



Comparison of the Social and Individual Behaviour of Intact and Neutered Female Domestic Dogs (*Canis Lupus Familiaris*) Using Video Analyses



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Abstract

Dogs accompanied humans for a long time. When living in close contact with humans' undesirable behaviours of the dog can cause a lot of problems. Nowadays neutering is often used as the method of choice to alter this behaviour. Using video analyses 18 female dogs were compared about their social, individual and play behaviour. Significant differences were found with neutered female dogs yawning and intact dogs imposing more often. For more meaningful results a larger sample size will be needed.

Keywords: Neutering; Female Dogs; Social Behaviour; Video Analysis

Introduction

Dogs accompanied humans for more than 30,000 years [1,2] and are often no longer used in their original functions nowadays, but live as companion dogs in families, at least in countries of the western societies [3]. In such a close contact between dogs and humans' undesirable behaviours pose a lot of problems. Neutering is often used as the method of choice, whether to prevent dogs from reproduction, to reduce all behaviours associated with reproduction, to prevent diseases or to alter undesirable behaviours, without taking the impact on behaviour into consideration.

Material and Methods

34 dogs were divided into groups of four dogs with two neutered and two intact female dogs per group. Each group was filmed in four sessions spread over 18 to 42 days. The owners simultaneously let the dogs run. Each dog was filmed for five minutes, the order being randomly chosen. At each following meeting the order of filming the dogs was changed, so that every dog was recorded once in every position. A total of nine groups with 16 intact and 18 neutered dogs was observed. The analysed behaviours were taken from an ethogram of the gray wolf by Goodmann and Klinghammer [4] which was modified by Ivonne Spitzley and Nicole Elsing and has not yet been fully published. The behaviours were recorded as sent or received by the focal

animal. Moreover, the behaviour patterns were recorded either as events or as states. For events only, frequencies were counted and for the latter the durations of the behaviour in seconds were analysed. Play behaviour was recorded as a state as well.

For statistical evaluation the software R was used. First the age was compared between neutered and intact female dogs using Mann-Whitney-U-Test. Behavioural data obtained were considered as being independent and compared pair wise, so that for each behaviour a comparison between intact and neutered female dogs was drawn. Data recorded as states were evaluated using the randomization test for two independent samples. The behaviours recorded as an event were analysed for significant differences using Mann-Whitney-U-Test. All data were analysed two-tailed. The significance level was set to $\alpha=0.05\%$.

Results

First the age of the intact and neutered female dogs was compared, and significant differences were found (Mann-Whitney-U-Test: $W = 68$; $p = 0.008$). Therefore all dogs younger than 1.5 years and groups consisting of less than 3 dogs were excluded from the analysis, through which 18 female dogs (8 intact and 10 neutered) could be analysed. After correcting for age neutered and intact female dogs were comparable in means of age (Mann-Whitney-U-Test: $W = 27.5$; $p = 0.396$). The videos were analysed

using an ethogram consisting of 34 behavioural patterns of which 32 were shown during the filming. The analysis of the patterns evaluated as states was divided into behaviour patterns sent by the focal animal, the patterns received and individual behaviour. Most significant differences found when analysing all 32 female dogs

disappeared after correcting for age. Then, a significant difference was found with intact females imposing more often than neutered ones and neutered ones yawning more often. Neutered female dogs tend to raise their leg more often when urinating and tend to send more behaviours in total (Table 1).

Table 1: Analyzed behaviors and statistical results depending on the test used.

Events	Mann-Whitney-U-Test		
	W	p-value	
Bark	32.5	0.447	
Yawn	19.5	0.037	*
Shake	31.5	0.414	
Individual behaviour	Randomization test		
	F	p-value	
Looking Around	0.894	0.358	
Walking Around	0.267	0.612	
Squat Urinate	0.372	0.551	
Raised Leg Urination	3.084	0.098	
Ears Pricked Sideways	0.355	0.559	
Received Behaviour	Randomization test		
	F	p-value	
Sniffing of Anal Region	1.224	0.285	
Avoid	0	0.991	
Molest	0.715	0.41	
Nosing	0.924	0.351	
Mounting	1.27	0.276	
Threat	1.141	0.301	
Follow	1.815	0.197	
Sniff Genitals	0.015	0.903	
Ignore	0.021	0.888	
Sniff Inguinal Region	0.079	0.783	
Inguinal Presentation	0.531	0.477	
T-Formation	0.554	0.467	
Shelter	0.891	0.359	
Sent Behaviour	Randomization Test		
	F	p-value	
Avert Gaze	0.015	0.903	
Sniffing of Anal Region	1.185	0.298	
Huddle	1.27	0.276	
Avoid	0.047	0.831	
Molest	2.409	0.14	
Nosing	1.855	0.192	
Threat	0.415	0.529	
Follow	0.001	0.973	
Sniff Genitals	0.004	0.948	
Ignore	0.004	0.952	
Impose	7.79	0.013	*
Sniff Inguinal Region	0.686	0.42	
T-Formation	2.868	0.11	

Shelter	1.205	0.289	
Playing behaviour	0	0.99	
Total	Randomization test		
	F	p-value	
Received	1.453	0.246	
Sent	3.598	0.076	t
Individual	1.046	0.322	

Discussion

The age of the female dogs differed significantly with neutered females having a higher median age than intact ones. Several studies have shown that behaviour changes with age [5-8]. Therefore, the results were not meaningful when dealing with such an important topic. After correcting for age neutered and intact female dogs were comparable in means of age. The lack of significant differences after correcting for age can be due to the small sample size or the sample. All female dogs were selected in different dog schools. Often owners visiting a dog school put much effort on socialising and training their dogs and dogs visiting courses in a dog school regularly, independent of their reproductive status, could show equal social skills, since early socialisation plays a great role for the behaviour of adult dogs [9]. Therefore, more information about the dogs, their environment and upbringing should be considered.

Imposing is a pattern of high status and is sent more often by intact females than by neutered ones. Neutered dogs were more anxious and less confident than intact ones when in contact with other dogs [10-12]. Due to the increased anxiety in neutered dogs, it seems possible that they are more often dominated by intact females because of their insecurity. To prove this a greater sample size is needed. In a previous study conducted by Kaufmann the effects of neutering on 33 male dogs were analysed. As here, intact dogs were found to be more self-confident and showing more frequently confident or assertive behaviours, respectively [13].

Conclusion

The small sample size used here did not show any differences in the behaviour of neutered and intact female dogs, but previous studies have shown tremendous effects of neutering on behaviour and health. Nevertheless, the consequences and benefits of neutering must be weighed, while taking health-wise and behavioural aspects into account. In a follow up study more dogs will be analysed and more information about the dogs will be regarded.

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