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Case Report
Trauma

Facial injuries following hyena attack in rural eastern Ethiopia

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Abstract. Hyenas are effective hunters and will consider humans as potential prey if the need and opportunity arise. This study describes the circumstances of hyena attacks, the patterns of injuries sustained, and reconstruction in a resource-poor setting. As part of a charitable surgical mission to Ethiopia in 2012, 45 patients with facial deformities were reviewed, of whom four were victims of hyena attacks. A semi-structured interview was performed to ascertain the circumstances of the attack and the subsequent consequences. The age of the victims at the time of attack varied from 5 to 50 years. The attacks occurred when the victims were alone and vulnerable and took place in outdoor open spaces, during the evening or at night. The initial lunge was made to the facial area; if the jaws closed on the facial bones they were crushed, but in all cases the soft tissues were grasped and torn from the underlying bone. Reconstruction was dictated by the extent of soft tissue loss but could normally be obtained by use of local or regional flaps. Hyenas have been shown to attack humans in a predictable way and cause injuries that typically involve the soft tissues of the face.

Key words: hyena; animal attacks; facial injuries; facial reconstruction; Africa; Ethiopia.

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Spotted hyenas (*Crocuta crocuta*), hereafter referred to simply as hyenas, are the most common carnivore in Sub-Saharan Africa, with substantial numbers found especially in eastern areas of the continent.[1] Hyenas have adapted to survive in a range of habitats including deserts, woodlands, and mountainous areas, but tend to congregate in greatest abundance near game reserves and areas of human settlement.[8] The two other extant species of the hyena family are the brown hyena (*Hyaena brunnea*), which is found in South Africa, and the striped hyena (*Hyaena hyaena*), which is found in northern Africa and parts of Asia.[3]

Hyenas are large (45–80 kg) predators, distinguished by exceptionally enlarged premolars, robust skulls, and heavily muscled jaws (see Fig. 1).[4] Though historically regarded as pure scavengers, hyenas are in fact effective hunters, with observation studies showing active hunting to account for 60–90% of their food intake.[2,8] Hyenas require 4 kg of meat per day to maintain their condition, but compared to carnivores of a similar size, they do not exhibit a significant preference for prey selection and have been observed eating species ranging from fish to buffalo.[4] Hyenas will adapt their killing method depending on the size of prey, with a disembowelling technique used for larger animals and the tearing away of chunks of flesh from the head and neck region in small to medium sized animals.[8]

The natural environment of hyenas has been altered in Africa by the steady cultivation of land due to population pressure. This tends to destroy the animals' natural habitat, as is the case in Ethiopia where the human population has risen to 90 million alongside an estimated 4000–5000 resident hyenas.[3,9] Hyenas are tolerated by humans throughout East Africa because of their perception as effective scavengers who willingly remove garbage, carrion, and other by-products of

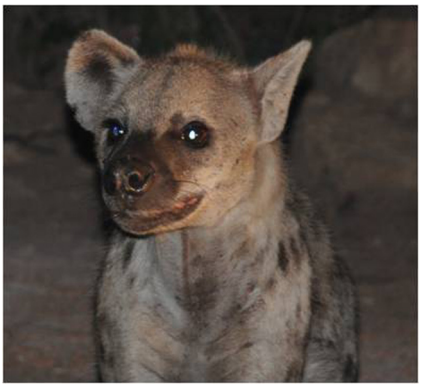

Fig. 1. The spotted hyena (*Crocuta crocuta*) at a feeding ritual in the city of Harar in the east of Ethiopia. The ritual occurred every night at a location nearby the walls of the city and consisted of a group of hyenas being fed meat whilst observed by a group of locals and tourists.

human existence.[17] An example of this can be seen in the eastern city of Harar in eastern Ethiopia, where hyenas are fed in a ritualistic way that plays a significant part in the daily routine of the community.[8] However, this symbiotic relationship is tenuous; hyenas are skilled, unscrupulous, and opportunistic predators who will view humans as potential prey in the face of scarcity.[1,10]

Brief reports of hyenas attacking humans in eastern and southern African countries over the last two centuries can be found.[1,8,10,16] Lacking in the literature to date is a detailed account of how hyenas attack humans, the patterns of injuries sustained, and the reconstructive methods available to a surgeon faced with these injuries.

Methods

Project Harar is a community-based charity that co-ordinates surgical treatment in Ethiopia; in 2012, the charity embarked on a 6-week mission to Addis Ababa. An outreach programme recruited 45 patients from rural regions of eastern Ethiopia with head, neck, and facial pathologies of varying chronicity, severity, and causes. All patients were from low socio-economic backgrounds and were living in areas where transportation constraints and a paucity of secondary and tertiary health systems conferred significant barriers to appropriate healthcare.

In this treatment population, four patients had been the victims of hyena attacks and had significant residual facial deformity. Two had undergone reconstructive surgery on a previous mission.

Using a semi-structured interview, the patients were questioned about the circumstances of their attack, any immediate care they had received, and the social consequences of the attack. Language barriers were mitigated by employing two bilingual interviewers who spoke in Amharic and Oromo. Operations were performed at plastic surgery units in Addis Ababa (Yekatit 12 Hospital and the CURE Hospital) by a multinational team led by Ethiopian plastic surgeons.

Results

The cohort consisted of three males and one female. All four of the patients initially presented to a local hospital for emergency stabilizing treatment. The presentation to the reconstructive surgical team occurred at a mean time of 23 years (range 5–30 years) post injury. A summary of the semi-structured interviews with each patient regarding the circumstances of the attack and the injuries sustained are displayed in Tables 1 and 2, respectively.

Case 1 was a male patient who presented to the reconstructive team aged 11 years, at 6 years after the hyena attack (see Fig. 2). The boy had been attacked aged 5 years by a solitary hyena whilst playing with a group of other children in the evening. The jaws of the hyena had extended across his whole face resulting in loss of the nasal structures, disruption of the left medial canthus, and fractures to the right temporal bone. For reconstruction, the scars around the nose were opened and the displaced nasal bones and canthal ligaments were exposed and sutured back into position. The nose was reconstituted from local soft tissue and the

Table 1. Circumstances surrounding the hyena attacks as determined by semi-structured interviews held with the four patients in this study.

Case	Sex	Age when attacked, years	Situation of attack	Vulnerability	Time of day	Number of hyenas
1	Male	5	Playing with other children in a field	Smallest child in group	Early evening	Solitary
2	Male	7	Playing alone near a field	Alone	Sunset	Solitary
3	Female	50	Walking with a group on a rural road	Slowest runner in group	Late evening	Solitary
4	Male	15	Sleeping alone outside whilst guarding cows	Sleeping alone	Night	Solitary

Table 2. The injuries sustained from a hyena attack and subsequent problems faced by the patients when they presented to the reconstructive surgical team.

Case	Injuries sustained	Age at presentation, years	Physical disability	Psychosocial impact
1	1. Soft tissue lacerations to midface 2. Nasal bone fractures 3. Disruption to left medial canthus	14	1. Facial scarring 2. Epiphora	Subdued mood due to verbal insults from peers
2	1. Degloving of scalp 2. Soft tissue lacerations to midface 3. Disruption of bilateral medial canthus	12	1. Facial scarring 2. Epiphora 3. Dacryoadenitis and chronic canaliculitis	Abstinence from school due to verbal insults from peers
3	1. Right mandibular ramus fracture (non-united) 2. Laceration to lip	55	1. Facial scarring 2. Compromised mastication	Subdued mood due to appearance and eating difficulties
4	1. Loss of nasal bones 2. Disruption of right medial canthus	45	1. Facial scarring 2. Facial pain due to air entering nasal cavity	Unemployed due to appearance