ABSTRACT
We report a case of a human bite that was initially inadequately treated and progressed to chronic osteomyelitis, finally resulting in digital amputation. Human bites are seemingly innocuous, but if neglected, may lead to subsequent infection and morbidity. Persistence of symptoms should alert the practitioner to the possibility of infection extending to the soft tissue or bone. Bacteriological studies commonly yield mixed aerobic and anaerobic flora. Early debridement and antibiotic treatment may prevent development of severe soft tissue or bone infection.

Key Words:
human bite, osteomyelitis, amputation

INTRODUCTION
Human bite injuries are common in medical practice. The human oral cavity contains a high concentration of microorganisms. Human bite injuries that appear deceptively innocent can lead to significant morbidity if initial management is inadequate. We suggest an initial management protocol for all human bite wounds using the “ODD BITES” mnemonic which includes Open treatment; Debridement; Drugs (antibiotics); Blood work; Irrigation; Tetanus prophylaxis; Exploration and Swabs. This helps to avoid a devastating outcome such as the one seen in our presenting case.

CASE REPORT
A 41-year-old lady presented to our orthopaedic team with a red, swollen, right middle finger, which was tender and discharging pus. She was bitten by a man during an alleged robbery one month prior and received outpatient treatment from a general practitioner. The wound was dressed superficially; no debridement was performed and she was prescribed a short course of oral antibiotics. The patient continued to experience dull aching pain over the wound for the next few weeks. A swelling developed on her finger and began discharging pus two weeks after the injury. The patient did not have diabetes mellitus or any history suggestive of immunosuppression. On examination, the right middle finger was grossly swollen and erythematous. There was purulent discharge on the radial and ulnar aspects of the finger (Figure 1). Active and passive range of motion of the proximal interphalangeal joint was grossly limited by pain and swelling. Sensation of the finger was intact. There were no signs of flexor tenosynovitis.

Laboratory analyses revealed an elevated total white cell count with neutrophilic predominance. Radiographic imaging of the right hand showed lytic areas surrounded by areas of sclerotic bone and a sequestrum (Figure 2) on the middle finger. In view of the presenting complaint and radiograph findings, a diagnosis of chronic osteomyelitis was made.

Two options were discussed with the patient; a ray amputation, or debridement followed by intravenous antibiotics. She opted for a ray amputation of the affected digit. The patient was given intravenous cefuroxime for three days followed by three weeks of oral cefuroxime. Tissue and bone cultures grew *Staphylococcus aureus*. She was later seen as an outpatient and the wound was healing well.

DISCUSSION
Human bite injuries occur most commonly on the arms. Two common mechanisms of injury are true bite injury (commonly occurs at the tips of the fingers) and clenched fist injuries. True bite injuries tend to be more superficial and less serious than clenched fist injuries. Clenched fist injuries occur from striking a fist into another person’s mouth, and tend to be deeper due to the considerable force of impact. These deeper injuries tend to result in more complications such as metacarpal fractures and tendon lacerations.

The microbiology of a human bite varies with the normal flora of the oral cavity. A majority of human bite wounds contain a mixture of organisms. The oral cavity harbours more than 300 different bacterial species with concentrations of bacteria ranging from 108 colony forming unit/ml (CFU/ml) in saliva, to 1011 CFU/ml on tooth surfaces. The most common bacteria cultured from bite wounds are...
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Streptococcus sp., Staphylococcal epidermis and penicillinase producing Staphylococcus aureus. Anaerobes, mostly Bacteroides sp. are also commonly involved.

Superficial wound dressing and oral antibiotics are inadequate for the management of human bite wounds. This case illustrates how inadequate management of human bites at presentation could lead to future complications and morbidity. Patients with bite injuries should be referred to the hospital for early inpatient wound debridement, intravenous antibiotics, and appropriate wound care. The principles of treatment can be remembered with the mnemonic 'ODD BITE S': Open treatment; Debridement; Drugs (antibiotics); Blood work; Irrigation; Tetanus prophylaxis; Exploration; Swabs. Wound swabs should be taken immediately for microbiological culture and sensitivity tests. The wound should be explored, irrigated with copious amounts of normal saline and surgically debrided. Intravenous antibiotics and tetanus prophylaxis should be given to all patients. Wounds should not be sutured but splinted and allowed to heal by secondary intention. After the infection has cleared, physiotherapy and occupational therapy will help improve functional outcomes.

Outpatient management may be considered for uncomplicated wounds only after the wound has been adequately cleaned and debrided. Antibiotic therapy should be given to all patients with bite wounds penetrating deeper than the epidermal layer and/or wounds older than 12 hours. A broad spectrum antibiotic such as a cephalosporin is an appropriate choice. Most patients would require at least one week of antibiotics.

Bites involving other areas of the body and those that only penetrate the dermis are considered to be low risk superficial human bites. Low risk superficial human bite wounds have similar outcomes when treated with or without antibiotic prophylaxis. Persistence of pain, loss of function and erythema should alert all medical practitioners of possible complication. Proper management of bite wounds at presentation is important to prevent future morbidity. Early wound debridement, intravenous antibiotics, proper wound care and follow up should be administered to all patients who present with bite injuries.

REFERENCES


Fig. 1: Photograph of the right hand showing a swollen middle finger and purulent discharge on the radial and ulnar aspect from the bite marks.

Fig. 2: Radiograph of the right hand anteroposterior and lateral view showing features suggestive of chronic osteomyelitis.