0022-5282/89/2904-0517$02.00/0
THE JOURNAL OF TRAUMA

Vol. 29, No. 4
Printed in U.S.A.

Mauling by Pit Bull Terriers: Case Report

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A child with extensive soft-tissue defects following an attack by four pit bull terriers is presented. Some future procedures are required and she will have a permanent gait disability. The multidisciplinary management of this patient is described. The escalating problem of dog attacks in the United States is discussed. It is hoped that increased physician and public awareness will expedite the enactment and enforcement of effective vicious-dog legislation.

Dog bites constitute a major public health problem in the U.S. Although exact statistics are not available, a report in 1975 from the Center for Disease Control estimated that nearly one million people are bitten annually (4). An epidemiologic study of dog bites in Baltimore indicated that the majority of the victims are children, more than one half of bites leave permanent scars, and one third cause disability defined as time lost from school or work (3). Seventy-five per cent of the attacks are unprovoked (3, 8). In a study of 73 deaths from dog attacks in the U.S. occurring from 1966 through 1980, only 16 breeds (excluding mixed breeds) accounted for all of the fatal attacks. German shepherds were involved in more deaths than any other breed, but German shepherds have the highest registration of any large breed according to the American Kennel Club. In relation to its small registration, the pit bull terrier was responsible for the highest number of deaths (8).

Due to the unique anatomy of the animal and nature of its attack, a pit bull injury tends to be more severe than that of other breeds. Herein we describe a patient who incurred serious, nonfatal multiple bite wounds with massive soft-tissue loss from an attack by pit bull terriers.

CASE REPORT

A 9-year-old female was the victim of an unprovoked attack by four pit bull terriers owned by a relative. After fluid resuscitation was begun at the scene, she was transported by helicopter to the University of New Mexico Burn and Trauma Center where she arrived approximately 20 minutes after the attack. Vital signs were stable en route, but hypotension with signs of hypovolemic shock were noted shortly after arrival to the Trauma Center.

Physical examination revealed multiple abrasions and lacerations over the neck, right pinna, abdomen, and thighs. There were multiple gaping wounds in both axillae with marked tissue loss, a 4 × 8 cm loss of skin and subcutaneous tissue in the right deltoid area (Fig. 1), and circumferential loss of skin, soft tissue, and muscle from the left arm extending from the deltoid area to the elbow (Fig. 2). Radial nerve function was intact. The right lower extremity from the knee to the ankle revealed a massive loss of tissue with absence of both anterior and lateral compartments with near-total skeletonization of the right tibia (Fig. 3). The patient had sensation of the dorsal and plantar aspects of the foot and could plantar flex but not dorsiflex. A posterior tibial pulse and brisk toenail capillary refill were present. All wounds were heavily contaminated with dirt, gravel, and debris.

The patient was further stabilized and brought immediately to the operating room where a team of trauma, orthopedic, and reconstructive surgeons worked concurrently. All wounds were copiously irrigated with pulsating jet lavage and mechanically and surgically debrided. An 11 × 21 cm circumferential skin defect at the left mid upper arm was temporarily closed with porcine xenograft. Minor wounds were closed primarily and drained with closed suction catheters. A 15-cm vein graft was interposed between the right anterior tibial artery and the dorsalis pedis artery in an attempt to augment the blood supply to the right foot. The soft tissue defect measuring 17 × 26 × 11 cm over the right lower leg was closed with porcine xenograft.

She was returned to the operating room 24 hours later for additional wound inspection, debridement, and dressing

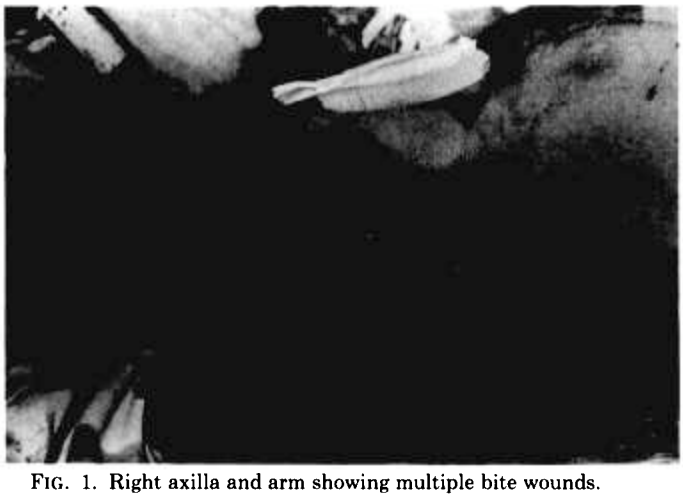

FIG. 1. Right axilla and arm showing multiple bite wounds.

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FIG. 2. Left upper arm showing extensive mauling injury with tissue loss.

FIG. 3. Right lower leg with extensive soft-tissue loss to level of tibia.

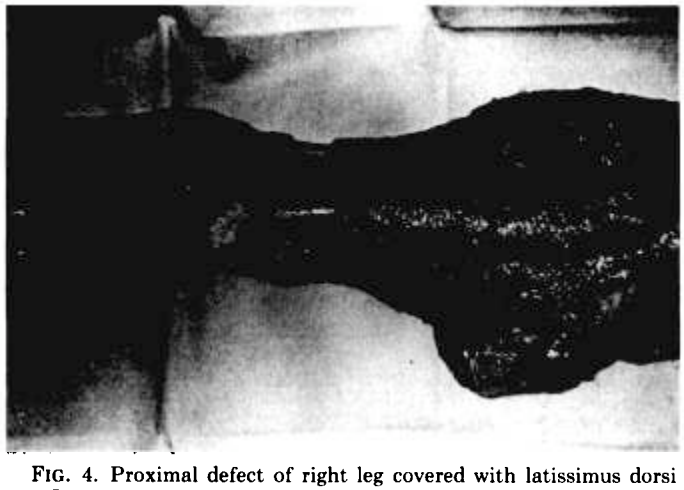

FIG. 4. Proximal defect of right leg covered with latissimus dorsi free flap.

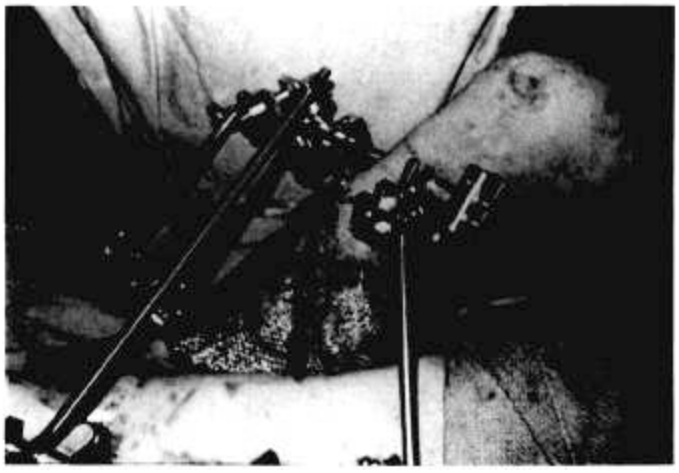

FIG. 5. Coverage of entire right leg defect with latissimus dorsi free flap, skin graft, and cross-leg flap.

FIG. 6. Residual deformity of left arm following skin graft closure.

changes. The interpositional vein graft was noted to be clotted and was re-opened by Fogarty catheterization with reconstitution of blood flow. Since kinking of the graft was suspected, the vein graft was secured by sutures to the tibial periosteum. However, a preoperative arteriogram 2 days later revealed reocclusion of the interposition vein graft. The posterior tibial artery, however, remained intact and the anterior tibial artery was patent to 3 cm above the defect.

A limb salvage procedure was initiated on the fourth post-injury day employing a latissimus dorsi free flap to cover remaining viable structures of the right lower leg. Although the entire right latissimus dorsi muscle was transferred, it was not sufficient to achieve complete coverage. The pedicle vessels were anastomosed end to side to the posterior tibial vessels.

FIG. 7. Healed right lower leg.

Successful coverage of this defect was achieved except for the distal 3 cm overlying the distal tibia. A cross-leg flap was required to achieve coverage for the distal tibia (Figs. 4 & 5).

Dressing changes of the other large wounds were performed under Ketamine anesthesia daily. Porcine xenograft was changed daily as required. Delayed primary closure employing meshed split-thickness skin grafts was utilized in those areas where direct suturing of the wounds was not possible (Fig. 6), and 5% sulfamylon solution was employed to maintain topical antibacterial control. Efficacy of treatment was monitored with quantitative bacteriology.

The child psychiatric service followed the patient during her hospitalization to help the patient and her family adjust to this severe physical and mental trauma. She was discharged 38 days after admission with all wounds closed. Daily physical therapy was instituted for progressive weight bearing on the right leg (Fig. 7). Over 3 weeks she advanced to unassisted ambulation with a splint. She had a persistent hindfoot varus deformity and a stiff subtalar joint and forefoot, necessitating a triple arthrodesis. She faces future reconstructive procedures of her residual deformities and a permanent gait abnormality.

DISCUSSION

In the patient with multiple lacerations and soft-tissue defects resulting from dog attacks, the principles advocated by Zook et al. (11) of meticulous attention to wound debridement, copious irrigation, and close postoperative monitoring were utilized. Smaller lacerations were closed primarily while larger defects with soft-tissue loss were treated with serial debridement, biologic dressings, topical antibacterials, and eventual closure by skin grafting or delayed primary closure.

The massive soft-tissue defect of the right lower leg with exposed tendons and tibia was closed 4 days post-injury utilizing a latissimus dorsi free flap. Harris et al. (7) have recently demonstrated excellent results with the use of free tissue transplantation as a primary treatment after trauma to accelerate recovery. In this patient, a 3-cm distal flap loss necessitated a secondary cross-leg flap, with uneventful recovery thereafter.

Pit bull terriers have received nationwide attention in the past few years (5, 9) due to an untoward number of maulings attributed to the breed. In one 18-month period in 1986–87, 12 of the 18 confirmed dog-related fatalities in the U.S. were caused by pit bull terriers.

The term pit bull refers not to a specific breed, but rather a kind of dog. The breeds most commonly referred to as pit bulls include the American Staffordshire Terrier (AKC), the Bull Terrier (AKC), the Staffordshire Bull Terrier (AKC), and the American Pit Bull Terrier (United Kennel Club) (2, 6), the last of which is the predominant pit or fighting dog. It is estimated that there are now 500,000 unregistered, often poorly bred, pit bull terriers in the U.S. (5).

It is difficult to precisely define a pit bull terrier. The AKC standard for the bull terrier states: "The bull terrier must be strongly built, muscular, symmetrical and active, with a keen, determined and intelligent expression, full of fire but of sweet disposition and amenable to discipline" (10). In general, pit bull terriers range from 20–100 pounds in weight. The head is egg shaped with small triangular sunken eyes. The back is short and strong with wide-set legs. The coat can be any color but is short and glossy and fits tightly to its muscular frame (10).

A pit bull terrier injury tends to be more severe than that caused by other breeds because of the propensity of these dogs to bite deeply into the tissues and to hold and tear rather than merely snap and recoil. Pit bulls bite with greater force than most dogs (up to 1,800 lb/in^2) (4). Once they have their victim in a hold, they do not merely maintain the "bite," but continue to grind their premolars and molars into the tissue while the canine teeth stabilize the hold (1). The resultant injuries are severe and injury to deeper structures such as muscle, nerve, blood vessel, and bone are often extensive. Unlike most breeds which frequently bite only once and then withdraw, pit bull terriers tend to multiple bite. When confronted, they do not make threatening gestures such as baring their teeth, snarling, or bristling the hair over the back and neck. Thus the attack victims have no forewarning. They maintain a wide stance as if ready to move forward or laterally, and attack with great speed and sense of purpose and generally devastating effect (6).

It is generally agreed that pure bred pit bull terriers, when raised by responsible owners, have a "steady temperament and intense loyalty" (5). A recent AKC publication states that "despite their aggressive natures, they are highly intelligent and affectionate" (2). The main hazard is posed by the pit bull terriers raised by owners

who train them to be aggressive, including dog-fighting enthusiasts, members of street gangs, and drug pushers.

Clearly, the impact on society of dog maulings is substantial. Our patient incurred a hospital charge of $80,000 for her acute admission alone. The total cost of her injuries will greatly exceed this number because of the need for long-term rehabilitation and future reconstructive procedures. However, pure monetary considerations are vastly overshadowed by the physical and emotional suffering incurred by the victims, the majority of whom are children, and their families.

As a result of recent developments, many municipalities have passed laws to restrict ownership of these dogs and many states are now drafting vicious-dog legislation. It is hoped that increased physician and public awareness will expedite this process. However, until this current epidemic of dog-related injuries is muzzled, emergency physicians and traumatologists will continue to be faced with severe, often life-threatening injuries from pit bull terrier attacks. A multidisciplinary team consisting of trauma specialists, orthopedic surgeons, anesthesiologists well versed in trauma and pediatric anesthesiology, reconstructive surgeons, psychiatrists, social workers, and physical therapists is often required in the management of severe cases to obtain an optimal result.

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