



# Animal Behavior Case of the Month

## Statement of the Problem

A dog was evaluated for growling at, snapping at, and biting its owner, groomer, and veterinarian.

## Signalment

The patient was a 3.5-year-old 22-kg (48.4-lb) spayed female English Springer Spaniel.

## History

The dog was acquired at 9 weeks of age from a breeder. The household included the female owner and her elderly mother who used a wheelchair. At 6 months of age, the dog started to show signs of fear of unfamiliar people or dogs. The owner reported that the dog retreated behind her when unfamiliar people or dogs approached. At 30 months of age, the dog began to display owner-directed aggression, growling at the owner when petted while resting in its dog bed, when its paws or face were handled, and when the owner attempted to physically remove it from furniture. The growling escalated to lunging and snapping at the owner when the dog was reprimanded. In 2 closely spaced episodes, the owner was bitten once while touching the dog's hind legs and again when petting the dog when it was laterally or dorsally recumbent. Before the bites occurred, rigid body posture, a fixed stare, and lip licking were noted. The owner reported that the dog appeared to know it had been bad after these episodes and that it subsequently retreated to its crate.

At 3.5 years of age, following treatment for anal gland impaction, the dog began to show aggressive behavior toward the primary care veterinarian and the groomer. On seeing either of these individuals, the dog had piloerection, retreated, growled, and snapped at them. Muzzling was required for monthly prophylactic anal gland expression by the veterinarian. After the first few treatments, the dog avoided the owner. The owner reported that the dog stiffened, licked its lips, yawned repeatedly, and growled whenever it was approached with the leash at the late time of day when it was routinely taken to the animal hospital for treatment. On 1 occasion, the owner was bitten when she persisted in leashing the dog.

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## Physical Examination Findings and Laboratory Results

At the first behavior consultation, the dog accepted placement of the muzzle by its owner to facilitate physical examination. Although the dog initially approached for food treats once everyone was seated, body language indicative of fear (lip licking, low body posture, tucked tail, and trembling) was observed during the physical examination. Following the examination and collection of a blood sample, the dog remained under the owner's chair for the remainder of the consultation. The physical examination results were unremarkable, and hematologic evaluation (CBC, serum biochemical analysis, and serum total thyroxine concentration) yielded results within the respective reference ranges. Core vaccines, including vaccination against rabies virus, were up-to-date. The dog was receiving no medications or nutritional supplements other than a topical application against fleas, ticks, and mosquitoes and a chewable heartworm preventative given on a monthly basis.

## Diagnosis

Diagnoses of conflict aggression, fear aggression, pain-induced (irritable) aggression, resource guarding, and idiopathic aggression were considered for the dog's owner-directed aggression.<sup>1</sup> A primary diagnosis of conflict aggression, which is characterized by aggressive behavior directed toward owners in response to a perceived provocation, was made. Until recently, this diagnosis was designated as dominance aggression. It was thought to occur when an owner challenged a dog's social status by attempting to interfere with rest, take away valued objects, manipulate the dog physically, or reprimand it.<sup>2-6</sup> True dominance aggression is accompanied by assertive body language and an absence of fear or uncertainty.<sup>7</sup> In recent literature, the applicability of dominance aggression in most cases has been questioned; the predominant current understanding is that conflict aggression better describes the motivation for aggression toward owners in response to physical interventions, reprimands, and interference with access to valued resources.<sup>2</sup> Dogs with conflict aggression are described as showing signs of fearfulness as puppies and as adults. Their body language prior to attacks is often ambivalent rather than confident. Following episodes of aggressive behavior, these dogs are often reported to appear submissive or fearful, which is not consistent with dominance.<sup>2</sup> Furthermore, dogs

with conflict aggression have lower circulating concentrations of the transmitter serotonin, whereas dominant and confident animals typically have high serotonin concentrations.<sup>2</sup> In recent years, a debate has emerged about whether dominant-submissive relationships, on which dominance aggression is predicated, exist at all between people and dogs.<sup>8,9</sup>

The mixed body posture described for the dog of the present report when disturbed while resting or during unwanted handling by the owner as well as its submissive or fearful behavior following the attacks was consistent with a diagnosis of conflict aggression. The history of fear of unknown people and dogs further supported the diagnosis.<sup>2,7</sup> On the basis of the dog's body language and avoidant as well as aggressive responses to the veterinarian, the groomer, and the owner in the context of leashing for grooming and veterinary examinations, a diagnosis of fear-motivated aggression was also made for this patient.<sup>6</sup> Unlike other contexts in which owner-directed aggression was reported, piloerection, trembling, and attempts to escape were observed when the dog was approached with a leash. Repeated exposure to the fear-inducing stimulus and intermittent success at evading the leash negatively reinforced the behavior.

Because resting spaces may be a high-value resource to dogs, a diagnosis of resource guarding, which is considered by some to be a subclassification of conflict aggression,<sup>2</sup> could also have been appropriate. However, in the absence of other instances of guarding objects or food, resource guarding was unlikely to be the primary motivation. Pain-based (irritable) aggression was considered as well. Irritable aggression occurs when a dog has a painful medical condition that lowers its aggression threshold.<sup>1</sup> Pain may have contributed to aggression toward the veterinarian, the groomer, and the owner during the period in which the dog's anal glands were impacted. However, because the incidents of aggression in response to being disturbed while resting or being reprimanded occurred before the onset of the anal gland problem, pain could not fully account for the behavior. Episodic dyscontrol, also called mental lapse aggression, is characterized by sudden violent outbursts that occur unpredictably without an external stimulus. These episodes are thought to be a form of limbic seizure or partial complex seizure. The condition termed Springer rage is thought by some to be a form of this disorder.<sup>10,11</sup> Because the aggressive outbursts observed for the dog of this report were triggered by predictable interactions, and because the aggression stopped abruptly when the provocation was removed, Springer rage was ruled out.

## Treatment

At the time of the initial behavior consultation, the dog was fed a high-protein diet. The owner was instructed to replace the 38% protein diet with one that had protein content in the range of 18% to 22%.

Results of a small study<sup>12</sup> suggest that diets low in protein may be beneficial for dogs with dominance aggression, although others have noted that the study was too small to enable conclusions to be drawn.<sup>2</sup> Fluoxetine hydrochloride (1.3 mg/kg [0.59 mg/lb], PO, q 24 h) was prescribed to decrease impulsivity and reactivity and to facilitate behavioral modification. Fluoxetine increases serotonin neurotransmission by inhibiting reuptake enzymes in axon clefts, thus prolonging the effect of the neurotransmitter. The effect is mood stabilization with decreased anxiety, impulsivity, and aggression. Although use of the drug for treatment of conflict aggression in dogs is extralabel, it can be an effective treatment for this problem.<sup>3</sup> All confrontations and triggers of aggression were to be avoided.<sup>2,7,13</sup> A list of all interactions that resulted in aggression was generated, strategies were developed to avoid them, and a log sheet was provided to the owner for tracking incidents of aggression so that problems could be individually addressed during the follow-up period. To prevent the frequent confrontations associated with attaching and detaching the dog's leash, desensitization and counterconditioning was recommended. The owner was instructed to gradually expose the dog to the leash and to pair this exposure with high-value rewards. Punishment and reprimands were to be avoided; although punishment may suppress certain negative behaviors, it may result in response substitution if the underlying anxiety is not addressed. It also increases the risk of an escalation of aggression, in which an injury could occur.<sup>2,14</sup> Interactions between the dog and owner, including feeding and petting, were to take the form of command-response-reward to enable the dog to better predict and appropriately respond to interactions with the owner.<sup>2</sup> The owner was instructed to continue with regular positive reinforcement training to support consistency in dog-owner interactions and to strictly ignore attention-seeking behaviors.<sup>2,7</sup> The risks of another episode of aggression were discussed. The owner was also informed that, whereas improvement was possible, a cure was unlikely. Because the episodes were predictable, the importance of strict avoidance of known aggression triggers for human safety was emphasized.

## Follow-up

Weekly follow-up phone calls were instituted to check in with the owner on progress with the program. Each episode of aggression was discussed in detail, and the behavioral modification plan was adjusted as needed. After 2 months, a moderate decline in the frequency of aggressive episodes was reported. The dosage of fluoxetine was increased to 1.8 mg/kg (0.82 mg/lb), PO, every 24 hours to further decrease the patient's reactivity to triggers for aggression. Shortly after the dose change, the dog became inappetent and was markedly less active and playful. Lethargy and anorexia are common dose-dependent adverse effects of fluoxetine.<sup>15</sup> The fluoxetine dosage

was reduced (0.9 mg/kg [0.41 mg/lb], PO, q 24 h), and buspirone (0.68 mg/kg [0.31 mg/lb], PO, q 12 h) was added to the treatment regimen. Conservative doses must be used when combining buspirone with a selective serotonin reuptake inhibitor or tricyclic antidepressant to prevent serotonin toxicosis. Buspirone is a partial 5-HT<sub>1A/B</sub> receptor agonist that provides mild anxiolysis with few side effects.<sup>16</sup> It is also modestly effective at reducing aggression in dogs.<sup>16</sup> The effect is enhanced when combined with other medications such as benzodiazepines or selective serotonin reuptake inhibitors.<sup>17</sup> Robust antiaggression effects in rhesus monkeys, rats, and human patients have been documented.<sup>18-20</sup> Nevertheless, concerns that buspirone might disinhibit fear aggression have been expressed.<sup>16</sup> After 6 months, substantial improvement was made. Aggression continued to occur only when the owner attempted to attach a leash to the dog's collar. The intermittent experiences in which the dog was leashed for traveling to the veterinarian and the groomer continued to reinforce the fear associated with leash placement, despite the owner's attempts to pair the appearance of the leash with high-value food treats. To prevent further sensitization to the leash and to facilitate desensitization and counterconditioning, clonidine (0.02 mg/kg [0.01 mg/lb], PO) was recommended to provide short-term anxiolysis prior to all veterinary and grooming appointments. Clonidine is an  $\alpha_2$ -adrenoceptor agonist that reduces fear-based behaviors and reactivity in dogs; the drug acts by decreasing the outflow of norepinephrine in the locus ceruleus.<sup>21</sup>

At a 1-year recheck examination, no adverse effects of medication were reported. Episodes of aggression occurred only rarely and with substantially less intensity. When discontinuation of the medication was discussed, the owner showed great reluctance to make changes in the plan. Buspirone, fluoxetine, and clonidine administration were therefore continued at the described dosages. Annual monitoring with a CBC and serum biochemical analysis was recommended.

## References

1. Landsberg GM, Hunthausen WL, Ackerman LJ. In: *Behavior problems of the dog and cat*. 3rd ed. Edinburgh: Saunders-Elsevier, 2013;297-326.
2. Luescher AU, Reisner IR. Canine aggression toward familiar people: a new look at an old problem. *Vet Clin North Am Small Anim Pract* 2008;38:1107-1130.
3. Dodman NH, Donnelly R, Shuster L, et al. Use of fluoxetine to treat dominance aggression in dogs. *J Am Vet Med Assoc* 1996;209:1585-1587.
4. Borchelt PL. Aggressive behavior of dogs kept as companion animals: classification and influence of sex, reproductive status and breed. *Appl Anim Ethol* 1983;10:45-61.
5. Beaver BV. Clinical classification of aggression. *Appl Anim Ethol* 1983;10:35-43.
6. Overall KL. Canine aggression. Abnormal behavior and behavioral pathologies involving aggression. In: *Clinical behavioral medicine for small animals*. St Louis: Mosby, 1997;172-230.
7. Landsberg G, Hunthausen W, Ackerman L. Pet selection and the genetics of behavior. In: *Behavior problems of the dog and cat*. 3rd ed. Edinburgh: Saunders-Elsevier, 2013;34-37.
8. Bradshaw JWS, Blackwell EJ, Casey RA. Dominance in domestic dogs—useful construct or bad habit? *J Vet Behav* 2009;4:135-144.
9. Schilder MBH, Vinke CM, van der Borg JAM. Dominance in domestic dogs revisited: useful habit and useful construct? *J Vet Behav* 2014;9:184-191.
10. Beaver BV. Mental lapse aggression syndrome. *J Am Anim Hosp Assoc* 1980;16:937-939.
11. Podberscek AL, Serpell JA. The English Cocker Spaniel: preliminary findings on aggressive behaviour. *Appl Anim Behav Sci* 1996;47:75-89.
12. DeNapoli JS, Dodman NH, Shuster L, et al. Effect of dietary protein content and tryptophan supplementation on dominance aggression, territorial aggression, and hyperactivity in dogs (Erratum published in *J Am Vet Med Assoc* 2000;217:1012). *J Am Vet Med Assoc* 2000;217:504-508.
13. Horwitz DF, Neilson JC. Aggression: human directed/familiar people. In: *Blackwell's five-minute veterinary consult clinical companion canine and feline behavior*. Ames, Iowa: Blackwell Publishing, 2007;35-45.
14. Herron ME, Shofer FS, Reisner IR. Survey of the use and outcome of confrontational and non-confrontational training methods in client-owned dogs showing undesired behaviors. *Appl Anim Behav Sci* 2009;117:47-54.
15. Plumb DC. Fluoxetine hydrochloride. In: Plumb DC, ed. *Plumb's veterinary drug handbook*. 7th ed. Stockholm, Wis: Pharma-Vet Inc, 2011;443-445.
16. Landsberg G, Hunthausen W, Ackerman L. Pharmacology intervention in behavioral therapy. In: *Behavior problems of the dog and cat*. 3rd ed. Edinburgh: Saunders-Elsevier, 2013;111-138.
17. Overall K. Pharmacological approaches to changing behavior and neurochemistry. In: *Manual of clinical behavioral medicine for dogs and cats*. St Louis: Elsevier, 2013;458-534.
18. Blanchard DC, Rodgers RJ, Hendrie CA, et al. 'Taming' of wild rats (*Rattus rattus*) by 5HT<sub>1A</sub> agonists buspirone and gepirone. *Pharmacol Biochem Behav* 1988;31:269-278.
19. Tomkins EC, Clemento AJ, Taylor DP, et al. Inhibition of aggressive behavior in rhesus monkeys by buspirone. *Res Commun Psychol Psychiatr Behav* 1980;5:337-352.
20. Coccaro EF, Gabriel S, Siever LJ. Buspirone challenge: preliminary evidence for a role for central 5-HT<sub>1A</sub> receptor function in impulsive aggressive behavior in humans. *Psychopharmacol Bull* 1990;26:393-405.
21. Ogata N, Dodman NH. The use of clonidine in the treatment of the fear-based behavior problems in dogs: an open trial. *J Vet Behav* 2011;6:130-137.