

Contemporary Update on the Treatment of Dog Bite: Injuries to the Oral and Maxillofacial Region

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Purpose: The purpose of the present retrospective record review was to evaluate the patient demographics, treatment rendered, and long-term outcomes of patients injured in dog bite attacks to the oral and maxillofacial region.

Materials and Methods: In the present study, a retrospective medical record review was conducted of patients treated by the oral and maxillofacial surgery department at the University of Tennessee Medical Center who had presented with injuries to the head, neck, and face region from dog bite attacks from February 1, 2006 to October 31, 2013. Each patient included had to have had at least 1 follow-up visit. The data obtained from the patients' medical records included patient demographics, event details, injuries sustained, and treatment rendered and analyzed.

Results: The medical records from 20 patients were included and reviewed. More than one half (60%) of the patients were younger than 12 years old. The dog was owned by the patient or a relative in 58% of the cases. The children sustained injuries requiring hospital admission and repair in an operating room setting more often than did the adults. Pit bulls were more frequently associated with injuries than other breeds (9 of 20).

Conclusions: Our patients required a total of 28 hospital inpatient days, 29 total procedures, and follow-up treatment for up to 2 years. Our review has shown the complexity of soft tissue injury treatment and the significant financial impact associated with dog bite injuries owing to the multiple hospital admissions, surgical revisions, and lengthy follow-up period required.

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Soft tissue lacerations of the head and neck region are one of the most common consultations for oral and maxillofacial surgeons (OMSs) in the emergency department. According to the most recent Centers for Disease Control and Prevention (CDC) statistics, more than 885,000 people in the United States will seek treatment for dog bites each year, with one half of these being children.¹ These injuries present a unique and complex challenge to OMSs for a variety of reasons, with the most serious being the potential for rabies infection and significant cosmetic disfigurement. The presentation of dog bite injuries can be variable, ranging from simple lacerations to the potential for

death. The CDC has estimated that 27,000 people underwent reconstructive surgery for injuries related to dog bites in 2012.¹ An unknown percentage will require multiple surgical procedures and long-term care.

The financial cost associated with dog bite injuries is staggering. According to the Insurance Information Institute and State Farm Insurance, dog bites accounted for more than one third of all homeowner insurance liability claims paid in 2012.² These data also showed that the average cost paid for dog bite claims was \$29,752, totaling more than \$489 million.² A 2010 report from the Agency for Healthcare Research

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and Quality revealed that in 2008, approximately 9,500 American hospital bed days were required for dog bites.³ The most prevalent admitting diagnosis from dog bites was skin and subcutaneous tissue contamination (43.2%). Open wounds of the head, neck, and trunk accounted for 10.5% of admitting diagnoses.³ Of those hospitalized, 57.9% required treatment with surgical procedures, such as suturing, skin grafting, incision and drainage, and wound debridement. The average length of stay was 3.3 days, with the cost of that stay totaling \$18,200.³

The University of Tennessee Medical Center in Knoxville is a level I trauma center that provides care to a 21-county region of east Tennessee and parts of North Carolina and Kentucky. According to the Medical Centers 2012 Trauma Data Registry, 4,100 trauma patients required hospital admission. The oral and maxillofacial surgery program was the third most often consulted specialty service by the trauma team, with a total of 760 consultations and 584 patients requiring operations. The purpose of the present study was to evaluate those trauma patients treated by the oral and maxillofacial department who had experienced dog bite injuries to the head, face, and neck region. The specific aim was to evaluate the patient demographics, events of the injury, treatment rendered, and long-term outcomes of the injured patients.

Materials and Methods

We performed a retrospective medical record review of dog bite injuries that were evaluated and treated at the University of Tennessee Medical Center level I trauma center from February 1, 2006 to October 31, 2013. The inclusion criteria were injury to the head, face, or neck region from a dog bite and treatment by the oral and maxillofacial surgery service. Patients were excluded if they had failed to return for follow-up visits as an outpatient for at least 1 appointment. A total of 20 study subjects were identified who met the inclusion criteria. Our university's institutional review board granted a waiver for both informed consent and the Health Insurance Portability and Accountability Act.

We gathered data in both paper and electronic format from the University of Tennessee Medical Center and from the office of the primary author (J.W.H.). We carefully reviewed each record to obtain the patient's age, gender, and ethnicity. The details of the event were recorded and included the location of event, sites of anatomic injury, breed of dog, ownership of the dog, and vaccination status of the canine, if possible. The treatment information included location of the treatment rendered (operating room or emergency department), initial management of the injury, length of stay, complications, and additional outpatient surgical procedures. Pre- and post-treatment photographs were ob-

tained from the medical records to further evaluate, classify, and provide a visual progression of the patients' injuries and outcomes (Figs 1 to 9).

Results

Patient age ranged from 8 months to 66 years (mean 20). Of the 20 patients, 12 were younger than 12 years old (60%), and 9 were male and 11 female. The ethnicity was predominately white.

The specific breed of the dog was identified in 16 of the 20 cases reviewed (Table 1). The pit bull breed was the most common breed, noted in 9 of the cases, with no specific breed known in 4 of the cases. Two cases involved multiple dogs, all of which were pit bulls. The remaining patient records noted breeds that included Rottweiler, Boxer, German Shepherd, Shih Tzu, Rat Terrier, Dachshund, and Britney Spaniel. Vaccination status was known in 12 of the dogs and unknown in 8. Ten dogs had up-to-date vaccinations and one was noted to have expired coverage in the owner's records. Eight dogs were recorded as having been quarantined after the injury. The owner of the offending dog was the patient's family or relative in 11 of the 20 cases (55%). Neighbor ownership was cited in 6 attacks, with the remaining 3 unknown.

All the reviewed attacks resulted in injury to the head and neck region, with some also involving other body parts. All were soft tissue injuries, with 1 patient



FIGURE 1. View of a 10-year-old child with bilateral ear avulsive injuries from a pit bull attack.

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