

Human Bites in Adults: A Descriptive Analysis

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Abstract In the West African sub-region, human bites are more common than animal bites because they keep a fewer number of pets than the Caucasians. There is a rising incidence and experts must be on the-know. **Objective:** The study is to describe the characteristics of human bites and their treatment in an adult population including infection, medical specialties, rates of admission and need for surgery. **Patients and Method:** A prospective study of 17 patients presented with human bites to the Emergency Department of University Caliber Teaching Hospital between January, 2014 and December, 2017 were included in the study. Details related to demographics, complications, consultations, and treatment were extracted from the patients' records and oral interview. All cases of human bites without skin breach and those of animals were excluded. **Results:** A descriptive analysis of 17 patients who had human bites, out of which 12 of them who had open wounds were recruited into the study. Five of them were excluded, representing 29.4% who had no open injury and were treated conservatively. The male female ratio was 1.1:1 and age ranged from 19 to 48years, with a mean value of 31years \pm 3years. The ear was the most frequently involved site followed by the nose and lip while the least site was the hands. Most wounds were avulsion injuries and required delayed primary closure after debridement and wound dressings. Minority of the patients (n=4, 33.3%) presented within 24hrs post injury while most of the patients (n=8, 66.7%) were admitted. They were given tetanus prophylaxis and antibiotics because they were considered to be contaminated wounds with positive wound swab culture and sensitivity results. A good number had surgery, n=6(50.0%). Five (41.7%) patients developed wound infection, 2(16.7%) had stiffness of interphalangeal joints and 3(25.0%) patients had scarring of the ear and the cheek. The plastic surgeons and nursing staff were highly involved in the management. **Conclusion:** Most human bites with avulsion injuries of the face were relatively common more than hand bites in our setting probably due to the fewer number of pets the Africans keep. Infection rate was high because of pre-hospital interventions and late presentation. Reconstructive surgery was common because of the avulsion injuries of the face with loss of tissues. Therefore the emergency physicians should be on the-know for early diagnosis and treatment.

Keywords Human bites, Descriptive analysis, Human saliva, Avulsion injury

1. Introduction

Human bites are injuries where the teeth have broken the skin barrier to external insults such as pathogens. Human bites could be classified as penetrating and non penetrating injuries. Non penetrating bites were seen as minimal injuries and carried minimal infective danger. [1] Conlon [2] pointed out that human bites are the third leading cause of all bites seen in hospital emergency department after dog and cat bites. Human bites can occur in a range of settings, especially in care settings for children, people with learning disabilities and during fight. Bites are commonly reported on the hands and fingers in the literature. [3, 4] Human bites are contaminated by pathogens even though there is no clinical sign of infection. Approximately 10-15% of human bites will

become infected. [2] Bite wounds can take a number of forms such as lacerations, puncture wounds, crush, degloving and avulsion injuries. [4]

Common causes of human bites include violent behavior often with alcohol, domestic violence and child abuse. Rough play in day care centers, sporting accidents, nail biting, seizure related tongue injury, aggressive sexual play or assault, occupational injury to workers in the dental field and self-inflicted wounds in those emotionally or mentally unstable. [5, 6] Human bites are classified as significant if there is skin breach or insignificant if the skin remains unbroken. Both conservative and surgical treatment has been recommended. The study was intended to descriptively analyze human bites in adults that presented to the facility in terms of demographics, sites, infection rate, medical specialties and need for surgery.

2. Patients and Method

A prospective study of human bites that presented to the Accident and Emergency Department of University of

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Calabar Teaching Hospital between January, 2014 and December, 2017. Details related to demographics, consultation, complications and treatment were extracted from medical records and oral interview. A thorough examination of the bite wound was performed under good lighting. The wounds were irrigated to enhance the examination. Wound examination and documentation included the extent of damage to the soft tissue, depth of the bite, involvement of tendons in the hand injury, presence of infection or foreign bodies such as fragment of the teeth, history of time of injury, mechanism of injury, allergy status, time of last tetanus immunization, first aid treatment and any known medical illness in the assailant who bit the patient were obtained. All patients had wound swab for culture, microscopy and sensitivity. Radiographs must be obtained in all clenched fist injuries and penetrating scalp wounds to rule out fractures, presence of foreign bodies or teeth fragments in the wound or in late cases, osteomyelitis. The first aider or attending physician must wear gloves where there was significant injury with bleeding. Most patients sought some form of self-treatment or patent medicine vendor attention before presentation in the hospital. The patient's wound had to be irrigated with copious saline or under running water or by using saline in a 10ml syringe to provide high-pressure jet that served to reduce the bacterial inoculum and debride the wound. Debridement of necrotic or devitalized tissue should be done minimally to avert the problem of wound closure. Tetanus prophylaxis was recommended. The limbs with bite wounds should be elevated. Infected wounds should be cultured and the swab taken from deep within the wound and full blood count were done.

Admission criteria were patients with systemic manifestations of infection such as fever, chills and elevated white blood count; those who fail to improve on initial outpatient treatment; those who fail to improve on initial emergency ward observation, those with infected wounds and those with a high likelihood of non-compliance, such as the alcoholic and mentally handicapped. The patients that had avulsion injuries that required surgical reconstruction were also admitted. If any part of the body had been bitten off, it should have been washed and stored in a plastic bag wrapped in clean tissue surrounded by ice which was transported to the hospital along with the injured patient where an assessment could be made about its use as a graft or re-implantation. Various reconstructive options such as delayed primary wound closure, healing by secondary intention and flap surgeries were used for wound closure. The study was to describe the characteristics of human bites and their treatment in an adult population including infection, medical specialties, rates of admission and need for surgery.

3. Results

Twelve patients were recruited into the study out of seventeen patients that were seen. Five of them were excluded because there was no open wound, representing

29.4%. There were cases of animal bites, of which dog bite was 7 and cat bite one which were also excluded. The male and female ratio was 1.1:1 and age ranged from 19 to 48 years, with a mean value of 31 ± 3 years. The ear was the most commonly affected site $n=4$ (33.3%), followed by the nose $n=3$ (25.0%) and lip $n=3$ (25.0%) while the least site was the hand, $n=2$ (16.7%). Lower lip bites are shown in pictures 1 and 2. Most wounds were avulsion injuries and required delayed primary closure after initial debridement and wound dressings. Wound swab microscopy, culture and sensitivity yielded staphylococcus aureus, streptococcus viridians and Eikenella corrodens, Bacteriodes and other anaerobes which were sensitive to ceftriaxone, augmentin, doxycycline, cotrimoxazole, penicillin and metronidazole. They were given tetanus prophylaxis and antibiotics because they were contaminated wounds with positive culture results. A good number ($n=17$, 36.2%) had reconstructive surgery because of soft tissue loss. The complications were wound infection 5 (17.2%), stiffness of interphalangeal joints 2 (6.9%) and scarring of the ear and the cheek 3 (10.3%). The admission rate was 75% while duration on admission was 4 weeks. The plastic surgeons and nursing staff were highly involved in the management. Convenience sampling as well as descriptive statistical analysis with mean, frequency, count and percentage was used. Data were exported to a Microsoft Excel spreadsheet and then imported into SPSS version 7 for analysis.



Figure 1. A 49- year-old man with bite of the lower lip inflicted by a neighbor following a quarrel



Figure 2. A 26- year-old lady who sustained a lower lip bite following a fight with her friend

4. Discussion

Human bites were frequently seen in the Accident and Emergency Department of the hospital. They are particularly notorious due to the polymicrobial nature of human saliva inoculated in the wound and the risk they pose for transmission of infectious disease. [7] On assessing the patients, most patients had their injuries on the face (86.2%) while the hand had 13.8% in the study. Olatain et al [8], which was an African study also showed that the common site was the face in their series.

Literature has documented that the common site was the hand [4, 6] which contradicted our findings which had been on the face. However, the purpose and intent of the attacker or assailant may be different in any given location. Here, among our sample population, the bite was aimed at the face with the intent of making a permanent and conspicuous disfigurement on his/her victim. The male assailants were slightly more than their female counterparts. The ear and the nose are prominent parts that were commonly bitten and avulsed. Adolescents typically have closed fist injuries where the teeth have scratched the knuckles which occurred during their violent play or fight. These often present as small lacerations particularly over the third and fourth metacarpophalangeal joints or the proximal interphalangeal joints of the dominant hand which were sustained during fight.

Human bites were contaminated by pathogens even though there was no clinical sign of infection. Depending on the nature and severity of the bite, there was potential for transmission of pathogens and blood-borne viruses which had been reported in literature [4, 3], the risk is thought to be extremely low [4], depending on the blood-borne virus status of the injured person and the biter, and whether bleeding was present during the biting incident. The injured person was at risk of bacterial infection and both the injured person and the assailant were at risk of blood-borne virus infection. The risk of bacterial infection was greater than that of blood-borne virus. It could be caused by numerous bacteria commensals of the mouth and by inoculation of bacteria colonizing the injured person's skin as the attacker's teeth pierced the skin. [6, 9] Human saliva was known to contain as many as 50 species of bacteria with almost 10^8 microbes/ml [5]. A study conducted by Brook [7] among paediatric age group revealed a total of 97 isolates from human bites and 59 isolates from animal bites. Eighteen beta-lactamase producing organisms were isolated in 16 wounds. This study demonstrated the polymicrobial aerobic and anaerobic nature of human and animal bite wounds. The rate of wound infection secondary to human bites was estimated to be about 10% [6] while our study showed 17.2%. If a bite wound became infected, the longer it remains untreated the greater the risk of severe local and systemic complications, thus early debridement and copious irrigation is the goal standard. In the study, the wound swab microscopy, culture and sensitivity yielded growth of bacteria and sensitivity similar

to some studies. [5, 6] Human bites differ from animal bites by higher prevalence of staphylococcus aureus and Eikenella corrodens. [10] The simultaneous presence of Eikenella corrodens and Veillonella parvula [9, 11] in bite wound was almost always diagnostic of human bite. The patients were most often treated with a combination of a beta-lactamase antibiotics and beta-lactamase inhibitor, which on the basis of the microbiologic findings was appropriate therapy. [12]

The risk of tetanus infection from human bite was very low [13, 14] and in most cases tetanus prophylaxis was not required. The bite itself did not usually introduce clostridium tetani into the wound but the wound in the skin which came from punctured wound enhance the growth of anaerobes such as Clostridium tetani. Therefore the addition of tetanus prophylaxis, gentamycin and metronidazole helped to prevent or treat these anaerobic infections.

The complications of human bite were wound infection [9], stiffness of the finger joints and scarring of the bite sites. Post bite tetanus infection was not encountered in the study. Jaindi et al [4] stated that complications of bite wound infection are subcutaneous abscess, osteomyelitis, septic arthritis, tendonitis and bacteraemia while streptococcus toxic shock syndrome and cellulitis were also seen. Kirkpatrick & Sikora [6, 15] had reported necrotizing fasciitis resulting from human bites.

Surgery played important role in the management of human bites. [16] Surgical management of human bites ranged from simple surgical exploration of the wound to reconstruction of complex structures [17]. Indications for surgical intervention were avulsion injury to the ear, lip, nose; severe soft tissue infection; abscess; underlying fractures and tendon rupture. [18] A decision to surgically close a human bite wound was dependent on many factors. Human bites were contaminated wounds and were closed by delay primary closure or healing by secondary intention. [19] A prospective cohort study by Cohen et al [20] demonstrated that primary closure of bite wounds was associated with higher rate of infection [6%] as compared with other sutured wounds in the same institution [3.4%]. According to Stefanopoulos & Tarantzopoulou [21] primary surgical repair is the treatment of choice for most clinically uninfected facial bite wounds whereas delayed closure should be reserved for certain high risk or already infected wounds, avulsion injuries with significant tissue loss represent the most difficult cases for definitive management and are also those most likely to require hospitalization.

Although primary repair of bite wounds was associated with higher rates of infection, it was still indicated for facial injuries where cosmetic outcome was important. [22] The bites of the face were associated with more bleeding and they were at a low risk of infection following primary closure. Thus, primary closure of some uninfected wounds of the face was indicated, whereas debridement and delayed primary closure may be performed in certain high-risk or already infected wounds. [23] Surgical closure of non-facial wounds, especially deep punctures, wounds more than 24hours old,

bites of the hand and clinically infected wounds were not indicated due to an increased rate of infection. [24]

If hand wounds were infected, physical therapy was initiated 3 to 5 days after the resolution of infection to regain function of the affected hand. [25] Bulky hand dressing and intravenous antibiotics to cover both gram-positive and gram-negative organisms were suggested in treatment of the patients [26] Proper instructions on discharge and assuring follow-up were as important as the initial care. Patient must be educated on wound care and signs of infection and asked to visit the clinic immediately in the event of developing infection. [27]

5. Conclusions

Human bites were potentially dangerous wounds and constituted a significant cause of morbidity. A hand surgeon or a trained emergency physician should evaluate and properly manage human bites to avoid complications. The role of early treatment, appropriate medical prophylaxis and surgical evaluation were important to achieving desired treatment outcomes. Due to the polymicrobial nature of bite wounds, the managing physician should be aware of the common pathogens involved and their susceptibility to commonly used antibiotics.

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