



## Age-related changes in the propensity of dogs to bite



L.L.McV. Messam\*, P.H. Kass, B.B. Chomel, L.A. Hart

School of Veterinary Medicine, Department of Population Health and Reproduction, 1114 Tupper Hall, University of California Davis, Davis, CA 95616, USA

### ARTICLE INFO

#### Article history:

Accepted 15 January 2013

#### Keywords:

Age  
Bite  
Dog  
Non-play  
Play

### ABSTRACT

This retrospective cohort study was aimed at describing the effects of age at acquisition, age, and duration of ownership of dogs on the risk of (1) bites during play and (2) non-play bites to humans. Data were collected on 110 dogs that had bitten during play with a person, 161 dogs that had bitten outside of play and 951 non-biting dogs from veterinary clients in Kingston (KGN), Jamaica and San Francisco (SF), USA. Modified Poisson regression was employed to model the relationships of both types of bites to each variable separately.

Effects of the variables on dog bite risk (1) during and (2) outside of play with the dog, differed from each other and by type of bite. Effects varied with the dog's age and age-related associations were strongest in dogs younger than 1 year old. Ages at acquisition of dogs at highest risk for bites during play were substantially lower than those at risk for non-play bites. Ages and durations of ownership of dogs at highest risk for bites during play were also lower than those of dogs at highest risk for non-play bites. The propensity of a dog to bite changes as it ages and relationships between dog bites occurring during and outside of play and the dog's age at acquisition, current age, and duration of ownership, differ from each other.

© 2013 Elsevier Ltd. All rights reserved.

### Introduction

Dog bites are frequent sequelae to human–canine interactions (Overall and Love, 2001; The American Veterinary Medical Association, 2001). This has led to much interest in identifying human and canine risk factors for both bites and aggression to humans in many parts of the world (Cornelissen and Hopster, 2010; Feddersen-Petersen, 1994; Georges and Adesiyun, 2008; Gershman et al., 1994; Guy et al., 2001; Maragliano et al., 2007; Messam et al., 2008; O'Sullivan et al., 2008; Rosado et al., 2009; Wake et al., 2009). While age is accepted as a risk factor for canine aggression (Borchelt and Voith, 1996a,b; Lockwood, 1995; Overall and Love, 2001), little is known about the age or ages at which dogs are most likely to bite (Overall and Love, 2001). Similarly, while a few studies have examined the association between the age of dogs at their acquisition and subsequent aggression (Appleby et al., 2002; Hsu and Sun, 2010; Petersen and Deddens, 2006), there is still need for an understanding of how age at acquisition is related to dog bites.

Knowledge of how a dog's age at acquisition and current age are related to its aggressive behavior will help veterinarians to contextualize properly for dog-owners both human-directed aggression in newly acquired dogs as well as aggression-related behavior changes in dogs as they age.

\* Corresponding author. Tel.: +1 530 754 9516.

E-mail address: [lmessam@ucdavis.edu](mailto:lmessam@ucdavis.edu) (L.L.McV. Messam).

To investigate the relationships of dog age-related factors to the risk of dog bites, a retrospective cohort study was conducted in Kingston (KGN), Jamaica and San Francisco (SF), USA. The premise of the investigation was that if the effects of age-related factors on the risk of a dog biting were not constant over a dog's lifetime, then age–time periods corresponding to higher or lower dog bite risks should be identifiable using analytic methods which permit data to define the shape of the age–time–dog bite relationship.

The goals of the study were: (1) to describe the relationships of age at acquisition, dog age, and duration of ownership to the risks of bites occurring during and outside of play; (2) to identify the ranges of these variables corresponding to the highest risks of dog bites; (3) to identify the ranges of these variables during which the change in dog bite risk is greatest, and (4) for each variable, to compare its relationship to the risk of bites occurring during play to its relationship to the risk of non-play bites. Age, age at acquisition and duration of ownership were used as surrogate measures for (1) the cumulative effect of time-related social and biological changes occurring in the dog since its birth; (2) the effect of the timing of the most recent change in the dog's ownership and living environment occurring during this process of change, and (3) the cumulative effect of these changes in the dog since the most recent change in its ownership and living environment, respectively.

The bi-national component in this study provided an opportunity to investigate if the effects of dog age-related factors on dog bite-risk differed between the two countries. Previous research points to differences in cultural attitudes to dog rearing between

the United States and the Caribbean (Davis et al., 2007; Deddens and Petersen, 2008; Fielding and Mather, 2001).

## Materials and methods

### Study protocol

This study constituted a part of a cohort study on dog bites approved by the University of California Davis Institutional Review Board. Most aspects of the materials and methods are identical to those previously described in detail (Messam et al., 2008, 2012) and so only a brief description is provided here.

### Study participants

Study participants were clients interviewed in the waiting rooms of eight veterinary clinics in KGN and three veterinary clinics in SF from May 2003 to January 2004. Clients were eligible to participate if they were at least 18 years old. Additionally, the dog in question had to be present at the time of the interview, owned for at least 24 h and living 7 days/week in the same home as the client. Whenever more than one dog was present, their names were ranked alphabetically and the first ranked chosen for participation.

### Outcome definition

Dog bite categories were determined using the following questions:

- During play, in the last 2 years, did the dog ever hold onto or catch a part of any person's body with its teeth and cause a wound?
- Not during play, in the last 2 years, did the dog ever hold onto or catch a part of any person's body with its teeth and cause a wound?
- Not during play, in the last 2 years, did the dog ever hold onto or catch a part of any person's body or clothes with its teeth but not cause a wound?

The outcome was considered a bite during play if the respondent answered 'yes' to (a) but 'no' to both (b) and (c); a non-play bite if the respondent answered 'yes' to (b) and/or (c) but 'no' to (a), and a non-bite if the respondent answered 'no' to all three questions. Bites occurring during play were restricted to those resulting in wounds to exclude cases of playful mouthing where a dog might grasp a person's body without applying sudden pressure (Messam et al., 2012). 'Bite during play,' instead of 'play bite' was used whenever the victim was playing with the dog at the time of the bite, as no distinction was made between when the dog was and was not playing. For dogs owned for 2 years or more, it was assumed that the dog bites oc-

curred 1 year prior to the date of the interview. For dogs owned for less than 2 years, it was assumed that the bite preceded the day of the interview by a time period equal to half the duration of ownership.

### Exposures of interest

The exposures of interest were the dog's age at acquisition, the dog's current age, and the duration of ownership (Table 1), with each recorded both as categorical and continuous variables. In the absence of exact dates of birth and acquisition, the following decision rules were used: when an exact age or time period was given, that number was used; when a range was provided, the midpoint of the range was used, and when fractions of weeks, months and years were given, the value was rounded to the nearest week, month or year, respectively. If a respondent could not provide one of the age or time periods, the value was estimated using the values of the other two variables of interest if possible. When no age or time period was obtained from the respondent, the value was omitted. Twenty-eight per cent of the ages at acquisition and 18% of dog ages were estimated, respectively, for the continuous variable analysis. No estimation of age-time variables was performed when these exposures were recorded as categorical variables.

### Statistical analysis

For analyses, modified Poisson regression (Zou, 2004) in SAS version 8.2 was used. Initially, each exposure of interest was used as a continuous variable to model play and non-play bites with functional forms (of the exposures of interest) separately, determined using fractional polynomials (Royston et al., 1999). This was necessary to allow the data, in addition to the statistical model, to define the shape of each age (-time) variable-dog bite relationship. Directed acyclic graphs (DAGs; Greenland et al., 1999) were used to choose a set of potential confounders of the relationships of age at acquisition to bites occurring during and outside of play. This initial set included city of residence, presence of yard space, source of the dog and reason for the dog's acquisition (Table 2).

A priori, no canine characteristics were believed to be confounders of the relationships of current age or duration of ownership to either type of bites, as both these variables represent slightly different surrogates for aging in the dog. Since aging is an inherent characteristic of the animal, its effect was not believed to be confounded by other individual-level characteristics or variables. For model selection, the change-in-estimate criterion (Greenland, 1989) was employed to select confounders from the DAG-based subset with a  $\geq 10\%$  change in the estimated RR required for a potential confounder to be retained in the model. To detect differences in RRs attributable to city of residence, an interaction term consisting of the exposure of interest and city was added to each model and retained if the corresponding regression coefficient was statistically significant ( $P < 0.05$ ). If no statisti-

**Table 1**  
Distribution of biting and non-biting dogs by selected exposures and city of origin: Kingston (KGN), Jamaica and San Francisco (SF), USA.

Exposure	Exposure categories	Total	Bites during play		Non-play bites		Non-bites	
			KGN n (%) <sup>a</sup>	SF n (%) <sup>a</sup>	KGN n (%) <sup>a</sup>	SF n (%) <sup>a</sup>	KGN n (%) <sup>a</sup>	SF n (%) <sup>a</sup>
Age at acquisition	Birth	149	5 (3)	0 (0)	12 (8)	1 (<1)	129 (87)	2 (1)
	≤2 months	481	35 (7)	28 (6)	38 (8)	22 (5)	242 (50)	116 (24)
	>2 months to ≤6 months	317	8 (3)	21 (11)	19 (6)	27 (9)	111 (35)	131 (41)
	>6 months to ≤1 year	84	0 (0)	4 (5)	4 (5)	9 (11)	24 (29)	43 (51)
	>1 year to ≤2 years	48	0 (0)	2 (4)	1 (2)	8 (17)	10 (21)	27 (56)
	>2 years to ≤5 years	43	0 (0)	3 (7)	0 (0)	5 (12)	7 (16)	28 (65)
	>5 years	34	0 (0)	3 (9)	1 (3)	6 (18)	3 (9)	21 (62)
	Total	1156 <sup>b</sup>	48	61	75	78	526	368
Current age	≤2 months	123	7 (6)	2 (2)	2 (3)	1 (<1)	106 (86)	5 (4)
	>2 months to ≤6 months	326	28 (9)	30 (9)	9 (3)	4 (1)	200 (61)	55 (17)
	>6 months to ≤1 year	145	9 (6)	7 (5)	15 (10)	9 (6)	65 (45)	40 (28)
	>1 year to ≤2 years	153	3 (2)	8 (5)	15 (10)	16 (10)	58 (40)	53 (35)
	>2 years to ≤5 years	184	1 (<1)	6 (3)	23 (12)	22 (12)	53 (29)	79 (43)
	>5 years	233	0 (0)	8 (3)	13 (6)	26 (11)	52 (22)	134 (58)
	Total	1164 <sup>b</sup>	48	61	77	78	534	366
Duration of ownership	≤2 months	425	27 (6)	29 (47)	10 (2)	8 (2)	273 (64)	78 (18)
	>2 months to ≤6 months	183	13 (7)	12 (20)	8 (4)	8 (4)	97 (53)	45 (25)
	>6 months to ≤1 year	139	4 (3)	8 (13)	16 (12)	18 (13)	48 (35)	45 (32)
	>1 year to ≤2 years	95	3 (3)	2 (3)	7 (7)	7 (7)	42 (44)	34 (36)
	>2 years to ≤5 years	154	1 (<1)	4 (7)	22 (14)	18 (12)	47 (31)	62 (40)
	>5 years	193	0 (0)	6 (10)	13 (7)	20 (10)	48 (25)	106 (55)
	Total	1189 <sup>b</sup>	48	61	76	79	555	370

<sup>a</sup> Row percentages. Not all percentages sum to 100 due to rounding error.

<sup>b</sup> Differences in totals reflect differences in number of responses to each question.

Download English Version:

<https://daneshyari.com/en/article/5798276>

Download Persian Version:

<https://daneshyari.com/article/5798276>

[Daneshyari.com](https://daneshyari.com)