

Facial human bites. Vision on STMMs in Africa

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ABSTRACT:

Objectives: Human bites of the face are a frequent and serious health issue as they often compromise patients function and aesthetics as well as lead to further complications. The aim of the study is to review human bites of the face referred to our team during 112 short-term medical missions (STMMs) in Sub-Saharan Africa over the past 20 years and to discuss the epidemiology, appearance, management and outcome, including the most common complications.

Methods: A retrospective medical documentation review was carried out examining all human bites of the face operated by our team during 112 STMMs from 2000 to 2019 in different countries of Sub-Saharan Africa.

Results: Out of about 5500 patients medical charts 51 patients were selected due to history of human bite. Patients' age range was 15–65 years, female to male ratio was 1, 55:1, the most often involved parts were: lips, ear and nose. Various surgical procedures were carried out including local flaps and free grafts. Infection and graft necrosis were the most common reported complication (n = 4; 9.3%).

Conclusion: Human bites injuries are a serious health problem in some African populations because of their frequency and possible severity. The treatment is particularly challenging due to their potential to cause local infections, the risk they pose for transmission of systemic diseases as well as their demanding surgical management.

KEYWORDS:

Africa, face, human bites, management, short-term medical missions

ABBREVIATIONS

HBV – hepatitis B virus

HCV – hepatitis C virus

HIV – human immunodeficiency virus

HIV-1 – human immunodeficiency virus 1

STMMs – short-term medical missions

INTRODUCTION

At times when emotions run high, it happens that people use their teeth as a weapon to attack or defend. The size and severity of the injuries vary, ranging from small cuts to total avulsion and tissue loss. Human bite injuries are a serious health problem because of their frequency and possible severity, the fact that they are common causes of suffering and pain, and also that they might be a cause of disability or even death. They are particularly challenging due to their potential to cause local infections, the risk they pose for transmission of systemic diseases as well as their demanding surgical management.

Human bite injuries and the associated complications are common issue in the developing countries in Africa. Bite wounds are frequently located on the face. Because of their location, they often compromise function and aesthetics, leading to social and psychological consequences. The sociocultural system appear to

affect the majority of this type of injury. The causes vary and include, among others, jealousy, workplace conflicts and matrimonial disputes in mono or polygamous marriages. These factors seems to be amplified by social tension and competition caused by overcrowding and difficult economic conditions [1].

In last 20 years we have organized 112 STMMs, focusing on head and neck surgery and facial plastic surgery in different countries in Africa. In this paper we report the presentation, management and surgical outcomes of patients operated on for human bites of the face by our team during the short term medical missions in Africa.

MATERIAL AND METHODS

A retrospective medical documentation review was carried out examining all head and neck human bites (adult and pediatric) over the past 20 years during 112 STMMs in Senegal, Sudan, Ethiopia, Ghana, Kenya, Gabon, Uganda, Cameroon, Democratic Republic of Congo, Cabo Verde, Gambia and Burundi.

Patients

Our study included all the patients with facial human bites injuries referred to our team during 112 STMMs from 2000 to 2019. All the patients were treated by the same chief surgeon specialized in head and neck surgery as well as facial plastic surgery.



Fig. 1. Partial amputation of auricle reconstructed with local flaps and cartilage graft.



Fig. 2. Partial amputation of nose reconstructed with rotation flap.



Fig. 3. Avulsion of part of the upper lip reconstructed with rotation flap.



Fig. 4. Human bite injury of the eyelid reconstructed with free skin graft.

Patients referred due to wounds that healed with complications which compromised function or aesthetics (e.g. keloid formation) were excluded from the study.

Treatment

In all the cases the initial treatment was the same: extensive wound irrigation with saline followed by careful and conservative debridement. Medical treatment included tetanus prophylaxis as all the human bite injuries were treated as tetanus-prone wounds. Patients with unknown or <3 doses of tetanus immunization were given a tetanus vaccination and tetanus immunoglobulin. Also in patients with 3 or more doses of the tetanus vaccine with the last dose more than 5 years prior, a tetanus vaccination was given. Antibiotic prophylaxis was administered to all the patients.

Wounds with no evident clinical signs of infection were surgically managed through primary closure. In the wounds with evidence of infection, the closure was postponed and a broad-spectrum antibiotic was administered. The signs of infection included: purulent drainage, increasing pain, redness and swelling of wounded area.

Surgical treatment varied depended on location and the severity of the injury.

Ear injuries: Avulsion of the skin alone with exposed areas of cartilage with untouched perichondrium were covered by vascularized tissue using full-thickness skin grafts. Partial avulsions of ear on a pedicle were simple reattached as cutaneous blood flow to the ear is often sufficient even in small pedicles. In the case of total amputation of large segments of auricle, ear reconstruction was performed (Fig. 1.).

Nasal injuries: Through-and-through lacerations were sutured in layers. Exposed cartilage were covered by local flaps or skin grafts. Complete amputations with significant loss of cartilage were repaired with a combination of local flaps and cartilage grafts (Fig. 2.).

Lip, cheek and eyelids injuries: laceration wounds were sutured in layers. Avulsions of large parts of tissue were reconstructed with local flaps or free skin grafts (Fig. 3., 4.).

Analyses

Demographics, treatment and outcome information was recorded. Facial bite wounds were assigned into 6 groups based on the extent of injury (Tab. I.).

Data obtained was entered into a Microsoft Excel spread sheet and analysed in TIBCO Data Science – Statistica software version 13.3.

RESULTS

A total of 5,500 patients were operated on during the 20 years of surgical otorhinolaryngological STMMs carried out by our team. Two hundred of them had traumatic injuries and fifty one of those injuries were human bite wounds.

The victims' age range was 15 to 65 years, with a mean 32.4 ± 11.5 . Women constituted the majority of patients, with female to male ratio 1.55:1.

Facial injuries in the studied population predominantly involved the lips, followed by ear, nose, chin, cheek and eyelid. Although when the male and female groups were evaluated separately, the places of the most common injuries differed according to gender (Tab. II.).

All wounds assessed involved breach of the integrity of the skin, with tissue loss (complete amputations) reported in 13 cases (25.5%). The remaining injuries were complex lacerations with no avulsion of the tissue (Tab. III.).

Time to initial emergency department presentation is shown in Table 4. Women rarely came to the emergency department in the first hours after the injury, although the relation between gender and time of first intervention (early < 24 h and late > 24 h) was not significant $\chi^2 (1, N = 51) = 2,82; p > 0.05$.

Treatment outcome

Out of fifty one (n = 51) patients referred to the hospitals that hosted us during the missions, forty three (n = 43; 84.3%) were treated primarily on presentation and the eight (n = 8) patients who reported with infection had either delayed surgical closure (n = 5) or healed by secondary intention (n = 3). Thirty nine (n = 39) patients from the group of primary closure recovered without complications and a satisfactory cosmetic result, and four (n = 4) developed an infection and tissue necrosis.

DISCUSSION

In our study we included 51 cases of human bite wounds treated by our team over the 20 years of experience in humanitarian missions. It should be emphasized that this data does not show the actual incidence rate of human bites in the population. These statistics show the number of cases that were presented to our team during STMMs. The duration of our stay in each country was about seven days and we carried out medical missions four to six times a year in different countries. Moreover, due to the nature of our service, we dealt mostly with patients with more severe wounds referred from local emergency departments.

In our study we described more cases of bite injuries in women than in men (60.78% vs 39.22%). This is consistent with the studies from Tanzania [2] and Nigeria [3, 4], which showed that most attackers and victims were females but is inconsistent with results from Ghana [5], where more males than females were involved. Predominance of women can be explained by the fact that females might have preferred to use teeth during fights, as often the fights were related to jealousy. They might have wanted to disfigure their rivals and punish them. Matrimonial conflicts in mono or polygamous marriages, jealousy and unfaithfulness are the important reasons for fights between man and wife or wife and co-wife [2, 4].

The body parts most often involved in the studied population were the lips, followed by the ear, nose, chin, cheek and eyelid. These findings are consistent with other studies which show that lower lip was the most common involved site [2, 3]. In their study Henry et al. [6] found the ear to be the most commonly involved

Tab. I. Classification of facial bite injuries.

TYPE	CLINICAL FINDINGS
1A	Partial skin detachment (pediculated)
1B	Complete skin detachment
2A	Partial skin detachment (pediculated) with cartilage exposure
2B	Complete skin and cartilage detachment
3A	Partial skin detachment (pediculated) with muscle involvement
3B	Complete skin and muscle detachment

Tab. II. Injury sites by sex.

SEX	EAR	LIPS	NOSE	CHIN	CHEEK	EYELID	TOTAL
Male	9	0	4	3	2	2	20
Female	4	20	2	2	2	1	31
Total	13	20	6	5	4	3	51

Tab. III. Number of patients depending on the severity of the injury.

INJURY TYPE	N = MALE (%)	N = FEMALE (%)	N = TOTAL (%)
1a	8 (15.68%)	11 (21.57%)	19 (37.26%)
1b	1 (1.96%)	1 (1.96%)	2 (3.92%)
2a	6 (11.77%)	5 (9.80%)	10 (19.61%)
2b	4 (7.84%)	2 (3.92%)	6 (11.77%)
3a	1 (1.96%)	7 (13.73%)	8 (15.67%)
3b	0 (0%)	5 (9.80%)	5 (9.80%)
Total	20 (39.22%)	31 (60.78%)	51 (100%)

Tab. IV. Time to initial emergency department presentation.

SEX	<12 H	12–24 H	>24 H
Male	4 (7.84%)	5 (9.80%)	11 (21.57%)
Female	2 (3.92%)	5 (9.80%)	24 (47.06%)
Total	6 (11.76%)	10 (19.61%)	35 (68.63%)

site, however, demographic conditions varied considerably (plastic surgery unit in Dublin, Ireland). This can be explained by the fact that these are the most prominent parts of the face and therefore are the easiest for the assailant to reach.

The complications associated with human bites in the facial region include subsequent local infection, and risk of systemic disease transmission and deformities, which can compromise patients' function and aesthetics. A significant late complication, especially in the black African population, is formation of keloids.

Human bites have higher rates of infection than comparable injuries [7]. Human saliva is known to contain 900×10^6 organisms/ml, with over 150 types represented [8]. Other factors that may increase rates of infection are delayed presentation for medical assessment and bites on relatively avascular structures like the ear cartilage.

A multicenter prospective study of 50 patients with infected human bites revealed that *Streptococci*, which form the physiological bacterial flora, were the most frequent pathogens isolated from infected human bites [9]. *S. agalactiae* was the predominant

pathogen, which may be due to its unique ability to cause abscesses [9, 10]. *Staphylococci*, particularly *S. aureus*, and *E. corrodens* were other common aerobic organisms. *E. Corrodens* is an indigenous oral microorganism that normally inhabits dental plaques, and which may be an opportunistic pathogen associated with human bites infections [11]. Therefore, empirical antimicrobial therapy should be directed against *S. anginosus*, *S. aureus*, *E. corrodens*, and oral anaerobic organisms. In antimicrobial susceptibility testing amoxicillin – clavulanic acid and moxifloxacin offer the best in vitro coverage of the pathogenic flora [9].

Delayed presentation (>12 h) to the emergency department is a factor associated with increased risk of infection [6, 12]. The vast majority 88.24% (n = 45) of our patients presented more than 12 hours after injury. These results are consistent with other studies [4, 6]. Late presentation for professional medical help, especially by women, may be associated with shame and a feeling of being stigmatized by the bite.

Another danger associated with human bites is the risk of transmitting systemic infectious diseases. Saliva can contain a range of infectious agents and therefore the possibility exists of its transmission through a bite that breaks the skin.

HCV-RNA and HBV-DNA can both be detected in the saliva of infected patients. This might provide an argument for the possible transmission of HCV and HBV via contaminated saliva through breaks in the skin [13, 14]. Single cases and experimental studies of transmission of viral hepatitis through this route have been reported in the literature [15, 16, 17].

The potential risk of HIV-1 infection following human bite exists, which have been documented in rare case reports [18, 19]. HIV can be present in the saliva, although infrequently and at low levels. The risk of transmission of HIV is considerably greater when there is blood in the mouth of the person doing the biting.

The *Clostridium tetani* has never been reported to be present in human mouth, however the potential danger of acquiring tetanus after human bite has been described in the literature [20, 21]. This is likely due to the fact that the wounds can be invaded secondarily. The bite crushes the tissue and creates the ideal medium for bacteria growth. Thereby, tetanus prophylactic therapy is recommended for all human bite wounds.

Surgical management of human bite wounds of the head and neck remains a controversial area as there is no standardized treatment. The treatment goals are infection prevention and healing with good cosmesis.

Proper surgical toilet with wound irrigation with saline followed by careful debridement remains the main initial treatment [22]. Certainly devitalized tissue should be removed, whereas questionable areas are left intact, because the generous vascular supply of the

face often facilitates survival of such tissue [22]. As a further treatment, some authors suggest delayed surgical closure (>24 h post-injury) to prevent infection [23]; others, in the absence of clinical evidence of infection, propose primary closure as it provides the best cosmetic result and the face is a region where a satisfactory aesthetic outcome is especially important [6, 22]. A fundamental rule for wound closure is that the tissues must be approximated without tension that can result in dehiscence and subsequently lead to infection. Primary closure, facilitated by mobilization of local flaps when there is significant tissue loss, is indicated for most facial bite wounds [22]. There has been publication reporting that locally injected hyaluronidase may help to decrease the edema and increase perfusion, and thus allows for easier tissue manipulation to achieve closure without tension [24].

Avulsive wounds require special management as an acceptable aesthetic result can sometimes only be achieved with reconstructive procedures. Replantation of completely detached parts of the lips or ears with the simple reattachment of the amputated part usually leads to necrosis [25]. Microsurgery techniques can be successful, but, because of their complexity, they are not widely used. Good effects can also be achieved with reconstruction using locoregional flaps (chondrocutaneous flaps, midline forehead flap, nasolabial flaps and skin grafts) in patients with healed wounds [23].

One of the late complications of human bite injuries that should be highlighted, especially in the African population, is the formation of keloids. The clinical spectrum ranges from unattractive scars to large protruding lesions, sometimes associated with contractures and functional impairment. Keloid scars are seen more frequently in people of black African ethnic origin.

Worldwide, the prevalence of keloids varies from 0.9% in the U.K. to 16% in the Democratic Republic of Congo [26]. Among people with keloids, the ear lobe was the single most common site affected by keloids [27]. There are proposed many therapeutic modalities, most having had limited success. Surgical excision is the most common treatment for a significant amount of keloid lesions. However, when used as the solitary form of treatment, it is associated with large recurrence rate. Intralesional corticosteroid injection (triamcinolone acetonide) or pressure therapy following surgical excision has shown promising results, especially in keloids of the ear and earlobe [28].

CONCLUSION

Human bites are relatively common in some undeveloped countries in Africa. Most human bites can be treated by wound debridement and primary closure with no future complications. Some of patients require special surgical management with reconstruction methods. Common early complications include infection and flap necrosis, and a significant late complication is the formation of keloids.

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