

Animal Behavior Case of the Month

This feature is sponsored by the American College of Veterinary Behaviorists. Readers of the *JAVMA* are invited to submit reports, which should include a brief description of a behavioral problem, the evaluation and treatment, and succinct discussion of the case.

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Statement of the Problem

Two dogs were evaluated for sibling or “room-mate” rivalry (ie, aggression between 2 unrelated dogs residing in the same household).

Signalment

Dog 1 was a 4-year-old spayed Welsh Terrier weighing 14 pounds. Dog 2 was a 3-year-old spayed Welsh Terrier weighing 20 pounds.

History

The family consisted of 2 adult humans, 3 dogs, and no children.

Dog 1 was acquired from a reputable breeder at the age of 9 weeks. She was raised indoors with a family until the age of 9 weeks and was spayed at the age of 6 months. Dog 2 was acquired from a breeder at the age of 9 weeks. She was penned outside with other dogs from birth to 9 weeks and was spayed at the age of 6 months. Both dogs were fed an artificial preservative-free dry food twice daily. During the day, they were permitted free access to all areas of the house and were allowed on the beds and furniture. Both dogs had at least 30 minutes of rigorous daily exercise including swimming and retrieving. Overnight they were confined separately in crates in the owners' bedroom.

The owners put dog 1 through a commercial obedience-training course when she was approximately 5 months of age. This dog's frenzied demeanor at the sight of other dogs caused the instructor to advise the use of a prong collar, which was used for correction on only 1 or 2 occasions. Dog 2 also was enrolled in a commercial obedience-training course at the age of 14 months.

The dogs were verbally but not physically disciplined for minor misdemeanors. Mild physical discipline was used on dog 1 for occasionally challenging the owners, and strong physical measures were taken by the dogs' owners to break up fights. To disrupt fighting, the owners had tried growling at dog 2, swatting her on the rear, flipping both dogs roughly onto their backs and then massaging them, loud screaming, and

tossing the dogs into the swimming pool. On one occasion a belt was placed around dog 2's neck and tightened until she released her grip on dog 1. Upon disengagement, the dogs were isolated from one another for a few hours.

The owners first noticed aggressive behavior in dog 2 the day after her adoption, when she began to bully dog 1 and exhibit possessiveness over toys, food, and chews. However, before the onset of actual fighting, the 2 dogs apparently enjoyed each other's company. They played constantly but competitively and spent all their time together. At that time, dog 1 was confident and happy in her role as leader.

The first serious incident of aggression between the 2 dogs occurred when dog 2 attacked dog 1 when dog 2 was approximately 5 months of age. Both dogs were scolded and isolated following the incident. The owners could not recall the trigger for this particular event but thought it may have been a favored object. After this first incident, the frequency, severity, and duration of fights began to escalate. Dog 2 was the aggressor in all instances.

The first altercation between the dogs necessitating emergency veterinary attention (for dog 1) occurred when dog 2 was 1 year of age. Dog 2's size advantage enabled her to pin dog 1 on her back. Dog 2's attacks focused on the throat region of dog 1 and, on achieving a grip anywhere on dog 1, she displayed a shake-and-kill head motion. Dog 1 did not lie passively but would growl and snarl at dog 2, further escalating the situation. The average severity of fights was rated by the owners at 6 or 7 on a scale from 1 to 10 (1 = minimal aggression; 10 = the most extreme behavior possible). In most fights, the dogs each locked their teeth into the other's muzzle, making separation difficult without causing physical injury to 1 or the other dog. Dog 1 typically sustained the worst injuries, most often neck or face wounds. On 1 occasion, a fight was severe enough to cause dog 1 to lose control of bodily functions and suffer what an emergency veterinarian diagnosed, retrospectively, as a brief cardiac arrest.

At the initial consultation, almost 3 years of fighting had resulted in injuries to dog 1 on approximately 6 or 7 occasions, injuries to dog 2 on 1 to 3 occasions, and injuries to the owners on 3 occasions as they attempted to break up fights. In 1 such instance, the woman owner received 17 sutures and sustained a digital fracture. Injuries to owners occurred exclusively during attempts to disrupt fights. Triggers for fights between the dogs included owner affection to dog 1, highly regarded chews or treats, food, and environmental disturbances such as visitors coming to the door or pedestrians passing on the street. The dogs did not fight when left alone.

From the time the fighting began, the owners supported dog 2 as the more dominant dog, handling and feeding her first and giving her access to preferred loca-

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tions. Dog 1 was verbally reprimanded after fights. Dog 1 consistently deferred to dog 2 in the owners' presence, presumably to avoid conflict. Dog 1's deference may have been a learned response facilitated by owner reinforcement of dog 2's social status.

The frequency of serious fights between the dogs escalated from every 6 weeks to every 10 days during the few months prior to the initial consultation. Altercations between the dogs were usually preceded by about 3 days of apparent tension and near hostility with dog 2 being hypervigilant and sometimes staring down dog 1 for no apparent reason. Despite the owners' interventions, the interdog aggression problem continued to escalate in frequency and intensity.

Physical Examination Findings and Laboratory Results

Both dogs were found to be in good physical health as assessed from a detailed clinical history and physical examination. No laboratory tests were performed.

Diagnosis

Dominance-related aggression between dog 1 and dog 2 was diagnosed. In addition, there were incidents of redirected aggression toward the woman owner as she attempted to break up fights.

Treatment

The owners were instructed to embark on a positive-reinforcement owner-dominance (or leadership) program to establish their dominant status with both dogs. They were instructed to avoid all confrontations with the dogs; cease all painful punishment-based interventions (because pain and punishment may promote aggression in dogs^{1,2}); deny the dogs access to furniture and other high places; require the dogs to work for or earn desired resources such as owner affection, food, and treats; and begin an in-home obedience regimen of noncompulsive positive-reinforcement techniques for 20 minutes daily for each dog, using a body harness as a teaching tool. Tug-and-pull games or roughhousing with the dogs were to be eliminated, and the owners were instructed to retain proprietary control over all of the dogs' toys and activities.

To restructure the dominance hierarchy between the dogs, the owners were asked to reinforce the dogs' status in keeping with an elder-support program. Because of her elder status and longer duration of tenure in the home, dog 1 was to be reinforced as the more dominant dog and be given preferred status (ie, to receive earned resources such as owner affection, food, treats, obedience lessons, and exits and entries into or out of the house or car before dog 2).

For safety reasons, during the initial 2 weeks of the behavior-modification program, all situations that may trigger fights were to be avoided, and the dogs were to be kept either separated or on leash at all times. As far as was practical, environmental disturbances were to be avoided, and the dogs' access to highly emotive items such as highly regarded edible chews was denied. These fight triggers were to be gradually reintroduced at a later stage in the program once the dominance

hierarchy had stabilized. In essence, all possible measures were to be taken to prevent fights from occurring until the rank order shifted.

To facilitate safe management of the dogs, the owners were instructed to keep the dogs in body harnesses to better control their activities and to facilitate the disruption of fights. If fights did occur, the dogs were to be disengaged by quietly holding them in place by the harnesses until their excitability level dropped, the moment passed, and they released their grips. The owners were instructed to pay particular attention to reducing the buildup of tension in the dogs, which characteristically preceded fights by about 3 days. This was to be accomplished through play-distraction and obedience training with a positive focus. To expedite the treatment program, dog 2, the primary aggressor in all instances, was treated with fluoxetine (10 mg, PO, q 24 h).

Follow-up

The overall situation in the household improved approximately 50% in the first 2 weeks of treatment, as assessed by both owners. At the same time, the owners' comfort level with the situation improved considerably with a lowered level of tension in the household. Both dogs were much calmer and seemed more playful and happy. Possibly as a result of the support dog 1 was receiving from her owners, her confidence in conducting her own daily activities improved noticeably, and she began to "participate in life" once more. Dog 1 invited play from dog 2 for the first time in several years, and dog 2 began to engage in approval-seeking from dog 1 (licking dog 1's mouth).

One fighting incident took place during this 2-week period. It occurred when a neighbor appeared unexpectedly at the door with her own large dog. The dogs were not wearing their harnesses at the time. Dog 2 attacked dog 1 in the context of excitement-induced redirected aggression. No physical injury occurred to either dog, and the owners reported that the intensity and severity of the fight was considerably less than in previous incidents. At this stage of the proceedings, dog 1 was still deferring to dog 2 in some situations, an indication that the dominance hierarchy between the dogs had not fully stabilized in the new order.

After 12 weeks of the elder-support initiative, 90% improvement had been achieved, as assessed by the owners. No actual fights had occurred in the previous 4 weeks, and if skirmishes did occur, dog 2 inhibited her aggressive responses, an indication that the natural rank order was beginning to emerge. Most noticeable to the owner was that she could now show affection to dog 1 in the presence of dog 2 without a fight ensuing.

After 14 weeks, the owners reported that the frequency and intensity of altercations had continued to decline. Situations that in the past had triggered altercations now passed without incident. The owners reported that the dogs were once again happy together, playing constantly and nonaggressively as they had been in the early stages of their relationship. Dog 1 recovered her confidence, standing up to dog 2 over toys, and dog 2 was regularly deferring to dog 1 on issues that for 3 years had resulted in conflict. Dog 1

was showing the normal confidence of the dominant dog, keeping order but sharing toys. At this time, there had been no fights for 6 consecutive weeks.

Fifteen weeks after initiation of the program, the dogs engaged in a scuffle, their first in more than 6 weeks. The altercation ceased on its own without owner involvement, but in the process, dog 2 stepped on a sharp object, lacerating a footpad. The wound required veterinary attention. The following day, on returning from the veterinary office, dog 2 attacked dog 1, and an intense fight broke out. The owners had to separate the dogs, but no physical injury was sustained by either dog. No altercations occurred during the ensuing 2 days, but dog 2 was taken back to the veterinarian's office for a minor surgical procedure to remove a sebaceous cyst. During the week following dog 2's surgery, 1 skirmish and 4 fights took place, the last 3 in the space of 12 hours beginning 4 days after the surgical procedure. The positive relationship that had developed between the dogs during the previous 4 months deteriorated abruptly. At this time, the local veterinarian prescribed diazepam (5 mg, as needed) for dog 2; however, the owners may have inadvertently administered 10 mg at a time, as 10-mg tablets had been dispensed. The fights promptly intensified, and the pair began to show aggression on mere sight of each other through barriers and windows. Administration of diazepam was discontinued immediately. The owners separated the dogs for 2 weeks to allow the effects of the diazepam to dissipate, but on reintroduction, the dogs continued to attempt to fight. They were separated again but continued to growl and display aggressive behavior on sight of each other for an additional 4 weeks.

At this time, the behavior-modification program was in limbo, and nonroutine measures were called for to get the program restarted. We suggested an intensified leadership program on the part of the owners and use of soft, pliable, yet secure cloth muzzles for both dogs to help prevent injuries to either dog while they were allowed to interact. Muzzling was not suggested simply to let them fight it out, a remedy to which the authors do not subscribe, but rather it was an attempt to permit dog 1 to reestablish her newly acquired dominant status without risk of injury to either dog. Consequently, the dogs were reintroduced wearing muzzles, harnesses, and leashes. The latter 2 items were employed as a precaution against a slipped muzzle. The owners were instructed not to react in any way if a fight broke out. The dogs were let outside into the pool area together. As expected, dog 2 attacked dog 1, however, as dog 2 was not able to inflict any damage or pain, dog 1 then turned and attacked dog 2. This was the first known instance of dog 1 attacking dog 2. As instructed, the owners did not react, remaining inside the house and away from the pool area. Dog 1 attacked dog 2 a total of 3 times. After 20 minutes and dog 1's third attack, dog 2 postured complete submission to dog 1, stopping just short of prostration. This was the first time dog 2 had ever displayed openly submissive behavior to dog 1. When dog 2 submitted and the fighting stopped, the muzzles were removed and the dogs trotted off together with dog 1 in the lead, an

indication that the dominance-deference issue had, if only temporarily, been resolved.

Two weeks later, there had been no serious altercations, despite the fact that the dogs had been permitted free access to one another, without muzzles, for the entire 2-week period. During that 2 weeks, there were 3 minor incidents of aggression (2 growls, 1 snap) by dog 2 toward dog 1. In each case, as instructed, the owners muzzled dog 2 as a consequence of her threat to dog 1. In all 3 instances, dog 2 appeared to acknowledge wrongdoing through displays of submissive postures, and when the muzzle was removed approximately 30 minutes later, she remained compliant in her interactions with dog 1 and her owners for the remainder of the day. With consistent application of the muzzle to dog 2 whenever she challenged dog 1, incidents of threats from dog 2 to dog 1 decreased to a desultory level.

Five months after program initiation, the dogs' owners reported that the problem was resolved. On occasion, the muzzle still had to be applied to dog 2 as a preventive measure when dog 2 was unwell or had visited the veterinarian's office. We suggested to the owners that they could reasonably decrease the dose of fluoxetine at this time with the possibility of eventually discontinuing administration, but they declined this option as they were concerned that the aggressive behavior may return. As we saw no reason to decline the owners' request, dog 2 was continued on fluoxetine treatment with the advice that the owners should have the dog's health status checked regularly by her local veterinarian.

The behavior-modification regimen was then continued to include gradual reintroduction of fight triggers into the environment. This stage was completed without incident. A progress check 1 year later indicated that despite occasional tension between the dogs, their relationship had remained fight free.

Discussion

Sibling or roommate rivalry between dogs is a result of an ongoing struggle to establish a stable dominance hierarchy.^{3,4} Domestic dogs normally determine rank by temperament, age, time in house, and size.⁵ In this case, fighting between dogs 1 and 2 escalated, because the owners were handling, supporting, and reinforcing dog 2, the younger and most recently acquired dog, as the more dominant dog simply because she behaved in what the owners had interpreted was a dominant manner. Reinforcement by the owners of an unnatural dominant-nondominant relationship between these 2 dogs, coupled with punishment-based techniques employed in breaking up fights, most likely caused, perpetuated, and intensified the aggressive rivalry between the 2 dogs.⁶ In addition, the owners' leadership of both dogs was inadequate, as evidenced by both dogs ignoring the owners' commands, particularly in novel or exciting situations. A dog without strong owner leadership has little need for owner approval and is indifferent to owner disapproval. The dogs' disinterest in owner approval made it difficult for the owners to interrupt fights and control the dogs in distracting situations.

The social interactions of domestic dogs, including the need to establish a stable pack structure, are based on their wolf ancestry.⁷ In the home, the dynamics of such interactions are inclusive of all family members, human and canine. It is necessary for owners to demonstrate their unequivocal leadership over both dogs for cases of sibling rivalry to be resolved successfully. In cases of sibling or roommate rivalry between dogs, a behavior-modification program that targets owner leadership and support of the natural dominance-deference order between dogs should be adopted. Body harnesses are useful in obedience training and for general management of small and large dogs. Using harnesses encourages dogs' compliance with owner requests in a nonconfrontational way and without the aggression that can result from more invasive training measures.

Addressing sibling or roommate rivalry is most often successful when an elder-reinforcement format is employed. In the authors' experience, this remedial arrangement has resulted in successful resolution of the problem in approximately 75% of cases; the opposite approach has repeatedly intensified or perpetuated the fighting.

The dominance or leadership program should be structured so that the owner can gain access to a hierarchical position clearly above that of the dogs. The strategic dispensation or withholding of approval by the owner can then be used as a behavioral tool for continued permanent management of appropriate pack structure. The owner leadership program includes noncompulsive nonconfrontational obedience training that does not use pain, force, or fear as teaching tools. Physical and verbal discipline should be eliminated from the retraining program, as it may cause an escalation of aggression between dogs and between dogs and owners.

If fighting intensifies after successful implementation of an owner-dominance program in conjunction with an elder-support program for 2 to 3 weeks, it may, in some cases, be necessary to try changing the order of support. A junior-support program may also be necessary when an older dog is adopted into a household containing a younger dog. In such a situation, sex and temperament are the primary factors to consider in determining which dog to support as dominant.

For successful treatment of sibling rivalry, 5 elements must be present: an accurate determination of the identity of the true dominant dog; owner reinforcement of the naturally dominant dog (typically, the elder dog); successful achievement of owner-leadership over all the dogs that are fighting; a noncompulsive nonaggressive obedience regimen; and full owner compliance with all recommended procedures. If all 5 elements have not been fulfilled, then the elder-support arrangement should be continued until all 5 conditions are met. It is strongly advised that the elder-support program be employed for an appropriate time (2 to 3 weeks) before considering reversing the order.

An unnatural rank order had been reinforced for a long time in the case described in the present report. That a junior-support program took place during a sensitive period of dog 2's development made rehabilitation more difficult than it otherwise may have been.

The wolf ancestry of dogs requires that the strongest and most secure holds the lead position. This is not necessarily true for pet dogs for which survival is no longer at stake. In domestic situations, the elder-support or incumbent-support arrangement is the most effective arrangement for preventing or rehabilitating sibling rivalry, although occasionally reverse-order support may be necessary.

The generalized aggressor-support therapeutic approach to sibling rivalry in domestic dogs in which the junior is challenging the senior is highly suspect in terms of its underlying philosophy and, in our hands, has seldom met with success. Among other factors, the patience and perseverance of dog owners may not be optimal with a junior-support arrangement, as they are often disinclined to deny the original resident dog what are perceived as its fundamental rights and privileges.

Most practitioners agree that the dominant dog should be supported in cases of sibling rivalry, and this approach has proved successful for many behaviorists. The difficulty, however, lies in the accurate determination of which dog is the truly dominant. Pet owners are sometimes misled, assuming that the dog that bullies, cuts off the other dogs at exits and entries, and secures all the toys for itself, and the dog that is successful at gaining the owner's attention by means of aggressive displays is the true dominant, but this is not necessarily the case.^{1,6} It has been said that "rank structure is maintained not through displays of aggression, but through displays of deference."⁶ We concur with this view. The bully of a pair is not necessarily the stronger dog; in fact, bullying is more characteristic of a lower-ranking dog.¹ As it relates to human social behavior, a bully is one who is notably insecure, one who does not possess leader characteristics.

In dogs, the naturally dominant dog is aloof, not excessive in acquiring owner attention and does not need to use aggression to secure resources. The dog with this calm and self-assured bearing is the dog to be identified and supported as the true dominant,⁶ and this coincides most often with the eldest dog in a group.

That domestic dogs determine the oldest to be dominant is rooted in their nature. Wolves respect the dominant status of elder wolves.⁶ Domestic puppies know instinctively from birth that maternal and paternal dominance is never questioned. Parents are older and, therefore, more dominant. By the junior-support formula, a 6-month-old puppy that challenges the rank of the resident dog would be supported as the more dominant dog. An unnatural rank order would be reinforced and, over time, sibling rivalry would likely develop in dogs with more aggressive dispositions. Owing to owner facilitation¹ of the inequity and the unresolved conflicts that therefore result, fighting often escalates in frequency and intensity⁶ until rehoming or euthanasia are sometimes seen by the owner as the only courses of action.

It is imperative to employ the optimum behavioral program initially to redeem these factors. If the success of a case is determined by the successful achievement of its objective to perpetuate the lives and sustain the

quality of life of all dogs involved, the early adoption of an elder-support program is strongly advised.

Fluoxetine was used to facilitate treatment in the case described in the present report on the basis of its reported antiaggressive effects.⁸ Fluoxetine increases the concentration of serotonin in central synapses, thus stabilizing mood and reducing impulsivity and aggression.^{8,9} That behavior modification was instrumental in the management of aggression between these 2 dogs, however, is borne out by the fluctuating levels of aggression during the initial stages of treatment, although fluoxetine treatment likely contributed to the successful resolution of this case.

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