cases. These suggested transmission only when the assailant's mouth contained blood e.g. recent loss of tooth or gum injury (8). One study showed a number of bites from known HIV positive carriers who failed to transmit the virus (9).

It is perhaps more widely known about the risk of Hepatitis B transmission although the literature is similarly sparse with a small number of references to transmission of the disease through bite wounds (10, 11). Even though it may be small, the risk is still apparent. Despite this, the documentation of Hepatitis B and tetanus status and actions taken regarding the threat of these diseases have been found to be lacking. This has profound medico-legal consequences. Minimal recommendations would be that for every patient presenting with a human bite, not only should the tetanus and Hepatitis B status be documented, but also the appropriate treatment should be instigated.

Despite the cosmetic implication of these injuries, it was seen that only a small per-

centage (13%) underwent some form of subsequent delayed reconstructive surgery. The remainder underwent minor surgical procedures at the weekend with consequent impact on delay in theatre time at a time when minimal staffing is in operation. These injuries are occurring in the young, single male population and as a result, the impact for long-term physical and psychological problems is considerable. It has also been shown that the majority of these disfiguring wounds are being inflicted on the face, particularly the left ear. Complete avulsion or loss of tissue is most common.

Human bite injuries are a common cause for the young to seek medical attention. It has been shown that there is an overwhelming association between alcohol intake and these injuries, and they occur predominantly at the weekend.

Alcohol plays a major role in violent crime and public disorder. It has been shown that alcohol is associated with violent crime at a higher level than non-violent crime. Most incidents involve drinking by the offender, the victim, or both (12). Alcohol related violence has been associated with the "night time economy" of town and city centres. This represents bars and night clubs as well as the fast food outlets and taxi ranks providing for the clientele of the aforementioned establishments (13). It has been shown that people that visit these establishments are more likely to fall victim to violent crime than those who do not (14).

The timing of violent assault, and in particular assault involving facial wounds, coincides with the closing times of bars and nightclubs (15). The peak times for attendance at Accident and Emergency Departments with facial assault injuries is between 9pm and 3am with the busiest times not surprisingly occurring at the weekend (16).

Binge drinking (being very drunk at least once per month) in particular has been implicated in the rise in violent crime amongst young adults. It has been statistically proven that there is a link between heavy sessional drinking and crime against the person in the male 18-24 year age group. The risk of being involved in, and being injured as a result of violent assault increases dramatically, when more than ten units of alcohol are drunk in one session (17). Binge drinkers are four times more likely to commit a violent act whilst drinking than regular drinkers (those drinking frequently but rarely becoming intoxicated) and are five times more likely to be involved in a fight in a public place than regular drinkers (18). This relationship overall is stronger amongst males compared to females of the same age group. Of interest it has been reported that there is a link between age of onset of drinking behaviour and later violent aggression when drunk. The earlier the age of onset of

alcohol consumption, the more likely that the individual will be engaged in alcohol related violence in later life (19).

There is also evidence of synergism between low intelligence levels and alcohol induced violence (20).

In conclusion, with an increase in weekend binge drinking and the associated violent assaults inherent with this pattern of behaviour, the human bite is an injury that will be seen regularly by clinicians involved in trauma. There is a considerable impact on reconstructive surgical units with the numbers attending primarily at times of minimal staffing and high non attendance at follow up. This study provides an insight into the demographics, presentation and management of these disfiguring injuries.

References

1. Larkin DM, Donohue WB. Treatment of human bites of the lip. *Journal of Oral Surgery* 1958; **16**:236-237.
2. Lowry TM. The treatment of human bites. *Annals of Surgery* 1936; **104**:1103-1105.
3. Boland FK. Morsus Humanus – sixty cases of human bites in Negroes. *Journal of the American Medical Association* 1941; **116**:127-130.
4. Crikelair JF, Bates GS. Human bites of the head and neck. *American Journal of Surgery* 1950; **80**:645-648.
5. Bates W. Electrocauterization in the treatment of human bites. *Annals of Surgery* 1931; **93**:641-645.
6. Goldstein EJC, Citron DM, Wield B, Blachman U, Sutter V, Miller T, Finegold S. Bacteriology of Human and Animal Bite Wounds. *Journal of Clinical Microbiology* 1978; **8**(6):667-672.
7. Earley MJ, Bardsley AF. Human bites: a review. *British Journal of Plastic Surgery* 1984; **37**:458-462.
8. [No authors listed] HIV transmission through biting. *AIDS Policy Law* 1996; **11**(10):5.
9. Tsoukas CM, Hadjis T, Shuster J, Theberge L, Feorino P, O'Shaughnessey M. Lack of transmission of HIV through human bites and scratches. *Journal of Acquired Immune Deficiency Syndrome* 1988; **1**(5):505-507.
10. Hamilton JD, Larke B, Qizilbash A. Transmission of Hepatitis B by a human bite: an occupational hazard. *Canadian Medical Association Journal* 1976; **115**(5):439-440.
11. Cancio-Beko TP *et al.* An institutional outbreak of Hepatitis B relating to a human biting carrier. *Journal of Infectious Diseases* 1982; **146**(5):652-656.
12. Murdoch D, Pihl RO, Ross D. Alcohol and crimes of violence: present issues. *Int J Addict* 1990; **25**(9):1065-81.
13. Tierney J, Hobbs D. Alcohol related Crime and Disorder Data: Guidance for Local partnerships. Home Office Online Research Report 2003; London: Home Office.
14. Povey D, Allen J. Violent crime in England and Wales. Crime in England and Wales 2002/2003. Home Office Statistical Bulletin. 2003; London: Home Office.
15. Hope T. Liquor Licensing and crime prevention. Home Office Research Bulletin No.20. London: Home Office.
16. Hutchison IL, Magennis P, Shepherd JP, Brown AE. The BAOMS United Kingdom Survey of Facial injuries part 1: aetiology and the association with alcohol consumption. *British Journal of Oral and Maxillofacial Surgery* 1998; **36**:3-13.
17. Shepherd J, Brickley M. The relationship between alcohol intoxication, stressors and injury in urban violence. *British Journal of Criminology*. **36**(4):546-566.
18. Richardson A, Budd T. Alcohol, Crime and Disorder: A study of young adults. Home Office Research Study No. 263. London: Home Office.
19. Hingson R, Heeren T, Zakocs R. Age of drinking onset and involvement in physical fights after drinking. *Paediatrics* 2001; **108**(4):872-7.
20. Welte JW, Wiczorek WF. Alcohol, intelligence, and violent crime in young males. *Journal of Substance Abuse* 1998; **10**(3):309-319.