

## Risperidone as a Promising Treatment of Choice in Dog Owner Directed Aggression

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### Abstract

Owner-directed aggression is reported as the most frequent of the aggression cases observed. Some factors underlying aggressive behavior are, adopting before the end of socialization period, genetic and hereditary parameters, inbreeding, environment, excessive punishment, sex, age, size, somatic reasons, territorial threats and owner dependant factors. The choices to deal with aggressive dogs is usually limited by relinquishment or euthanasia. The aim of this study is to evaluate the effects of risperidone (atypical antipsychotic) in decreasing the risk of danger in dogs presenting owner directed aggression. Sixteen household dogs from various age, sex and breed with the complaint of showing aggressive behavior were examined and after elimination of somatic reasons a scoring scale based on the considerations for assessing danger and risk of injury was prepared with the owner. Treatment was comprised of owner informing on the management and behavioral approach for each individual case and medical treatment with Risperdal oral solution 1 mg/1 mL, 100 mL sid (1 mg/m<sup>2</sup>). Examination, history taking and scoring were repeated after 1 month of therapy. Risperidone created satisfactory results in decreasing the risk of danger, also will prevent many household dogs from relinquishment or euthanasia.

**Keywords:** Dog, Owner directed aggression, Risperidone, Dog bite, Antipsychotic

## Köpeklerde Sahibine Yönelik Agresyonda Başarı Vaad Eden Bir Tedavi Seçeneği Olarak Risperidon

### Özet

Sahibine yönelik agresyon, en sık gözlenen agresyon vakalarındandır. Agresif davranış biçiminin altında yatan faktörlerden bazıları, sosyalizasyon dönemi tamamlanmadan anneden ayrılma, genetik ve herediter parametreler, aile içi çiftleşme, çevre, aşırı cezalandırma, cinsiyet, yaş, büyüklük, somatik nedenler, çevresel tehditler ve sahip kaynaklı nedenlerdir. Agresif köpek sahiplerinin çözümü genellikle ötenazi veya hayvanı terk etmek olmaktadır. Bu çalışmanın amacı, sahibe yönelik agresyon gösteren köpeklerde risperidon'un (atipik antipsikotik) tehlike riski üzerindeki etkilerini ortaya koymaktır. Agresif davranış şikayeti ile getirilen farklı yaş, cinsiyet ve ırktan 16 ev köpeği, muayeneleri ve fiziksel nedenlerin eliminasyonunu takiben tehlike ve yaralanma riskinin belirlenmesi kriterleri bazında hasta sahibi ile birlikte skorlanmışlardır. Tedavi, hasta sahibinin genel ve davranışsal yaklaşım açısından bilgilendirilmesi ile Risperdal oral solüsyon 1 mg/1 mL, 100 mL sid (1 mg/m<sup>2</sup>) kullanımı ile şekillendirilmiştir. Muayene, anamnez ve skorlama işlemleri 1 aylık tedaviyi takiben tekrarlanmıştır. Risperidonun, tehlike riskini düşürmede etkin sonuçlar sağladığı ortaya konmuştur. Bu sonuç aynı zamanda pek çok ev köpeğinde terk edilme ve ötenaziden uzak tutulmasına neden olacaktır.

**Anahtar sözcükler:** Köpek, sahibine yönelik agresyon, Risperidon, köpek ısırma, antipsikotik

### INTRODUCTION

Aggression is a major canine behavioral disorder <sup>[1]</sup> and an important public issue, but bite and attack cases are usually remain unreported <sup>[2]</sup>. Human directed aggression is the main presentation of canine aggression with 54%-67% of all aggression cases <sup>[3]</sup>. In United States, nearly

885.000 dog bite victims seek medical care, 30.000 undergo reconstructive procedures, and between 10 and 20 are reported fatalities <sup>[4]</sup>. Approximately 2-4% of all dog bite cases require hospital involvement <sup>[5]</sup>. The target is usually the family members, in which the dog fights for a higher hierarchical position in the family <sup>[1]</sup>, as well as adults <sup>[6]</sup>, men <sup>[6]</sup>, children <sup>[7,8]</sup> and the elderly <sup>[8]</sup>. Children has a higher



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risk for attacking to the vital areas as the face and neck <sup>[4]</sup>.

Dog aggression usually take place at home <sup>[9]</sup>, and during interaction with the dog <sup>[6,9]</sup> nearby childrens provocation <sup>[7,9]</sup>. Infact, studies on dog bite cases of humans especially children, suggest that serious human directed aggression is most likely to occur in the home from known or family dogs <sup>[10,11]</sup>. More than half of severe aggression cases are reported to be associated with a family member taking away food or other goods important for the dog <sup>[5]</sup>.

Owner-directed aggression is reported as the most frequent of the aggression cases observed diagnostic category (35.34%) <sup>[1]</sup>.

There are many factors originating aggressive behavior such as adopting before the end of socialization period, genetic and hereditary parameters, inbreeding, enviroment, excessive punishment, sex, age, size, somatic reasons, territorial threats and owner factors <sup>[12]</sup>. Surprisingly, owner dependent factors are superior to dog dependent factors in aggresivity <sup>[13]</sup>. However, these factors do not provide a presicion about an individual dog's risk of aggression to people based on these parameters <sup>[14]</sup>.

Alas, the choices to deal with dogs presenting aggression is usually limited by relinquishment or euthanasia.

Current managing strategies for dog aggression starts with the diagnosis and classification of aggression type followed by environmental manipulation, physiologic intervention, behavioral techniques and medical therapy <sup>[12,15]</sup>. Pharmacological intervention aims to produce a stable change in the perception of a stimulus and the resulting emotion, leading to the correction of the behavioural problem. It is very important to evaluate the subject's pathological state based on history and examinations, to identify the functional impairment of the pivotal neurotransmitter systems involved in the disorder in order to select a suitable pharmacological treatment <sup>[15]</sup>.

Level of rigor, risk of injury and danger for the household together with foreigners including pedestrians risk of attact during walks must be concerned at the first stage. The main target of the aggressivity management should be reducing the risk of danger to a reasonable level. Therefore, especially in dogs with high risk and danger potential, pharmacological treatment is essential to avoid irreversible damages.

Psychoactive drugs are efficient to regulate the behavior and underlying mechanisms and they are commonly prescribed in clinical practice for serious behavioural problems <sup>[15,16]</sup>. Thymoregulators, antidepressants and neuroleptics are used to treat different types and degrees of aggressivity, but in cases presenting high risk antipsychotics are good choices to reduce the injury potential <sup>[16,17]</sup>.

Risperidone, an atypical antipsychotic, is a serotonin type 2 (5-HT<sub>2</sub>) and dopaminergic D<sub>2</sub> receptor antagonist with high potency, also used in human medicine in schizophrenia, bipolar mania and irritability associated with autistic disorder <sup>[16]</sup>. In dogs it is proposed for diminishing behavioral arousal and in sociopathy stage 1 when the warning phases are still complete, social directed regression, sociopathies, impulsive aggression, hallucinatory type signs <sup>[17]</sup>, with considerable safety <sup>[16-18]</sup>, but there is not much literature on the clinical therapeutic results in dog aggression.

The aim of this study is to observe the therapeutic affects of risperidone in dog aggression cases with considerable risk which is also an important public health issue.

## MATERIAL and METHODS

### Animal Material and Examinations

The material of this study consisted of 16 household dogs from various breeds, age and gender which referred to the faculty clinics with the complaint of showing aggressive behavior (*Table 1*). Elimination of somatic disorders were performed and the patients were evaluated from the behavioral aspect (*Table 2*). After aggression was diagnosed, assessment of risk of injury and danger was achieved by a scoring scale based on the considerations

**Table 1.** General characteristics of the dogs

Factors	Condition	
Household population	1 Member	6 Families
	2 Members	3 Families
	3-5 Members	6 Families
	6- Members	1 Families
Kids and adolescent number	9 in 7 families	
Owner experience with dogs	First dog	11
	Previously owned one or more dogs	5
Dog gender	Male	6
	Female	10
Dog age	29.9±21.9 months of age	
Dog race	Labrador retriever	1
	Terrier	2
	Poodle	1
	Rotweiler	1
	Kangal	2
	Cocker spaniel	2
	Mix	5
	German shepherd mix	1
	Boxer	1
Neuter status	Neutered	2
	Intact	14

**Table 2.** Behavioral Complaints and Concurrent Behavior Problems

Dog	Aggression to Owners (less- more/1-5)	Aggression to Foreigners (less- more/1-5)	Concurrent Behaviour Problems	Presence of Dominant Posture and Behaviour
1	4	2	Tail chasing, Anxiety Play related aggression	+
2	5	2	-	+
3	5	4	Anxiety	+
4	4	2	Fear aggression	+
5	3	3	-	+
6	3	2	Tail chasing, Hallucitative episodes	+
7	4	3	-	+
8	4	3	Territorial aggression	+
9	3	1	-	+
10	3	2	-	+
11	4	1	-	+
12	4	1	Territorial aggression	+
13	3	1	Separation anxiety	+
14	4	1	-	+
15	3	2	-	+
16	3	3	Territorial aggression	+

**Table 3.** Danger and risk of injury scores before and after therapy

Parameter		Before Therapy (X±Sx)	After Therapy (X±Sx)	Significance	
Predictability	Identifiable stimuli and situations	3.56±1.09	1.56±0.96	***	
	Consistent response to aggression eliciting stimuli	3.75±0.93	1.38±0.81	***	
	Benignness of stimuli that trigger aggression	3.63±0.96	1.13±0.34	***	
	Existence of warning signals	3.31±1.14	1.75±1.13	***	
	Latency to attack	3.19±1.05	1.19±0.40	***	
	Availability of pertinent historical info	2.94±1.76	2.81±1.87		
Potential to cause damage	Size and strength of animal	3.44±1.15	3.44±1.15		
	Degree of bite inhibition	3.19±0.91	1.13±0.5	***	
	Intensity of focus/level of arousal	3.56±0.81	1.31±0.6	***	
	Target for aggression	3.25±0.77	1.25±0.58	***	
	Type of aggression	1.5±0.63	0.56±0.51	***	
The human element	Comprehension of danger	3.56±1.03	1.75±1.29	***	
	Ability to understand management and treatment	3.68±1.08	1.75±1.44	***	
	Ability to provide safe control	3.88±0.96	1.43±0.81	***	
	Verbal control of pet	3.69±0.95	1.38±0.72	***	
	Dependability	History of compliance and consistency	2.81±1.56	2.56±1.75	
		Family size, life style	2.56±1.55	2.56±1.55	
		Ages of family members	2.31±1.62	2.31±1.62	
Experience with animals	4.25±1.24	4.25±1.24			
Complexity of the situation	Number of types of aggression	1.44±0.63	0.56±0.51	***	
	Number of situations/stimuli that trigger aggression	3.68±0.95	1.31±0.60	***	
	Number of concurrent behaviour problems	0.63±0.89	0.06±0.25	*	
	Opportunity for confrontations	3.63±0.96	1.31±0.60	***	

Statistically significant at \*  $P \leq 0.05$  and \*\*\*  $P \leq 0.001$  level

for assessing danger and risk of injury <sup>[16]</sup>. For each case, owner was questioned in order to score each parameter of the scale. Treatment was comprised of owner informing on the management and behavioral approach for each individual case and medical treatment with Risperdal® oral solution 1 mg/1 mL, 100 mL (Eczacıbaşı - İstabnul) sid (1 mg/m<sup>2</sup>) <sup>[16,17]</sup>. Examination, history taking and scoring were repeated after 1 month of therapy (Table 3).

### Scoring

Considerations for assessing danger and risk of injury has four major parameters (predictability, potential to cause damage, the human element, complexity of the situation) according to Landsberg et al. <sup>[16]</sup>. Scoring was recorded according to these parameters 1 to 5 (subjective parameters were scored as good to worse conditions, from 1 to 5).

### Statistical Analyses

Student t test was used in comparing pre and post therapy scores of the groups. Duncan test was used in determination of difference between groups.

## RESULTS

Results were presented in Table 3. Significant progress in predictability, decrease in the potential to cause damage and the complexity of the situation demonstrates a favorable effect for risperdal in dominance cases with high risk of danger. As a matter of fact, owners mentioned a great difference in behavior and uttered a higher and safer life quality for the mutual lifetime.

## DISCUSSION

Literature states that, human directed aggression is usually observed in smaller breeds and small breed dogs has a higher risk of biting as the result of their nervous and disobedient nature <sup>[5,19,20]</sup>. The advantage of this condition is that the risk of danger is less for small breeds as more likely to be tolerated by the owner. In the long term, this may have led to a genetic predisposition in smaller dogs <sup>[21]</sup>.

In the present study half of the cases were small breeds, but deduction of a consequence from 16 dogs will not be a suitable attempt in that respect.

Breed associated aggression is a focus of interest in behavior medicine and variations among results may be due to breed distribution on the area basis and the genetic lines of each breed <sup>[20,22]</sup>. Nevertheless, consensus to a great degree is achieved on most frequently reported breeds with human directed aggression in a serious manner; these are Dachshunds, Chihuahuas, English Springer Spaniels, Jack Russell Terriers, Australian Cattle Dogs, American Cocker Spaniels and Beagles <sup>[1,5,20,21]</sup>. The least aggressive breeds were reported as Retrievers, Labrador Retrievers,

Bernese Mountain Dogs, Brittany Spaniels, Greyhounds and Whippets <sup>[5]</sup>.

In the present study only two Cocker spaniels are belonging to the group of most aggressive dogs, and surprisingly one Labrador retriever belonging to the less aggressive group was present among our cases. Again, the number of cases do not allow drawing a consequence. Besides, authors opinion is that, although undeniable genetic influences are present for aggression, local education level and understanding of the dog nature together with breed preference are significant factors. For example, Kangal dog is known as a calm and well behaving local breed, but the Kangal dogs in the present study were household dogs contradictory to their nature. Unfortunately, national preference for Kangal dog is very high neglecting the physiologic and behavioral nature, resulting with a high yield of aggressivity, so concluding a genetic predisposition would be misleading for this breed.

According to literature, aggression is most frequently observed between adolescence to social maturity (6 months - 4 years) <sup>[23-25]</sup>. Similarly, dogs in the present study were 29.9±21.9 months of age.

Male sex was reported to be superior with regard to dominance <sup>[1,14,25,26]</sup>. In the present study only 6 dogs were male and 10 were female. Only dogs showing owner directed aggression were included in this study, so a larger scale regarding generally aggression would allow different observations.

Controversial reports are published on the effect of neutering on aggression. While some authors suggest that neutered dogs of either sex were calmer than the intact ones <sup>[1,7,24]</sup>, others suggest that incidence of aggression increases with neutering. Anyway, hormonal influences also must be considered in the clinical examinations <sup>[27,28]</sup>. Interestingly only 2 dogs were neutered in the present study and 14 dogs were intact. This may be due to low dog neutering tendency of local people.

There is a positive correlation reported between the number of people in the household and aggression and disobedience and is believed to be another important factor <sup>[24,29]</sup>. Observations in this study were concordant with these suggestions as aggression level and risk of danger increased with the household population.

Owners' past experience with dogs also is an important factor. First time dog owners complain with more problems <sup>[30]</sup>, where the experienced ones were reported to have less problems <sup>[29]</sup>. Dogs of first time or less experienced owners are reported to present dominance aggression more frequently <sup>[13]</sup>. Similarly, 11 of 16 owners (68.75%) were living their first experience and unsurprisingly were not familiar to dog nature.

The complexity of the situation is an important factor



forming the risk level. Presence of different types of aggression or behavioral disorders and the number of stimuli that triggers aggression complicates the situation. Concurrent behavioral disorders are reported in similar cases including a frequent observation of anxiety<sup>[20,25]</sup>. In the present study half of the cases presented one or more behavioral disorders and/or aggression types together with anxiety. The other half possessed owner directed aggression as the single disorder suggesting that this aggression may be a learnt response to situations and to specific perceived threats occurring in particular contexts, yielding the environmental and living conditions nearby the human factor<sup>[14,31,32]</sup>.

Management of owner directed aggression has multiple contexts, but identifying the underlying reasons has major importance. Then, modification of the human factor including the consistency of the owner, informing about the dog nature and communication rules, is an important step, because dogs usually learn to present aggression in response. Positive reinforcement, desensitization, playing activities, rewarding, limiting the boundaries of dominance patterns are important modification attempts<sup>[21,32,33]</sup>.

However, presence of risk of danger must be strictly considered for human welfare. Keeping the dog under close control and away from public places will not be enough to secure family members. In cases with considerable risk of danger, pharmacological treatment is essential. Satisfactory results had been achieved with risperidone in dogs for diminishing behavioral arousal and in sociopathy stage 1 when the warning phases are still complete, social directed regression, sociopathies, impulsive aggression and hallucinatory type signs with considerable safety<sup>[16-18,34]</sup>. Our results are concordant with previous work. Satisfactory effect in decreasing the risk of danger had been achieved in dogs with owner directed aggression.

In conclusion, understanding the underlying motivation in a case of owner directed aggression is the first step of management, but in cases with high danger potency, safety of the family and foreigners must be considered at the first step. The results obtained in the present study reveal that risperidone creates satisfactory results in decreasing the risk of danger. In addition, from the view of animal welfare, pharmacological treatment with risperidone will prevent many household dogs from relinquishment or euthanasia.

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