Hand Trauma Pitfalls: A Retrospective Study of Fight Bites

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Abstract
Clench fist or fight bite injuries are associated with some of the worst types of infective complications but their mechanism is often poorly understood. In a retrospective case series, 34 patients seen between 1998 and 2004 presented to a local hand surgery unit with confirmed human bite hand injuries. Seventy-six percent presented with infective complications with a mean delay in presentation of 4 days. Eighty percent of patients were clench fist injuries (CFI) (open joints in 59% and tendon injuries in 63%). Using an aggressive treatment policy including early surgical and antibiotic intervention, most patients achieved good results functionally (full range of movement was achieved in 83% of those with CFI which completed follow-up (44%)). High rates of non-compliance and incomplete follow-up was noted. Major long-term complications including limited range of movement and osteomyelitis was low and suggests the policy of prompt and comprehensive surgical and medical intervention is the optimal treatment option. A brief but in-depth discussion of the specific anatomical pitfalls is included.

Key Words
Fight bites · Punch bites · Clench fist injury · Human bites · Chondral divot fractures

Introduction
Human bites are common injuries seen in Accident and Emergency Departments but require special consideration. Presenting in two ways: either as a direct bite usually confined to the limbs, head and neck regions e.g., pinna, or as a result of striking another person in the teeth with a closed fist. The latter is known as a ‘fight bite’ or clench fist injury (CFI). Of the two, fight bites pose a greater problem for the attending physician.

The fight bite often involves deep structures besides the obvious skin laceration, including the metacarpophalangeal joints (MCPJ). The initial trauma may cause fractures, articular cartilage, extensor tendon and ligament damage but it is the ensuing infection (up to 50% [1]) that is responsible for the worse outcomes seen. Infection is typically aggressive with rapid soft tissue destruction and if left unchecked or worse still, undetected by the unwary physician, culminates in disastrous consequences for the patient.

The aim of the present study was to ascertain the success of current treatment practices and identify the potential pitfalls when treating injuries to the hand caused by human bites. We present our findings from a regional hand unit including a pictorial of fight bite mechanisms and a brief look at the current literature.

Patients and Methods
All patients seen in the emergency department presenting with hand injuries between the years 1998 and 2004 were included in the initial search. Examination
of individual medical records identified 34 patients with definite human bite injuries. Only those patients with complete medical records were included in the final study.

Results
Presentation
Thirty-four patients were included in the final analysis. All presented with hand injuries related to human teeth. Most were young patients (age: 19–38 years; mean 28 years), adult males (87%) and predominantly of lower social class (SC) (11% SC IV, 68% SC V), with social class being a socio-economic classification based upon occupation/employment status (higher SC equates roughly with better employment status) [2]. In this series, most patients were Caucasian (71%), and the rest of Asian (14.5%) or Afro-Caribbean descent (14.5%).

Of the total injuries, 29 involved the right hand (85%) and 5 involved the left (15%). The dominant side was involved in 94%. All cases except 2 were a result of violent intent: 1 case resulted from sexual activity (occlusional) and 1 case resulted from a rugby game collision (accidental CFI). The influence of alcohol was prevalent (92%) with 3 patients (8%) admitting to illicit drug use. The distribution of the injuries is shown in figure 1.

Of the 34 patients, 27 (79%) suffered from CFI, all involving the dominant hand. The injuries were all situated over the MCPJ, with the 2nd, 3rd and 4th MCPJ most commonly involved (Figure 1). The remaining 7 patients (21%) had occlusional bite injuries. Their pattern of injury was more varied, with sites other than over the MCPJ (Figure 1).

Patients presented anywhere from 5 h to 21 days (average: 4 days) from the time of initial injury, usually the wound had become very inflamed (75%), with other signs of infection including pus and foul smell. Twenty patients presented at 2 days or less, whereas 14 presented after 2 days. 19/27 of CFI cases presented at 2 days or sooner (71%). Only four patients had already commenced on antibiotics (penicillin) at presentation, in all cases less than 48 h. All patients received initial treatment in the form of exploration and irrigation with saline and tetanus prophylaxis. The predominant antibiotic regimes were either penicillin, flucloxacillin and metronidazole, or amoxillin/clavulanic acid (Augmentin®) and metronidazole. In two patients, the regime was changed to gentamicin and ticarcillin/clavulanate.

Radiographic Findings
Thirty patients (88%) had radiographic investigations. Of these, six patients (20%) had radiological abnormalities other than soft tissue swelling. These included 2 films with metacarpal fractures (CFI; non-articular fractures), 1 film with a distal phalanx fracture (occlusive) and 3 demonstrating chip fragments off the metacarpal heads (CFI). All cases with fractures presented early at 2 days or earlier. No films demonstrated septic arthritis.

Microbiological Analysis
Twenty-seven culture specimens were sent for microbiological culture and sensitivity testing. In the remaining seven cases, the information was lacking. Of those tested, six showed nil growth whilst four cultured two organisms and one cultured three organisms. The commonest organisms isolated were Gram +ve *Staphylococcus aureus* (15%) and *Streptococcus* (52%) species. There was nil growth of *Eikenella corrodens*, despite specific attempts to do so. Summary of findings is shown in table 1.

Operative Findings
33/34 patients had surgery: including all 27 CFI patients and 6 occlusional bite patients. Average injury to surgery time was 4.37 days, largely due to a delay in presentation. All operations included a preliminary detailed exploration, debridement of contaminated and necrotic tissues, extensive lavage and repair of...