

## CASE REPORT

Michael A. Clark,<sup>1</sup> Ph.D., M.D.; George E. Sandusky,<sup>2</sup> D.V.M., Ph.D.; Dean A. Hawley,<sup>1</sup> M.D.; John E. Pless,<sup>3</sup> M.D.; Patrick M. Fardal,<sup>4</sup> M.D.; and Larry R. Tate,<sup>4</sup> M.D.

### Fatal and Near-Fatal Animal Bite Injuries

---

**REFERENCE:** Clark, M. A., Sandusky, G. E., Hawley, D. A., Pless, J. E., Fardal, P. M., and Tate, L. R., "Fatal and Near-Fatal Animal Bite Injuries," *Journal of Forensic Sciences*, JFSCA, Vol. 36, No. 4, July 1991, pp. 1256–1261.

**ABSTRACT:** Fatal and near-fatal maulings of humans by pit bulls have recently become a topic of major public concern, resulting in the passage of laws in some jurisdictions that make the owner of a pit bull criminally liable for manslaughter if his or her pet causes a human death. The authors recently investigated two cases in which children were fatally injured by pet dogs. In the first case, a 17-day-old girl suffered fatal abdominal injuries when attacked by a pregnant Siberian husky. A 2-year-old girl expired from neck wounds inflicted by a pit bull or a rottweiler or both. Because no expert would testify as to which dog caused the fatal injury, the owner of the animals was not charged under a statute which specified criminality only if a pit bull caused the fatal injury. We also examined a 12-year-old boy who attempted to pet a circus tiger; the animal grabbed his arm with its claws and bit off the arm at the shoulder. The arm could not be reattached, but the child survived. These cases and the differentiation of animal bites from other injuries will be presented.

**KEYWORDS:** pathology and biology, animal bites, injuries, patterned injuries, autopsy

Animal bites have been a major public health problem; approximately 1 to 2 million bites occur annually in the United States, and many bites probably go unreported [1]. There have been a few published case reports focusing on deaths due to dog bites and attacks [2–4]. Many of these vicious attacks were by a single pet dog within the owner's yard or its proximity; the most frequent fatal bite location on the victim was the head and neck region [5]. Three previous studies indicated that the majority of dog bite deaths were among children less than 10 years old [3–5]. One large study found that pit bull breeds were involved in over 40% of all dog bite fatalities and had three times the incidence of bites caused by German shepherd breeds [4]. In addition, from 1979 to 1988 the proportion of deaths caused by pit bull breeds increased by 20% [4].

Presented in part at the 42nd Annual Meeting of the American Academy of Forensic Sciences, Cincinnati, OH, 19–24 Feb. 1990. Received for publication 15 Oct. 1990; revised manuscript received 24 Nov. 1990; accepted for publication 17 Dec. 1990.

<sup>1</sup>Associate professors of pathology, Indiana University School of Medicine, Indianapolis, IN.

<sup>2</sup>Senior research scientist, Lilly Research Laboratories, Greenfield, IN.

<sup>3</sup>Culbertson professor of pathology, Indiana University School of Medicine, Indianapolis, IN.

<sup>4</sup>Chief forensic pathologist and forensic pathologist, respectively, Franklin County Coroner's Office, Columbus, OH.

A report surveying deaths caused by animals in a ten-year period in Finland indicated that the greatest number of deaths was caused by horses (30 cases), followed by cows (18 cases), bulls (11 cases), dogs (2 cases), cats (1 case), and a ram, but none of these deaths were due to animal bites [6]. Dogs have also been responsible for injuries and deaths by causing motor vehicle accidents, most frequently those involving people riding two-wheeled motor vehicles or bicycles [7].

The authors of this paper have recently investigated two cases in which children were fatally injured by pet dogs, as well as that of a boy who was severely injured by a circus tiger.

#### *Case 1*

This 18-day-old female infant was at her grandmother's house and was left briefly unattended on a couch. A pregnant pet Siberian husky attacked the child. The dog was subsequently destroyed by a veterinarian. The child was taken to a major trauma center, where she expired despite a splenectomy and partial hepatectomy. At autopsy, multiple bite wounds were noted on the abdomen, back, and upper thighs (Figs. 1 and 2). Distinctive bite marks diagnostic of canine dentition were present, most prominently on the back (Fig. 3). Death was attributed to hemorrhagic shock.

#### *Case 2*

A 2-year-old female was playing in the yard of an apartment complex where she lived when she was attacked by a rottweiler or a pit bull or both. At autopsy, there were 15 bite wounds noted, with the fatal wound in the left side of the neck (Fig. 4). It could not be determined that the pit bull caused the fatal wound, and, for this reason, the owner of the dogs could not be charged with manslaughter under a very specific local statute.

#### *Case 3*

A 10-year-old boy was visiting a circus in a small farming community when he reached into a tiger's cage to "pet" the animal. The tiger clawed his forearm prior to biting it off

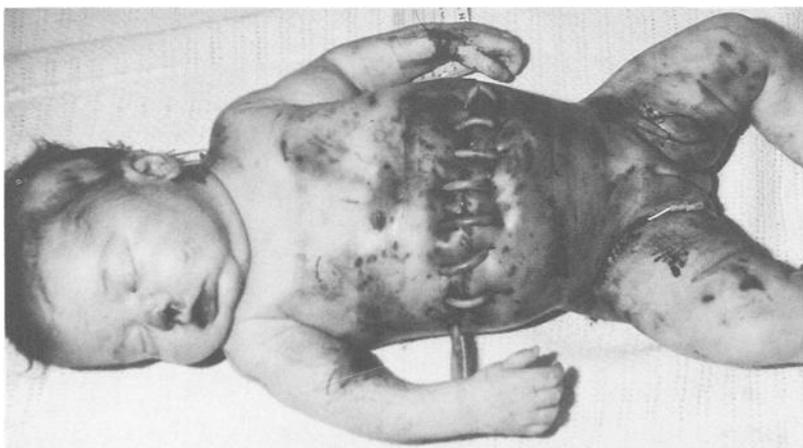


FIG. 1—Anterior surface of the victim in Case 1, showing multiple contused bite marks as well as a sutured laparotomy incision. Because of the victim's small size, these wounds were all caused by multiple bites from one of the dog's dental arches.



FIG. 2—Back of the victim in Case 1, showing multiple distinct bite marks. Again, because of the small size of the victim relative to the size of the dog, these wounds are bite marks from multiple bites of one dental arch.

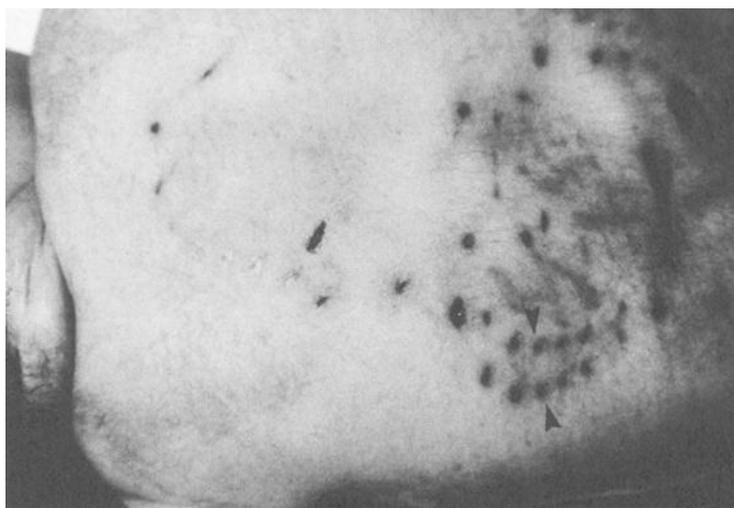


FIG. 3—Close-up of bite marks from Fig. 2, showing two distinctly parallel sets of tooth imprints (arrows), corresponding to two bites from the same dental arch.

near the shoulder. The amputated arm was packed in ice and sent with the patient, but surgeons were unable to reattach the arm. Claw marks are apparent on the forearm of the severed arm (Fig. 5). The severed end of the arm showed primarily shearing and tearing with a comminuted humeral fracture.

### Discussion

The dog attacks that are detailed in this study were similar to previously reported dog attacks in that the victims were young and relatively defenseless, which has been a major



FIG. 4—The victim in Case 2. The fatal wound in the left side of the neck (with suture in place) is illustrated. Note the multiple abraded tooth marks to the right of the fatal wound.



FIG. 5—Dorsolateral view of the upper extremity in Case 3. Note the multiple parallel incised wounds from the animals claws on the hand and forearm.

finding in all earlier studies [2–5]. Children in the 1 to 4-year age range were at greatest risk, but the age of the victims ranged from newborn to 91 years. Other reported common factors included attacks that occurred near or at the owner's residence, and the location of fatal bite wounds was usually in the head and neck region [3,5]. In contrast to overall statistics, none of the dogs in our study had a history of previously attacking humans.

The most recent large study of dog bites found a definite breed predisposition, with the pit bull terrier being responsible for approximately 42% of documented dog-bite-

related fatalities during the past ten years. Stray pit bull terriers accounted for 37% of these deaths [4]. In 1979, about 20% of all fatal dog bites were attributed to pit bull terriers, but the incidence increased to 62% in 1988. This marked increase was determined to be a real one and not a statistical aberration.

In contrast to man, both dogs and cats have asymmetric upper (maxillary) and lower (mandibular) dental arches [8]. Adult dogs have 42 permanent teeth, whereas cats have only 30. Adult dogs have 20 upper teeth, consisting of 6 incisors, 2 canines, 8 premolars, and 4 molars [9]. There are 22 lower teeth, with 6 incisors, 2 canines, 8 premolars, and 6 molars. The canine lower dental arch is narrower and shorter than the upper. Dogs as a rule do not completely chew their food and tend to "bolt it down" [9]. The shape of the dental arches in the dog is breed dependent, which is reflected in the different facial characteristics of the many different breeds of dog. There are natural gaps between the teeth of most breeds, which can be either accentuated or attenuated, depending upon the breed [8]. Some breeds, such as the Jack Russell terrier, have what is termed a "scissors bite." This means that the upper or maxillary canine teeth are distal to the lower (mandibular) canines. This enables an animal to lock his teeth onto prey and exert tremendous force by twisting and tearing. The shape of dog bite wounds will vary considerably, depending upon the size and breed of the dog, as well as whether or not the entirety of the dentition was used in producing the wound. There may be wide gaps between the impressions made by the different teeth, and the dog's poor occlusion and asymmetric dental arches will also be apparent in the wound.

Adult cats have 30 permanent teeth, which are arranged into 16 upper and 14 lower teeth. There are 6 incisors in each dental arch, along with 2 canines and 2 molars. The difference in the arches is that there are 6 upper, but only 4 lower premolars [8]. The feline bite is much shorter and more rounded than that of the dog. The upper teeth of the cat overlap the lower, resulting in an "overbite." In addition to biting, cats tend to claw their prey, which produces parallel incised wounds, as is illustrated in Case 3, as well as in a recently published report [10].

Animal bite injuries and fatalities are increasing in incidence and are yet another patterned injury that should be recognized by forensic pathologists. As was mentioned in the description of Case 2, some jurisdictions specify that criminal charges can be filed against the owner of a pit bull if that animal has caused a fatal injury. We are unaware of any case to date where one dog or cat has been identified as the perpetrator of a particular bite wound to the exclusion of all others, but it is certainly possible that an expert on animal bite wounds could make such a determination.

## References

- [1] Underman, A. E., "Bite Wounds Inflicted by Dogs and Cats," *Veterinary Clinics of North America: Small Animal Practice*, Vol. 17, No. 1, Jan. 1987, pp. 195-207.
- [2] Winkler, W. G., "Human Deaths Induced by Dog Bites, United States, 1974-75," *Public Health Reports*, Vol. 92, No. 5, Oct. 1977, pp. 425-429.
- [3] Pinckney, L. E. and Kennedy, L. A., "Traumatic Deaths from Dog Attacks in the United States," *Pediatrics*, Vol. 69, No. 2, Feb. 1982, pp. 193-196.
- [4] Sacks, J. J., Sattin, R. W., and Bonzo, S. E., "Dog Bite-Related Fatalities From 1979 Through 1988," *Journal of the American Medical Association*, Vol. 262, No. 11, Sept. 1989, pp. 1489-1492.
- [5] Wright, J. C., "Severe Attacks by Dogs: Characteristics of the Dogs, the Victims, and the Attack Settings," *Public Health Reports*, Vol. 100, No. 1, Feb. 1985, pp. 55-61.
- [6] Karkola, M., Mottonen, M., and Raekallio, J., "Deaths Caused by Animals in Finland," *Medicine, Science, and the Law*, Vol. 13, No. 2, April 1973, pp. 95-97.
- [7] Bewley, B. R., "Medical Hazards From Dogs," *British Medical Journal*, Vol. 291, Sept. 1985, pp. 760-761.
- [8] Ettinger, S. J., *Textbook of Veterinary Internal Medicine: Diseases of the Dog and Cat*, Vol. II, W. B. Saunders Co., Philadelphia, PA, 1983, pp. 1126-1191.

- [9] Evans, H. E. and Christensen, G. C., *Anatomy of the Dog*, W. B. Saunders Co., Philadelphia, PA, 1979, pp. 415–422.
- [10] Cohle, S. D., Harlan, C. W., and Harlan, G., “Fatal Big Cat Attacks,” *American Journal of Forensic Medicine and Pathology*, Vol. 11, No. 3, 1990, pp. 208–212.

Address requests for reprints or additional information to  
Michael A. Clark, Ph.D., M.D.  
Room 157, Medical Science Building  
635 Barnhill Drive  
Indianapolis, IN 46202-5120