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Dear Doctor,

I am a professional dog behavior consultant in DFW working with your clients. For reference, among other qualifications, I am a Certified Dog Behavior Consultant (CDBC) from the International Association of Animal Behavior Consultants (IAABC) as well as a Certified Behavior Consultant Canine (CBCC) from the Certification Council for Professional Dog Trainers. I am also a Certified Separation Anxiety Trainer and Fear Free Elite Certified Professional and have a Master's Degree. I work with fearful and aggressive dogs and help them to feel better without using fear, pain or force.

The family reached out for help with their dog's noise sensitivity. I would like to have their dog considered for the medicines recommended by veterinarian team who authored Behavior Problems of the Dog and Cat, 4<sup>th</sup> edition. I have included this section of this book for you and have highlighted a few areas with medicine.

Please don't hesitate to contact me if you would like further detail I welcome collaboration and have seen better prognosis and outcomes when the veterinary teams work closely with us.

Sincerely,

*Nicole Kohanski*

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# Behavior Problems *of the* DOG *and* CAT



*Fourth Edition*



Gary Landsberg, Lisa Radosta, Lowell Ackerman

# Behavior Problems of the Dog and Cat

FOURTH EDITION

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# Noise aversion

**Kelly C. Ballantyne, DVM, DACVB**

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## Introduction

Noise aversion is a term used in veterinary medicine to describe an animal's negative emotional and behavioral response(s) to noise. While commonly referred to as noise phobia, noise sensitivity, and noise reactivity, noise aversion may be a more appropriate term to describe the problem, as not all responses meet the criteria for phobia.<sup>1-3</sup> Noise and thunderstorm aversion are among the most common emotional disorders of dogs, ranging in prevalence from 17% to as high as 50% of the pet dog population.<sup>4-9</sup> While cats can also have noise aversions, their behavioral responses of freezing or hiding may be overlooked by pet parents, or not deemed as problematic or necessitating treatment unless the noise aversion results in more troublesome responses such as unacceptable elimination. In addition, noise aversion is one of the most common triggers of redirected aggression in cats toward people, other cats, and dogs.<sup>10</sup> Genetic sensitivity, trauma associated with noise, lack of socialization, and poor maternal care may contribute to the development and progression of the problem.<sup>2,7,8,11,12</sup> Fearful dogs have been shown to have greater noise sensitivity than nonfearful dogs.<sup>4,7</sup> One study suggested social transmission may play a role, whereby the dog learns its fear from another dog in the household,<sup>10</sup> but additional empirical data on this phenomenon are lacking. Noises that trigger an aversion include fireworks, thunder, gunshots, vacuum cleaners, or loud vehicle noises,<sup>3,4,11</sup> and dogs averse to one noise are not always averse to all noises.<sup>2,5</sup> Prevalence of noise aversion varies with study populations (e.g., behavior referral cases versus pet parent surveys) and with location, perhaps due to differences in geography, genetics and breed distribution, environment and upbringing, and cultures. In a web-based survey of over 4000 dog owners, 75% of whom

were from the United States, 25% were fearful of noises (including storms) while in a UK postal survey of almost 4000 UK pet parents, 49% of dogs were reported to have noise fears. One study showed approximately 90% of dogs with storm phobias have noise phobias, but only 75% of dogs with noise phobias have storm phobias.<sup>1</sup> Some studies suggest a comorbidity with separation-related disorders and other fear and anxiety disorders.<sup>1,7,8,9</sup> However, one study found that about 50% of dogs with separation-related disorders were afraid of loud noises, while 23% of dogs with noise sensitivity had signs of anxiety.<sup>7</sup> In yet another study, fear of gunshots, thunder, and fireworks commonly co-occurred, but there was low association with other fearful and anxious behaviors including separation-related disorders, fear of people, and attention seeking.<sup>4</sup> Yet dogs with fear of less salient noises such as traffic, loud sounds on TV, and vacuum cleaners were more likely to have a comorbidity with separation-related disorders, fear of people, and fear of animals.<sup>5</sup> Similarly, Tiira et al. found a correlation between thunder, fireworks, and gunshots but not with other loud noises such as vacuums and leaf blowers.<sup>7</sup> This may indicate an association between fear of less salient noises with more fearful personalities (sensitivity, reactivity), while fear of more salient noises occurs in a wider range of dogs due to the nature of these stimuli.<sup>4,13</sup> Noise aversions typically develop around one to two years of age,<sup>5,11</sup> with prevalence<sup>4,8,11</sup> and severity<sup>5,6</sup> increasing with age. The aversion may generalize to the location where the noise was experienced and/or the conditions that co-occur with the noise (e.g., rain, wind, dark skies); therefore, animals may demonstrate signs of distress when exposed to these stimuli without the noise. Dogs that generalize their noise aversion to associated locations or develop signs later in life should be carefully evaluated for chronically painful conditions such as osteoarthritis.<sup>14</sup>

Exposure to fireworks, engine noises, banging doors, vacuum cleaners, and loud voices before six months of age<sup>12</sup> and proactive training prior to the onset of noise aversions may have protective effects.<sup>5</sup>

The best way to prevent fears and phobias is to carefully expose pets to as many different stimuli as possible while they are still young. As early as two weeks of age, puppies and kittens should be exposed to a wide variety of mild stimuli, including noises, lights, surface textures, and odors. The goal is to habituate them to a variety of stimuli during the socialization period and through the first year of life. Proactive counterconditioning to stimuli that are known to evoke fear, such as the sound of thunder or fireworks, using the animal's favorite reinforcer should begin as soon as possible.<sup>5</sup> See Chapters 2 and 5 for a discussion of socialization and prevention of behavior problems and Chapter 10 for a discussion of behavior modification, including desensitization and counterconditioning (DSCC).

## Diagnosis and potential outcomes

Signs of noise aversion can include trembling, hiding, vocalization, attention seeking, crouching, pacing, freezing, panting, hypersalivation, destruction, escape attempts, decreased appetite or anorexia, vocalization, and urination or defecation in response to a noise or throughout the duration of a noise event.<sup>3,4,6,15,12</sup> (see Figure 15.1). The intensity of the clinical signs can range from mild signs of anxiety to intense panic. Return to normal baseline behavior following the end of the noise event may be delayed in some dogs, with approximately 12% taking 3–7 days to recover from the event, and approximately 3% taking several weeks to months.<sup>5</sup> In most cases, the fear-eliciting sound is loud and quite distinct (e.g., fireworks, thunder, gunshots) and difficult to localize. The diagnosis is straightforward if the pet parent is present at the time of the noise event to observe the pet's response; however, noise aversions may mimic separation-related

disorders if the pet's distress is more intense when home alone during a noise event.<sup>16</sup> Some pets may display aggression toward humans and other animals during or following noise events, either as redirected aggression or if attempts are made to force the frightened animal out of a hiding spot.

As with all behavior disorders, noise aversion is treated with four modalities in mind: systemic wellness, management of the environment, behavior modification, and neurochemical modulation (i.e., medications, supplements, diet). Many noise aversions can be managed successfully with a combination of environmental management, behavioral modification, and neurochemical modulation. The prognosis varies greatly depending on the individual, the duration and intensity of the problem, the ability to control stimuli during treatment, the household, and pet parent expectations. Successful resolution of noise aversions is possible for some dogs,<sup>5</sup> but management and medication may be necessary for many dogs throughout their lives.

We know that noise aversions can have a genetic component, which might explain why treatment of some dogs can be such a challenge. Other factors lending to a negative prognosis include the presence of concurrent fears and phobias and the inability to completely avoid fear-eliciting stimuli outside of controlled behavior modification sessions, which makes DSCC less effective. Complete avoidance of noise stimuli, especially thunderstorms and fireworks, is not possible for many animals. Thunderstorm season can last several months in some parts of the world and fireworks may occur daily for several weeks surrounding major holidays in some regions. In addition, thunderstorms have multiple stimuli, including sounds of rain, thunder, lightning, and possibly barometric pressure and static charges that are difficult to reproduce for DSCC sessions. In comparison, gunshots, cars, trucks, or other noises that might cause noise aversions can be more practically reproduced for DSCC. Another issue is that DSCC takes time and commitment, and treatment adherence is variable.<sup>17,18</sup> Therefore, management, rather than resolution, might be a more reasonable goal.

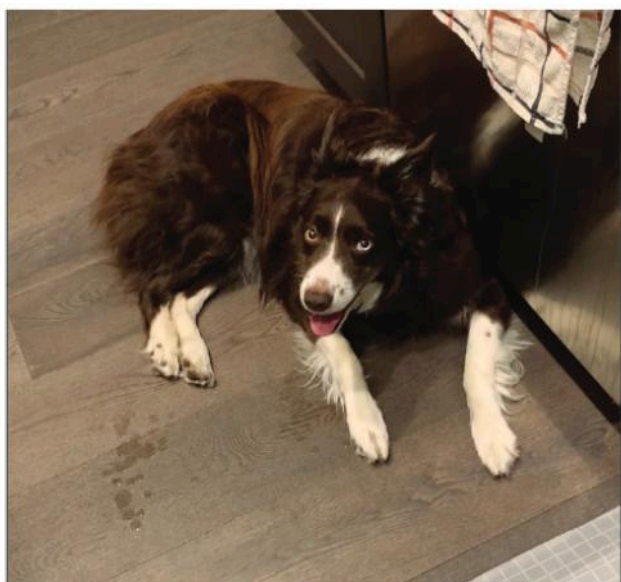


**Figure 15.1** The body language associated with noise aversion includes ears back, panting, hiding, lying down, not moving, head down, and dilated pupils. (Attribution: Kelly C. Ballantyne.)

## Management

An important initial step in the treatment of noise aversions is management of the pet and environment to minimize or prevent exposure until behavior modification can be effectively implemented (Box 15.1). As the problem is often a serious concern for the pet parent (e.g., concern over the pet's well-being, disturbing sleep, household damage) and further exposure generally worsens the problem, some method of avoiding, masking, muting, or reducing the intensity of the sights and sounds should be the initial focus. During noise exposure, the pet parent should develop strategies for helping the pet to calm, such as taking it to an area where it feels most secure and attempting to engage the pet in a pleasant activity such as feeding or play. Retreat to a safe hiding place is a normal, appropriate, and adaptive response to storms. It is not uncommon for pet parents to be told to ignore their pet when they are showing signs of fear or panic during a noise event. This recommendation is outdated, ineffective, and inhumane. Fear cannot be positively reinforced. In other words, if the pet parent hugs their cat if it is afraid of a storm, they will not be more afraid of the storm. However, the pet parent

**Box 15.1** Management of pets with noise aversions

1. Protect from overwhelming exposures to fear-evoking noises or thunderstorms
  - a. Avoid situations where the pet may encounter the sound if possible.
    - i. Walk at different times of day
    - ii. Don't bring the pet to areas where they may encounter the sound (e.g., fireworks display, baseball games)
2. Make a sanctuary space (Figures 15.2 and 15.3)
  - a. Room, area of the home, crate, or carrier.
  - b. Follow the pet's lead. If the pet has already chosen a space, try to make it work.
  - c. If necessary, condition the pet to accept a new sanctuary space.
  - d. Choose a room with small or no windows.
  - e. If windows are present, draw the curtains, blinds, or shades.
  - f. Prepare the space with food, toys, litterbox (cats) or pee pads (dogs) if applicable, litterbox (cats) or pee pads (dogs) if applicable, reduction of sound, etc. before any event where it might be needed. For storm-phobic dogs in southern states, it will need to be prepared each day.
  - g. Train the pet to settle and relax in the area and enter the area voluntarily and on cue using positive reinforcement.
3. Reduce the sound
  - a. Provide sound reduction by nesting cardboard boxes, blankets, or covers made of acoustic foam. Be certain to maintain sufficient air circulation.
  - b. Use white noise, brown noise, classical music, a fan, or the television. Note: background noise such as white or brown noise is best.
4. Countercondition whenever possible
  - a. Give favored chews, companionship
  - b. Offer favored reinforcers (food, play) immediately following loud noises
  - c. Throw a storm party by running around the home, excitedly tossing treats and toys
  - d. Offer a food-filled toy for the pet to enjoy throughout the noise event
5. Use commercially available products if helpful and the pet has been positively conditioned to wearing them.
  - a. Wearables to mute auditory stimuli such as Mutt Muffs (Figure 15.4), Happy Hoodies and noise-canceling headphones for dogs
  - b. Wearables to mask visual stimuli such as Doggles, Rex Spex, and ThunderCaps
  - c. Pressure wraps, including the Anxiety Wrap and ThunderShirt, may have small but beneficial effects. Habituation to the wrap and repeated use may improve the likelihood of any benefit.<sup>18,30</sup>
6. Keep it positive
  - a. Do not punish.
  - b. Redirect the pet immediately to the sanctuary space or a safety behavior when fearful if the pet can recover from the fearful event spontaneously
  - c. Offer contact and comfort if that decreases the pet's distress
7. Desensitize and countercondition
  - a. Select a calm location with few distractions for training.
  - b. Desensitize with a reproduction of the noise (or a masked, muted, reduced, or sufficiently distanced presentation of the noise (e.g., gunshots) and countercondition with favored reinforcers reserved exclusively for associating with the noise recording.
  - c. Desensitization and counterconditioning is only effective if complete avoidance of the fear-inducing stimuli is possible until the entire process is complete. This rarely works for thunderstorms, but may work for more discrete stimuli.
8. Neurochemical modulation/anxiolytic support
  - a. Use an SSRI, TCA, or SNRI on an ongoing basis year-round or through the time of year when distress-inducing noises might be expected.
  - b. Use an as-needed medication for storms either initially until the antidepressant is effective (4–6 weeks) or consistently (e.g., orotransmucosal dexmedetomidine gel, imepitoin, a benzodiazepine, clonidine, trazodone, or gabapentin).

also isn't teaching the pet any coping tools in order to self-soothe. Nor are they ensuring that the disorder doesn't progress. Don't tell pet parents to ignore their pets during a panic attack. Tell them to distract, redirect, move their pet into the sanctuary space, or countercondition their pets.

## Treatment

One of the most effective ways to treat noise aversion is to provide the patient with a sanctuary space (see Chapters 5 and 14). A sanctuary space is a room, crate, or another space where the pet can get away from frightening sounds (see Figures 15.2 and 15.3). The room should be comfortable with all that the pet needs including water, a comfortable bed and if for a cat, a litterbox (see Box 15.1). It should have no windows, or the windows should be able to be closed and covered so that the lightning and dark sky is not seen by the pet. It is notable that pets often choose their own sanctuary spaces. While ideally we would train them to move to a more appropriate space if the one that they have chosen is less than ideal, that isn't always practical. Sometimes, we need to make the space that they have chosen safe using the techniques below. The purpose of the sanctuary space is not to necessarily confine the pet there, as many pets that have noise aversion may also have confinement distress. Instead, the room is open to them. They are taught to go there when

they are stressed. The room should be prepared for storms beforehand with background noise (e.g., white, brown) or classical music, a bed, water, pheromone analogs, potentially aromatherapy, and a toy filled with food. The pet can be conditioned to go there using hide-and-seek games or a go to your mat cue. In the latter, the pet is taught to go a mat and stay there in the sanctuary space. Products that drown out sound such as Mutt Muffs noise-canceling headphones or a small amount of cotton in the outside of the ear may help as well (see Figure 15.4). For both dogs and cats, toys filled with food can be used to help condition a calm response. In a multipet household, one of the pets may need to be confined if they are likely to fight over resources.

DSCC is a commonly recommended treatment for noise aversions in dogs; in two studies that utilized sound recordings and a written DSCC protocol for treatment of fireworks fears, pet parents reported improvement in their dogs' firework fears and high satisfaction with the treatment.<sup>19,20</sup> This treatment is most effective when fear-inducing stimuli are avoidable. In addition, the stimuli used for DSCC will need to be modified and controlled. For example, controlling the volume or distance from the stimulus to the subject can be used to set up a gradient of stimuli. Audio recordings and camera flashes can be used for dogs that are afraid of storms or fireworks. Recordings are available for most noises that might be aversive, including fireworks, gunshots, cars, trucks, motorcycles, vacuum cleaners, hot air balloons, and more. For sources of noise

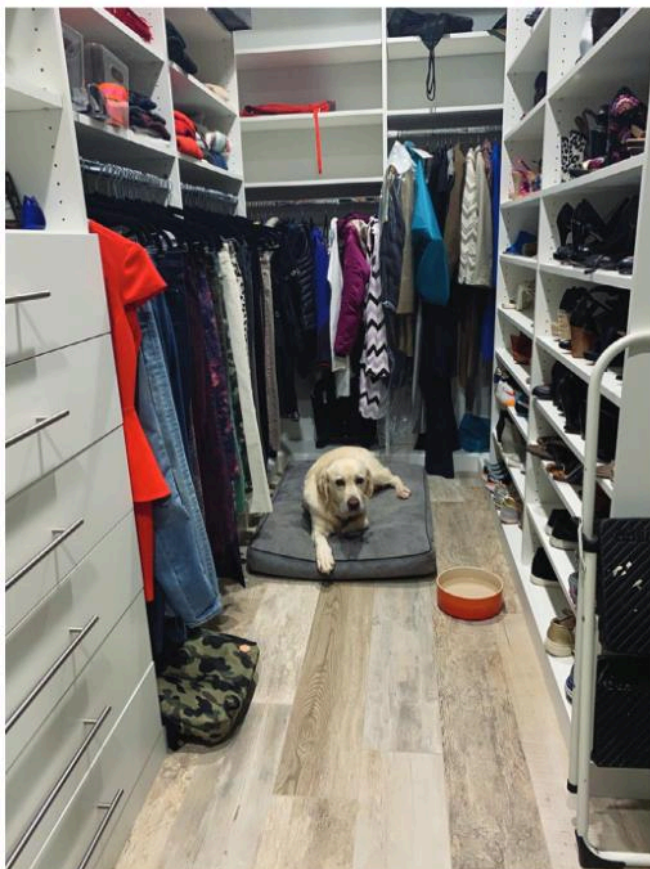


**Figure 15.2** A sanctuary space can be made anywhere and is the foundation of improvement for storm and fireworks treatment. (Attribution: Lisa Radosta.)

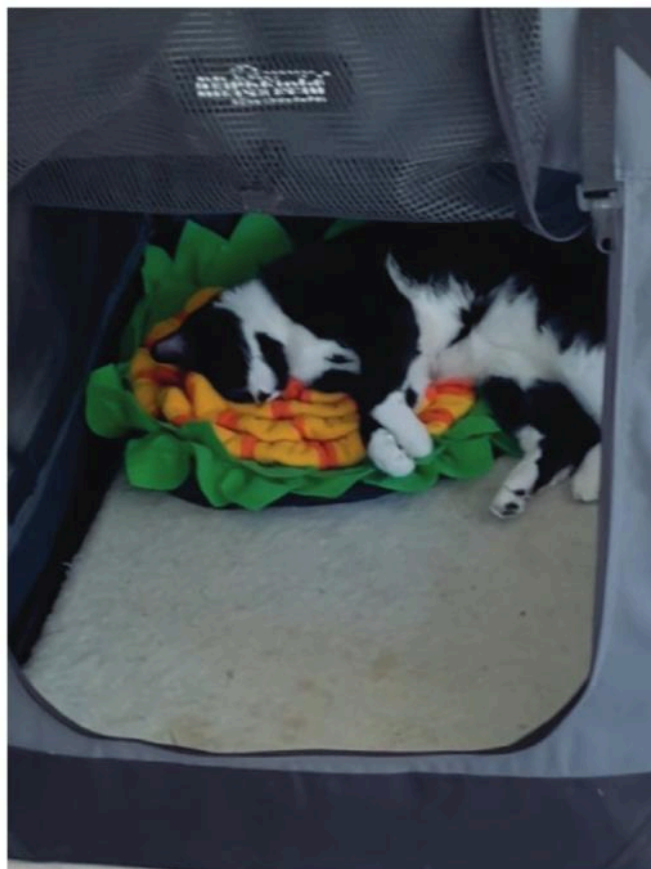


**Figure 15.3** Sanctuary spaces can be made for cats as well. (Attribution: Erica Grier, DVM.)

desensitization audio recordings, see Appendix A. It should be noted, however, that not all noise-averse dogs may respond to a recording of the noise.<sup>20</sup>

Before starting DSCC, the pet should be trained to go to a site to relax and settle using positive reinforcement (see Chapter 10 for details). Desensitization is intended to expose the pet to a low enough level of the fear-evoking stimulus (in this case the recording) while the pet remains relaxed. The dog's most preferred reinforcers, such as food or play, should be identified and then paired with the sounds (counterconditioning). By identifying and pairing the pet's preferred reinforcers with each desensitization session, the dog develops a positive emotional response to the recorded sounds. An enthusiastically positive emotional response to gradually increased levels of sound intensity might then transfer to actual storms or fireworks. Stimulus reduction and products that might further help to reduce noise aversion might be used concurrently ([Box 15.1](#)). While counterconditioning is paired with desensitization during planned training sessions, counterconditioning can be used exclusively during an actual noise event. This can be achieved by offering the dog's favorite reinforcers (e.g., food or play) immediately after each loud noise or throughout the noise event. This technique is simple and easy to learn, and focusing pet parent efforts on easy-to-implement strategies may improve treatment adherence. A recent study reported that counterconditioning and relaxation training were the



**Figure 15.4** Mutt Muffs and other products which cancel sound can be helpful management tools. (Courtesy Dr. Kelly C. Ballantyne.)

most effective training strategies for treating fireworks fears, while DSCC had a lower success rate as rated by dog owners.<sup>21</sup>

If the noise aversion is intense, medication will most likely be needed. The frequency of noise events, the intensity of the dog's noise aversion, and the refractory period after exposure to return to an unstressed baseline will determine the type of medication selected. For example, dogs that experience noise events infrequently and have mild to moderate noise aversions may respond well to situational treatment with rapidly acting anxiolytic drugs. Orotransmucosal dexmedetomidine (Sileo) is FDA approved for the treatment of noise aversions in dogs and can be administered as needed 30–60 minutes prior to the fear-evoking event, at the first loud noise, or first signs of fear.<sup>22</sup> Tasipimidine, an alpha-2 agonist, is approved in Europe for alleviation of situational anxiety and fear triggered by noise or owner departure in dogs at a dose of 30 µg/kg 1 hour in advance. See resources and recommended reading. Imepitoin (Pexion) is FDA approved for the treatment of noise aversion in dogs and has demonstrated efficacy in alleviating storm anxiety; however, at the time of writing it is distributed in Europe but not yet in the United States. It is administered twice daily starting two days before an expected noise event.<sup>23,24</sup> Benzodiazepines such as alprazolam or diazepam can be given on an as-needed basis one to two hours prior to a fear-evoking event.<sup>25,26</sup> They might even have some value during or after the storm to speed recovery and in theory to possibly induce amnesia of the event.<sup>27</sup> In addition, there is also some supportive evidence that repeated dosing with an anxiolytic such as dexmedetomidine gel over a series of noise events may decrease the need for

medication administration over time.<sup>28</sup> Clonidine, trazodone, or gabapentin may be useful as well in the treatment of storm phobia and noise aversion.<sup>29–32</sup> In a double-blinded, placebo-controlled crossover study, storm-phobic dogs were treated with a single dose of gabapentin ranging from 25 to 30 mg/kg PO 90 minutes prior to exposure. Dogs in the study were less fearful when treated with gabapentin and side effects were rare. As with other studies, a common side effect was ataxia.<sup>32</sup> When treating dogs that experience frequent noise events, have severe noise aversions, or have comorbidities such as separation-related disorders, use of selective serotonin reuptake inhibitors (SSRIs) (e.g., fluoxetine, paroxetine, sertraline) or tricyclic antidepressants (TCAs) (e.g., clomipramine) in combination with situational anxiolytics is indicated. The SSRI or TCA is given daily and may take four to six weeks to become effective. Selegiline is sometimes used for noise aversions associated with chronic anxiety and can be used concurrently with benzodiazepines but only after complete withdrawal of any SSRI or TCA. Other drugs that might be added or combined are phenobarbital or acepromazine (for sedation but not anxiety), or pindolol and propranolol (see Chapter 11). Natural therapeutics such as dog-appeasing pheromones (Adaptil)<sup>19</sup> or supplements such as Solliquin,<sup>33,34</sup> alpha-casozepine (Zylkene or in calm and stress therapeutic diets), L-theanine,<sup>35</sup> melatonin, or aromatherapy might also be considered as part of the treatment regime (see Chapter 12). Extralabel drug use and drug combinations should be used cautiously, with informed pet parent consent and under close supervision by the pet parents to monitor for efficacy or potential side effects.

## CASE EXAMPLE

### Presentation

Thor, a 7-year-old, 30-kg neutered male mixed-breed dog, was presented for fear during storms, heavy rain, fireworks, and every evening after sunset.

### History

Thor would hide in the bathtub, tremble, pant, whine, and sometimes dig or force himself into tight spaces during thunderstorms, heavy rain, fireworks, and every evening after sunset. These signs developed following an event when he was caught outdoors with his pet parents during a severe thunderstorm.

### Workup

Thor's physical examination, fecal antigen test, and lab work were within normal limits. He was found to have uneven nail wear on the right hind foot when compared to the left hind foot. The veterinarian elicited pain upon extension of the right hip. For these reasons, radiographs were recommended and completed. Radiographs showed moderate osteoarthritis in the right hip and mild osteoarthritis in the left hip.

### Differential diagnoses

The differential diagnoses included hip dysplasia, osteoarthritis, noise phobia, storm phobia, and generalized anxiety. Thor was diagnosed with hip dysplasia, osteoarthritis, noise phobia, and storm phobia.

### Treatment

NSAIDs were dispensed for use daily for 14 days. In addition, Thor was given fatty acid and joint supplementation. The pet parents were given

instructions as to how to set up a sanctuary space in a windowless bathroom. Thor should have access to the space at all times. The sanctuary space should be as comfortable and sound proof as possible using soft bedding and white noise. They were given resources for dog body language, dog training, and best practices for living with a fearful dog. Finally, they were counseled to avoid forcing Thor out of his hiding space. There was concern that he would injure himself in attempts to hide in tight spaces, so it was recommended that these areas be proactively blocked off using closed doors and baby gates. During quiet times of the day, the pet parents were to practice short sessions of relaxation training with Thor in the sanctuary space.

As Thor experienced distress daily regardless of the weather and storms and fireworks were frequent around Thor's home, treatment with the SSRI fluoxetine was initiated in addition to nightly administration of gabapentin 10–20 mg/kg PO two hours prior to sunset and the onset of a noise event up to every 8–12 hours if needed. When there was a noise event, the pet parents were to take him to the bathroom, where white noise was turned on. Thor was offered his favorite food in a long-lasting chew toy during the event.

### Follow-up

The veterinary technician followed up with the pet parents in two weeks from the initial appointment. They reported that Thor continued to hide nightly but did not tremble, whine, or pant, at which point the frequency of hiding decreased to only during storms and fireworks. During storms and fireworks, he continued to hide, pant, whine, and tremble, and showed no interest in the food-filled toy. They were giving the fluoxetine,

*continued*

## CASE EXAMPLE—cont'd

supplements, NSAIDs, and gabapentin as directed. They noted that he was able to get up more quickly and fetch the ball for longer periods of time in the yard. In addition, they reported that the fluoxetine “wasn’t doing anything.” The veterinary technician reminded the pet parents that the fluoxetine may take up to six weeks to have an effect. They reported no side effects from any of the treatment except a mild decrease in appetite. Because he was still eating 75% of his daily food ration and was eating treats, the veterinary technician instructed them to continue with the fluoxetine. Because the pet parents were seeing a difference in his behavior, but it wasn’t at least a 50% change, per the veterinarian’s recommendations, the veterinary technician instructed them to increase the gabapentin to 30 mg/kg PO two hours prior to stressful events and bedtime. They had set up the sanctuary space and were practicing relaxation training using the instructions in the books and videos which were recommended.

The veterinary technician followed up by phone four weeks after the appointment. Thor continued to improve. He was tolerating the gabapentin and fluoxetine well. He had regained his normal appetite. In addition, he was going to the sanctuary space on his own. When he went to the sanctuary space during a storm, he was able to lie down and eat out of the food toy without any other overt signs of panic.

However, the pet parents were concerned about the upcoming fireworks.

Six weeks after the original appointment, Thor was seen for a follow-up to evaluate his pain level and discuss the upcoming

fireworks holiday. The pet parents were very concerned and expressed that they would prefer that he be more “out of it” than he was on gabapentin. The veterinarian recommended orotransmucosal dexmedetomidine (Sileo) given 30 minutes prior to fireworks and repeated in two to three hours as needed for up to five doses. They were to put him into the sanctuary space one hour prior to when they anticipated that the fireworks would start and keep him there until they were completely over. The gabapentin was to be continued for storm events.

The veterinary technician followed up with the pet parents in two weeks. Thor had gotten his medications as directed for the holiday and he had slept in his sanctuary space. The pet parents stayed with him for the entire fireworks display. He was calmer but was not too sedated, which made the pet parents happy.

He continued to go to his sanctuary space during severe storms, but would not pant, tremble, or whine, and would eat food out of his chew toy. DSCC using an audio recording was discussed, but Thor did not demonstrate signs of distress in response to audio recordings when tested. The pet parents elected to continue daily fluoxetine year-round, given the frequency of storms and fireworks near their home, and continue to use oromucosal dexmedetomidine gel and counterconditioning as needed during noise events.

## Discussion

Thor presented in middle age, which is a common signalment for dogs with noise aversion that also have pain or systemic disease. Even though there was an inciting incident in his past which fit nicely with a behavior-only cause, the veterinarian still took the time to do a complete physical examination and follow through with appropriate diagnostics. For all behavior disorders, disorders of all body systems must be considered. It is typical for pets to need more than one medication for the treatment of noise aversion or phobia. In addition, fireworks are such stressful events that they may need an add on medication. Trazodone would have

been a good option instead of gabapentin if Thor did not have osteoarthritis.

## Conclusion

Noise aversion is common in dogs and with future study is likely to be found to be common in cats. It can contribute to generalized anxiety, elimination in the house and separation-related disorders as well as severe negative effects on the quality of life of the patient and the pet parent. The good news is that treatment is available, and most pets can be helped.

## References

- Overall KL, Dunham AE, Frank D. Frequency of nonspecific clinical signs in dogs with separation anxiety, thunderstorm phobia, and noise phobia, alone or in combination. *J Am Vet Med Assoc.* 2001;219:467–473.
- Overall KL, Dunham AE, Juarbe-Diaz SV. Phenotypic determination of noise reactivity in 3 breeds of working dogs: a cautionary tale of age, breed, behavioral assessment, and genetics. *J Vet Behav.* 2016;16:113–125.
- Sherman BL, Mills DS. Canine anxieties and phobias: an update on separation anxiety and noise aversions. *Vet Clin North Am Small Anim.* 2008;38:1081–1106.
- Blackwell EJ, Bradshaw JWS, Casey RA. Fear responses to noises in domestic dogs: prevalence, risk factors and co-occurrence with other fear related behaviour. *Appl Anim Behav Sci.* 2013;145:15–25.
- Riemer S. Not a one-way road—severity, progression and prevention of fireworks fears in dogs. *PLoS One.* 2019;14:e0218150.
- Dale AR, Walker JK, Farnworth MJ, et al. A survey of owners’ perceptions of fear of fireworks in a sample of dogs and cats in New Zealand. *N Z Vet J.* 2010;58:286–291.
- Tiira K, Lohi H. Early life experiences and exercise associate with canine anxieties. *PLoS One.* 2015;10:e0141907. doi:10.1371/journal.pone.0141907.
- Tiira K, Sulkama S, Lohi H. Prevalence, comorbidity, and behavioral variation in canine anxiety. *J Vet Behav.* 2016;16:36–44.
- Dinwoodie IR, Dwyer B, Zottola V, et al. Demographics and comorbidity of behavior problems in dogs. *J Vet Behav.* 2019;32:62–71.
- Amat M, Manteca X, Ruiz de la Torre JL, et al. Evaluation of inciting causes, alternative targets, and risk factors associated with redirected aggression in cats. *J Am Vet Med Assoc.* 2008;233:586–589.
- Storengen LM, Lingaas F. Noise sensitivity in 17 dog breeds: prevalence, breed risk and correlation with fear in other situations. *Appl Anim Behav Sci.* 2015;171:152–160.
- Iimura, K. The nature of noise fear in domestic dogs. Master’s Thesis - The Lincoln Repository. 2006. Available at: <http://eprints.lincoln.ac.uk/id/eprint/4513/>. Accessed September 8, 2020.
- Handegard KW, Storengen LM, Lingaas F. Noise reactivity in standard poodles and

- Irish soft coated wheaten terriers. *JVB*. 2020;36:4–12.
14. Fagundes ALL, Hewison L, McPeake KJ, et al. Noise sensitivities in dogs: an exploration of signs in dogs with and without musculoskeletal pain using qualitative content analysis. *Frontiers Vet Sci*. 2018;5:1081–1085.
  15. Mills DS, Mueller HW, McPeake K, et al. Development and psychometric validation of the Lincoln Canine Anxiety Scale. *Frontiers Vet Sci*. 2020;7:171.
  16. Horwitz DE. Separation-related problems in dogs and cats. In: Horwitz DE, Mills DS, eds. 2nd ed. *BSAVA Manual of Canine and Feline Behavioural Medicine*. British Small Animal Veterinary Association, 2010;146–158.
  17. Ballantyne KC, Buller K. Experiences of veterinarians in clinical behavior practice: a mixed-methods study. *J Vet Behav*. 2015;10:376–383.
  18. Levine ED, Mills DS. Long-term follow-up of the efficacy of a behavioural treatment programme for dogs with firework fears. *Vet Rec*. 2008;162: 657–659.
  19. Levine ED, Ramos D, Mills DS. A prospective study of two self-help CD based desensitization and counter-conditioning programmes with the use of Dog Appeasing Pheromone for the treatment of firework fears in dogs (*Canis familiaris*). *Appl Anim Behav Sci*. 2007;105:311–329.
  20. Overall KL, Dunham AE, Scheifele P, et al. Fear of noises affects canine problem solving behavior and locomotion in standardized cognitive tests. *Appl Anim Behav Sci*. 2019;221: 104863.
  21. Riemer S. Effectiveness of treatments for firework fears in dogs. *J Vet Behav*. 2020; 37:61–70.
  22. Korpivaara M, Laapas K, Huhtinen M, et al. Dexmedetomidine oromucosal gel for noise-associated acute anxiety and fear in dogs—a randomised, double-blind, placebo-controlled clinical study. *Vet Rec*. 2017;180:356–357.
  23. Perdew, I, Emke, C, Johnson, B, et al. Evaluation of Pexion® (imepitoin) for treatment of storm anxiety in dogs: a randomised, double-blind, placebo-controlled trial. *Vet Rec*. 2021. doi:10.1002/vetr.18.
  24. Engel O, Müller HW, Klee R, et al. Effectiveness of imepitoin for the control of anxiety and fear associated with noise phobia in dogs. *J Vet Intern Med*. 2019;33:2675–2684.
  25. Herron ME, Shofer FS, Reisner IR. Retrospective evaluation of the effects of diazepam in dogs with anxiety-related behavior problems. *J Am Vet Med Assoc*. 2008;233:1420–1424.
  26. Crowell-Davis SL, Seibert LM, Sung W, et al. Use of clomipramine, alprazolam, and behavior modification for treatment of storm phobia in dogs. *J Am Vet Med Assoc*. 2003;222:744–748.
  27. Dantas LM, Crowell-Davis SL. Benzodiazepines. In: Crowell-Davis SL, Murray TF, Dantas LM, eds. 2nd ed. *Veterinary Psychopharmacology*. 2019;67–102.
  28. Gruen M, Case BC, Robertson JB, et al. Evaluation of repeated dosing of a dexmedetomidine oromucosal gel for treatment of noise aversion in dogs over a series of noise events. *Vet Rec*. 2020;187(12):489. doi:10.1136/vr.106046.
  29. Gruen ME, Sherman BL. Use of trazodone as an adjunctive agent in the treatment of canine anxiety disorders: 56 cases (1995–2007). *J Am Vet Med Assoc*, 2008;233:1902–1907.
  30. Ogata NN, Dodman NH. The use of clonidine in the treatment of fear-based behavior problems in dogs: an open trial. *J Vet Behav*. 2011;6:130–137.
  31. Orlando JM. Animal behavior case of the month. *J Am Vet Med Assoc*. 2017;251: 1011–1014.
  32. Bluer-Elsner S, Medam T, Masson S. Effects of a single oral dose of gabapentin on storm phobia in dogs: a double-blind, placebo controlled crossover trial. *Vet Record*. 2021. doi:10.1002/vetr.453.
  33. DePorter TL, Landsberg GM, Araujo JA, et al. Harmonase Chewable Tablets reduces noise-induced fear and anxiety in a laboratory canine thunderstorm simulation: a blinded and placebo-controlled study. *J Vet Behav*. 2012;7:225–232.
  34. Landsberg G, Huggins S, Fish J, et al. The effects of a nutritional supplement (Solliquin) in reducing fear and anxiety in a laboratory model of thunder-induced fear and anxiety. Proceedings of the 11th International Veterinary Behaviour Meeting, 14–16th September 2017, Samorin, Slovakia. 2017;94–97.
  35. Pike AL, Horwitz DE, Lobprise H. An open-label prospective study of the use of l-theanine (Anxitane) in storm-sensitive client-owned dogs. *J Vet Behav*. 2015;10: 324–331.

## Resources and recommended reading

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| <p>Albright JD, Ballantyne KC. Can anxiolytic medications induce long-term improvement in dogs with noise aversion? <i>Vet Rec</i>. 2020;187: 486–488.</p> <p>Ballantyne KC. Separation, confinement, or noises: what is scaring that dog? <i>Vet Clin North Am Small Anim Pract</i>. 2018;48: 367–386.</p> | <p>Fear free happy homes – Fear of Thunder or Fireworks. <a href="https://www.fearfreehappyhomes.com/kit/fear-of-thunder-fireworks/">https://www.fearfreehappyhomes.com/kit/fear-of-thunder-fireworks/</a>.</p> <p>Keep your pets stress-free during fireworks season. <a href="https://todaysveterinarypractice.com/pet-owner-resources/pets-noise-aversion-fireworks-handout/">https://todaysveterinarypractice.com/pet-owner-resources/pets-noise-aversion-fireworks-handout/</a></p> <p>Korpivaara M, Pohjanjousi P, Huhtinen M. Tasipimidine, a novel orally dosed</p> | <p>alpha-2 Adrenoceptor agonist, alleviates canine acute anxiety and fear associated with noise – a pilot study. Proc 3<sup>rd</sup> European Veterinary Congress of Behavioural Medicine and Animal Welfare, 2021:148.</p> <p>Tasipimidine (Tessie) European Medicines Agency <a href="https://www.ema.europa.eu/en/medicines/veterinary/EPAR/tessie">https://www.ema.europa.eu/en/medicines/veterinary/EPAR/tessie</a>.</p> |
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