

Dog Bites of the Face, Head and Neck in Children

Bruce B. Horswell, MD, DDS, MS, FACS

Associate Professor and Director, *FACES
Women and Children's Hospital- CAMC*

Carol J. Chahine, DMD, FRCD (c)

Former Fellow in Craniomaxillofacial Surgery
Women and Children's Hospital- CAMC

Abstract

Dog bites of the facial region are increasing in children according to the Center for Disease Control. To evaluate the epidemiology of such injuries in our medical provider region, we undertook a retrospective review of those children treated for facial, head and neck dog bite wounds at a level 1 trauma center. Most dog bites occurred in or near the home by an animal known to the child/family. Most injuries were soft tissue related, however more severe bites and injuries were observed in attacks from the pit-bull and Rottweiler breeds. Younger (under five years) children sustained more of the injuries requiring medical treatment. Injury Severity Scales were determined as well as victim and payer mix demographics, type and characteristics of injury, and complications from the attack.

Introduction

Dog bite injuries represent a serious medical and public health problem affecting 1.5% of the US population annually.¹ An estimated 4.7 million people are bitten annually and of these approximately a fifth (19%) require medical attention.^{1,2} Most studies report that children, especially boys aged 5-9 years, have the highest incidence of suffering a dog bite.^{2,4} The face, head and neck areas are involved in 50 - 70% of these injuries.^{2,5-8} This is in contrast to adult victims who suffer only 5 to 15% of animal bites to the head and neck.^{2,9} Injury severity can range from minor lacerations to death. Moreover, many children who are attacked by dogs develop post-surgical complications and require revision procedures.

This report aims to describe the epidemiology of dog bite injuries

in 40 children presenting to the Charleston Area Medical Center (CAMC, Charleston, West Virginia) over a 4-year period (January 2005 - December 2009). This data may help to raise public awareness and to develop prevention strategies to protect children who are most vulnerable to dog attacks.

Methods

Between January 2005 and December 2009, 40 children (21 boys, 19 girls) were treated at the Charleston Area Medical Center for dog bite injuries to the face, head and neck. These patients were identified based on ICD-9 codes (906.0) in the Trauma Registry records. This study was reviewed and approved by the Institutional Review Board at CAMC.

The following demographic data were collected for all patients aged 16 years and younger admitted to the ED of our institution with a dog bite: age, gender, payer source, ethnicity, and location (rural/urban). Accident details included injury location (home or other), breed of dog, dog vaccination history, dog known to victim, injury severity score (ISS), and anatomical area of injury. Injury management information included length of hospital stay, management of the injury, number of surgical revisions, and incidence of complications.

Since this is a retrospective design the data were analyzed using descriptive statistics. Data were tabulated using the Excel program.

Results

There were 21 boys and 19 girls. The average age was 5 years (range: 1 - 13 years). The payer source was Medicaid (n=21, 53%), HMO/PPO (n=4, 10%), self-pay

(n=6, 15%), and commercial (n=9, 22%). (See Table 1) The majority of the injuries occurred in a rural setting (n=21, 53%), urban (n=9, 22%), and unknown (n=10, 25%).

The dog attack took place in a site familiar to the child including a family member's home (n=25, 63%) or neighbor's home (n=7, 17%). Eight attacks took place elsewhere (20%) (see Table 2). The most common breed was a Pit bull-type dog (n=12); other breeds included Rottweiler (n=6), Collie (n=4), Bulldog (n=3), Husky (n=3), and Saint Bernard (n=2) (Table 3). Canine vaccination history was known for the majority of dogs (n=25). The remainder (n=15) were quarantined to determine infectivity; no child required rabies vaccination. In a majority of instances in which the dog was identified (n=31, 78%), it was known to the victim or to the victim's parents. (See Table 2)

The areas of injury (see Table 4) included the cheek (n=16), lip (n=15), ear (n=8), forehead (n=7), scalp (n=5), eyelid (n=5), and nose (n=4). Bites (n=8) also were recorded on the limbs and shoulders, as well as the facial region, suggesting a more violent or aggressive attack.

Table 1. Demographic Data of Patients

Characteristic	N (40)	%
Sex		
Boys	21	53
Girls	19	47
Age group (years)		
0-4	18	45
5-9	15	38
10-14	7	17
Payer source		
Medicaid	21	53
HMO/PPO	4	10
Self-pay	6	15
Commercial	9	22

Table 2. Characteristics of Attack

Characteristic	N	%
Relationship between dog and victim		
Family member	19	47
Family friend	5	13
Neighbor	7	18
Total (dog known to victim)	31	78
No relationship	3	8
Unknown	5	12
Location of attack		
Family member's home	25	63
Neighbor's home	7	17
Unknown	8	20

Table 4. Description of Dog Bite Injuries

Anatomical area of injury	N
Lacerations/Avulsions	
Cheek	16
Lip	15
Ear	8
Forehead	7
Scalp	5
Eyelid	5
Nose	4
Neck	4
Other, Limbs	8
Ductal/Neurovascular Injuries	
Facial nerve	5
Lacrimal duct	3
Superficial Temporal Artery	2
Fractures	
Skull	1
Orbit	1
Nasal	2

Four patients sustained facial fractures involving the skull (n=1) and midface (n=3). The skull and orbital fractures were puncture and small fragmentation type fractures from pit-bulls. Eight patients had injuries to ductal/neurovascular structures including the facial nerve (n=5), lacrimal duct (n=3) and superficial temporal artery (n=2).

All children required surgery for management of their soft tissue wounds. Other treatments included: facial fracture repair (n=1), inferior canaliculus repair (n=2), and facial nerve microneural repair (n=3). The average ISS (Injury Severity Scale; the higher the score the more severe the injury) was 3.5 (range: 1-10). Eleven children required hospitalization with an average length of stay of 2

Table 3. Breed of Dog

Dog Breed	N=40
Pit Bull	12
Rottweiler	6
Collie mix	4
Bull Dog	3
Husky	3
St Bernard	2
Unknown	10
Vaccinated (+, -)	+ 25, - 15

days (range: 1-4 days). Post-surgical complications included excessive hypertrophic scarring (n=11), infection (n=3) and loss of tissue (n=1). Revision surgery was required in 11 children and included scar revision (n=9), ear reconstruction (n=3) and scalp and cheek reconstruction with local flaps (n=2).

Discussion

This report presents data on 40 children treated at the Charleston Area Medical Center over a 4-year period for dog bite injuries to the head, face, and neck. In our patient population there was an alarmingly high incidence of injuries in the younger age groups, similar to that published elsewhere.¹⁻⁶ We saw more children less than five years of age with dog bite injuries in contrast to national estimates from the Centers for Disease Control and Prevention (CDC), which found highest rates of ED-treated dog bites among children ages 5 to 9 years.^{1,2} Injury severity scales of children who are admitted to the hospital with dog bite injuries range from 1 to 25 with an average score of 4.⁵ The mean injury severity score of children in our group was slightly lower at 3.5 (range: 1-10).

In 78% of the attacks, the dog was known to the victim or to the victim's care givers, a finding consistent with the literature.¹⁰⁻¹² Our results also support previous findings that dog bite injuries more often occur

at the family home or at the home of a neighbor.^{4,13} The association between increased tendency to attack and the dog's home environment could be explained by the need to express protective, possessive, or fear-induced aggression.¹⁴⁻¹⁶ Children, in particular may not be able to discern between a dog that feels threatened and one that is playing.¹⁴

Most of our patients (53%) were on Medicaid, an indication of low socioeconomic status which may reflect a less controlled environment in which children are exposed to more hazards and risk. In order to avoid insurance coverage bias as it relates to ER visits, the Medicaid percentages for general trauma in children was determined through the institutional coding and data registry bank. For the study period, approximately 8.2 % of those children presenting to the ER for trauma-related conditions had Medicaid insurance coverage. This

demonstrates a disproportionate number of children from families with Medicaid coverage who suffered dog bites relative to the general pediatric trauma population at the same institution. This may beg the question as to why such a disproportionate number of Medicaid-covered children present with dog bite injury? Dog-owners in a lower income neighborhood may not have or provide the necessary training or supervision needed to minimize a high bite-risk situation.³ Moreover, another study showed that dog bite injuries occurring in low income areas were attributed to large numbers of children playing outdoors, few homes with adequate fencing, poor dog control, and a high proportion of large-breed dogs owned for protective purposes.¹⁶ Unfortunately, these social variables could not be ascertained in our study.

Similar to other reports,^{5,12,17} the pit bull-type dog was the breed

most commonly involved in a bite injury (30 %). Pit bull-type dogs and Rottweilers have been bred to hunt vermin, protect property, and work livestock.³ In situations where they are not controlled, these dogs could revert to instinctual behaviors.¹⁴ In addition, bites from these breeds can result in more serious injury because of their size and strength. The skull and orbital fractures were caused by a pit-bull bite which is characterized as a "vice-grip" which crushes, avulses and strangles, potentially making it a more dangerous breed. Finally, breed assessment is often subjective. Our data relied on the owner and victim (parents) to describe the breed which then was entered into the medical record. Bites from large-breed dogs, especially pit bull-type dogs and Rottweilers are more likely to result in more severe injuries, subsequent medical care and report, which may over-represent those breeds among biting dogs -

Beckley ARH Adolescent Behavioral Science Center

Teenagers face numerous challenges today that can sometimes cause them to have serious issues.

Beckley ARH's Behavioral Science Center can intervene to help them cope and prevent a problem from becoming worse as they enter adulthood. The Unit allows for an excellent opportunity to identify, diagnose and treat problems at an early stage so they can get back to school and what should be some of the happiest times of their lives.



306 Stanaford Rd | Beckley, WV 25801
304-255-3000 | www.arh.org



in other words, creating reporting bias.^{11,14} However the severity of injury necessitating medical attention should not be overlooked when considering the breed of dog generating more severe injuries.

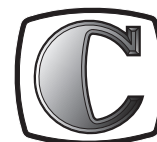
In our chart review, it was difficult to ascertain whether the dog attack was provoked or unprovoked as this relies on patient narratives. Examples of narrative comments in the medical records included: "playing with dog" or "petting dog, got close to face". These were generally brief, vague, and often absent. Thus we did not include this variable in our report. Other studies have shown that the majority of dog attacks are documented as "unprovoked".^{5,15-17}

It is our hope that this study contributes to the existing data on dog bites in children. We found that younger children (under five years) may be more at risk for dog bites in our medical provider region. We also verified that the majority of dog bites occurred in a lower socio-economic setting where burdens of care are already great. Most injuries occurred in the facial region. Our results support the findings of previous studies that dog bite injuries in children most commonly occur in or near home by a dog known to the victim. Dog bite injuries are a largely preventable cause of trauma; as such preventative strategies should be multi-directional. Some breeds are more aggressive and offending, particularly around vulnerable victims such as children.

Parental or adult supervision of children around dogs should be provided. Owners need to make every effort to minimize dog bite injuries through obedience training, supervision and restraint, especially around children. Further, every dog owner should assume and be held responsible for the behavior, control, well being (vaccinations) and conduct of their canine pets.

References

1. Gilchrist J, Sacks JJ, White D, Kresnow MJ. Dog bites: still a problem? *Inj Prev* 2008; 14(5):296-301.
2. Nonfatal dog bite-related injuries treated in hospital emergency departments--United States, 2001. *MMWR Morb Mortal Wkly Rep* 2003; 52(26):605-610.
3. Shuler CM, DeBess EE, Lapidus JA, Hedberg K. Canine and human factors related to dog bite injuries. *J Am Vet Med Assoc* 2008; 232(4):542-546.
4. Weiss HB, Friedman DI, Coben JH. Incidence of dog bite injuries treated in emergency departments. *JAMA* 1998; 279(1):51-53.
5. McHeik JN, Bergnes P, Bondonny JM: Treatment of facial dog bites in children: a retrospective study. *J Pediatr Surg* 2000; 35(4):580-83.
6. Morgan JP, III, Haug RH, Murphy MT. Management of facial dog bite injuries. *J Oral Maxillofac Surg* 1995; 53(4):435-441.
7. Ruskin JD, Laney TJ, Wendt SV, Markin RS. Treatment of mammalian bite wounds of the maxillofacial region. *J Oral Maxillofac Surg* 1993; 51(2):174-176.
8. Goldstein EJ, Richwald GA. Human and animal bite wounds. *Am Fam Physician* 1987; 36(1):101-109.
9. Lackmann GM, Draf W, Isselstein G, Tollner U. Surgical-Treatment of Facial Dog Bite Injuries in Children. *Journal of Cranio-Maxillofacial Surgery* 1992; 20(2):81-86.
10. Day H, Roesler JS, Kinde M. Hospital-treated dog bites in Minnesota, 1998-2005. *Minn Med* 2007; 90(7):43-5, 47.
11. Schalamon J, Ainoedhofer H, Singer G, Petnehazy T, Mayr J, Kiss K et al. Analysis of dog bites in children who are younger than 17 years. *Pediatrics* 2006; 117(3):e374-e379.
12. Dwyer JP, Douglas TS, van As AB. Dog bite injuries in children--a review of data from a South African paediatric trauma unit. *S Afr Med J* 2007; 97(8):597-600.
13. Ozanne-Smith J, Ashby K, Stathakis VZ. Dog bite and injury prevention--analysis, critical review, and research agenda. *Inj Prev* 2001; 7(4):321-326.
14. A community approach to dog bite prevention. *J Am Vet Med Assoc* 2001; 218(11):1732-1749.
15. Chapman S, Corwall J, Righetti J, Sung L: Preventing dog bites in children: randomised controlled trial of an educational intervention. *BMJ* 2000; 320:1512-23.
16. Beck AM, Loring H, Lockwood R. The ecology of dog bite injury in St. Louis, Missouri. *Public Health Rep* 1975; 90(3):262-267.
17. Sacks JJ, Lockwood R, Hornreich J, Sattin RW. Fatal dog attacks, 1989-1994. *Pediatrics* 1996; 97(6 Pt 1):891-895.



THE CHAPMAN PRINTING CO., INC.
A Division of Champion Industries, Inc.

THE COMPETITIVENESS
OF TODAY'S BUSINESS
WORLD DEMANDS TOP
QUALITY PRINTING.
THE BEST IN TECHNOLOGY,
CRAFTSMANSHIP AND QUALITY
IS YOURS WHEN YOU
CHOOSE CHAPMAN PRINTING

CHARLESTON CHARLESTON, WV 3000 Washington St. West (304) 341-0676	HUNTINGTON HUNTINGTON, WV 2450-90 1st Avenue (304) 528-2791
PARKERSBURG PARKERSBURG, WV 405 Ann Street (304) 485-8596	LEXINGTON LEXINGTON, KY 890 Russell Cave Road (859) 252-2661



Save the Date!

Annual Midwinter Business Meeting

February 3-4, 2012

The Marriott, Charleston, WV

