

# Advances in Feline Behavior

**Wayne Hunthausen, DVM**

Director

Animal Behavior Consultations

Westwood, Kansas 66205

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## KEY WORDS

- urine spraying
- environmental stimuli
- pharmaceuticals
- territorial aggression
- play aggression

## MANAGEMENT OF FELINE URINE SPRAYING PROBLEMS

Housoiling is the most common behavior problem for which cat owners seek help.<sup>1-4</sup> There are many causes of housoiling, but urine spraying can be the most frustrating to treat. Urine spraying is a marking behavior during which a cat deposits urine on particular objects or areas in its environment. The behavior is usually triggered by territorial stimuli or stressful situations. Objects that are commonly sprayed include trees, bushes, doors, walls by doors or windows, new objects in the home, and furniture. During this behavioral sequence, the cat backs up to the target, stands with its rear end held high, tail erect and quivering, and squirts a stream of urine. At the same time or just prior to the release of urine, the cat may alternately tread the ground with its rear paws. The amount of urine that is deposited is typically smaller than that voided when a cat empties its bladder during normal urination.<sup>1,5,6</sup>

Urine spraying is a sexually dimorphic behavior, occurring with a higher frequency in male cats.<sup>7</sup> Sexual hormones appear to facilitate urine spraying, as the incidence is higher in intact animals. It is not completely dependent on sexual hormones, however, because 10% of males and 5% of females continue to spray urine following neutering.<sup>7</sup>

The appearance of a female cat in the territory increases the likelihood of urine spraying by intact or castrated male cats.<sup>7</sup> The total number of cats in the home territory can also have a strong effect on a cat's inclination to spray urine. Skerritt and Jemmett noted that the incidence of urine spraying in the home is directly related to the density of the cat population and that the incidence of this behavior increased from 25% in single cat households to 100% in those with 10 or more cats.<sup>8</sup> Although most cats urine-mark by spraying vertical objects, some cats mark horizontal surfaces from a standing or squatting position. This is

more likely the case with female cats.<sup>9</sup>

Because housoiling may result from medical problems, it is important to perform a thorough medical workup. Once underlying medical problems have been ruled out or treated, the behavioral workup can begin.

## History

You need to know the signalment, sexual status, and medical history of the patient. You also need to ascertain that the cat presented for the problem is actually the one that is housoiling. In a multicat household, separation may be necessary to determine the culprit. Another method is to give fluorescein by mouth (0.5 ml of a 10% solution) or by injection (0.3 ml of a 10% solution subcutaneously) to trace urine stains to the individual with the problem.<sup>6,10,11</sup> Urine-soiled spots retain fluorescence for at least 24 hours.<sup>6</sup>

Diagnosing the early causes of a long-standing urine spraying problem can be difficult, so a thorough behavioral history is essential. The objective is to uncover the environmental triggers for the marking behavior. Close attention should be given to anything that might elicit a territorial response or make the pet anxious. The tendency to spray is influenced by factors pertaining to the individual (hormones, temperament), environmental stimuli that are upsetting to the cat (new cat in the neighborhood, new roommate, remodeling, moving), and its relationship with the owners (change in the work schedule, absences from home, spending less time with the pet, inappropriate punishment).

You also want to find out when and where the problem began, whether any changes in the cat's environment were associated with the appearance of the problem, what surfaces are being soiled, how frequently the problem occurs, whether the appearance of the problem has changed, and what has been done to try to correct the problem. If you do not perform a house call consultation, ask the owner to diagram the house with windows, doors, and soiled areas noted. If the cat is urinating in the house in response to visits by neighborhood cats, you may discover clusters of soiled areas around windows or doors in the house near the areas that outdoor cats visit.

Sometimes, just the suggestion that another pet has invaded its territory can cause the pet to spray. For example, if a visitor has cats at home, a cat may spray the visitor's coat when it smells the odor of nonresident cats. A cat may start spraying around the living

room fireplace when fire logs that have been sprayed by neighborhood cats are brought inside.

If the cat is spraying or urinating on top of personal items, such as the owner's clothing, bed, or favorite chair, you will want to be sure to consider anxiety as a cause of the problem. If stress is maintaining the marking behavior, you may see related changes, such as hiding, avoidance, aggression, or alteration in the pet's general temperament.<sup>1</sup> Keeping a diary may help the owner identify the stimuli that trigger intermittent marking behavior.

### Prognosis

The likelihood of success depends on a number of factors: the duration of the problem, the number of areas soiled, the number of different surfaces soiled, the ability to control the arousing stimuli, the temperament of the pet, the owner's willingness to neuter an intact pet, and the family's patience, ability, and willingness to commit to working with the pet.

### Treatment

The main approaches to controlling urine marking involve altering the cat's exposure to the stimuli that trigger the behavior and altering the cat's response to the stimuli.<sup>12</sup> If outdoor cats are the stimuli for spraying, the owner should consider discouraging their visits with a water hose or booby traps or with humane removal from the property. Anything in the yard that might attract roaming cats should be removed (bird feeders, garbage, food, etc.). Besides removing the stimuli, the owner can remove access to the stimuli. The spraying cat should be kept away from windows or out of rooms that permit it to view outdoor cats. Drapes can be closed. Windowsills can be modified so that the cat can no longer sit on them. Chairs near windows on which the cat perches can be moved. Urine odor should be cleaned from around doors and windows. If other cats in the household are contributing to the problem, they should be separated. In some cases, the number of cats in the home may need to be reduced. Some individuals will spray less indoors if they have more access to the outdoors. Others do better if they are kept inside all of the time.

### Surgery

Neutering is very successful in curbing spraying behavior at any age and, in most cases, should be performed as soon as possible. Efficacy has been reported at 90% for males and 95% for females.<sup>7</sup> Although rarely used, olfactory tractotomy<sup>13</sup> and ischiocavernosus myectomy<sup>14</sup> have been suggested to control urine marking.

### Pharmaceuticals

Medication is often necessary to control urine spraying. Owners should be informed of all potential side effects and told that no drugs are approved for behavior modification in cats. A complete physical examination and pretreatment laboratory tests should be performed to determine that the pet is healthy before pharmaceuticals are prescribed. Because individual responses to psychoactive drugs may vary considerably, owners should give the initial dose when they can be at home to observe the cat's behavior. The dosage may be adjusted up or down by 25% increments until the behavior is controlled without causing undue sedation. If the pet responds to treatment, a decrease in marking behavior usually occurs within 1 to 2 weeks. Two to 6 weeks after the start of medication, an attempt should be made to slowly decrease the dosage.

Clomipramine 2.5 to 5.0 mg/cat orally (PO) q 24 h appears to be the most promising drug. In a recent study in Belgium, 80% of the cats ( $n = 26$ ) demonstrated at least a 75% reduction in spraying behavior.<sup>15</sup> Buspirone 2.5 to 7.5 mg/cat PO q 12 h is another good choice for spraying, with a reported efficacy of approximately 55%.<sup>16</sup> Buspirone is effective within the same range as diazepam and greater than that for the progestins. Buspirone does not cause the adverse effects of sedation and ataxia commonly seen with most benzodiazepines.<sup>16</sup> Diazepam is an effective drug in a significant number of cats at a dosage of 1 to 2 mg/cat PO q 12 h.<sup>3</sup> Studies have shown that after cessation of diazepam, however, 90% of cats resumed spraying, while only 50% resumed spraying when buspirone was discontinued.<sup>16,17</sup> A small number of cats become hyperactive when given diazepam, but the hyperactivity usually decreases within 3 days.<sup>18</sup> A recently reported, more serious side effect is acute, fatal hepatopathy.<sup>19</sup> This problem has been documented in a very small number of cats. Pretreatment laboratory work was not performed on most of the reported cases, and the pathophysiology of this problem is not well understood. Amitriptyline 5 to 10 mg/cat PO q 24 h or alprazolam 0.125 to 0.25 mg/cat PO q 12 h has also been reported to be effective for treating urine marking.<sup>20</sup> Progestins are not as effective as the aforementioned medications for decreasing spraying behavior and have more side effects.<sup>3</sup> They may be considered for cats that do not respond to other treatments.

### Pheromones

A recent approach to the treatment of urine spraying involves the use of the environmental application of facial pheromones. Work by Dr. Patrick Pageat in

France has evaluated the use of feline facial pheromones to curb spraying behavior. He demonstrated a significant reduction in the incidence of spraying by cats when their own facial pheromones were collected on gauze pads and applied to areas in their environment that were being sprayed.<sup>21</sup> His work was the basis for the development of a spray containing synthetic analogues of naturally occurring feline facial pheromones (Feliway® [Abbott Laboratories]). Recent studies have demonstrated that the pheromone spray is up to 95% successful in stopping reactionary urine spraying triggered by changes in the cat's surroundings, such as moving, new occupants of the home, stress, remodeling, etc.).<sup>22,23</sup> The product also shows promise in helping cats settle into new surroundings. Information provided by the company details a study of 56 cats in which the pheromone product was successful in significantly decreasing the time interval between introduction into a new environment and exhibition of feeding and exploratory behavior.

### **Preventing Resoiling**

Previously soiled areas can be safeguarded by placing booby traps, food bowls, bedding, or toys in the areas. Lemon-scented room deodorant deters some cats.<sup>5</sup> Plastic carpet runners can be placed upside down with the "feet" facing up. Plastic, foil, or double-stick carpet tape can be used to protect specific areas. You may need to experiment. Each cat is an individual in regard to surface preference for elimination. Although some cats avoid eliminating on plastic-covered surfaces, others are drawn to these areas to eliminate. Access to the soiled areas can be denied by moving furniture or closing doors. Removing urine odor from indoors and outdoors is important. Products that are specifically formulated to work on this type of odor should be used, such as K.O.E.™ (Thornell Corporation) diluted 1 ounce per quart of water. These products need to make contact with the organic material. In most cases, an ample amount should be poured on carpeting and porous surfaces to allow penetration into deeper layers rather than just spraying the surface.

Some cats are extremely sensitive to changes in their environment. They will spray in response to minor changes. Owners need to realize this and do their best to keep things constant, although this is not always possible. When situations likely to upset the cat occur, the owner should confine, supervise, and administer anxiolytic medications. Desensitization and counterconditioning may help reduce undesirable responses to anxiety-producing stimuli.

### **Punishment**

Punishment is the least effective tool for controlling spraying. Under no circumstances should the owner physically punish or loudly scold the pet. If the owner catches the cat in the act of spraying urine, the behavior may be interrupted by making a sharp noise, squirting it with a water gun, or tossing an object near the cat. Any type of correction should be provided only during the behavior or within 1 second of cessation of the behavior. Punishment is contraindicated if anxiety or fear is an important component of the problem. It is important that the cat not associate anything aversive with the owner, or the bond between the pet and the owner will quickly deteriorate. A proper interruptive stimulus should stop the behavior and slightly startle the cat without causing it to become fearful or to avoid the owner.

### **A METHOD FOR INTRODUCING TWO CATS**

Our domestic cats have evolved from relatively solitary ancestors, and they do not always do well when forced to live with conspecifics in a relatively small home environment. Territorial issues and play problems are the most common causes of friction between two cats in the home. A typical problem involving territorial aggression is one in which a new cat is brought into the home and the resident cat becomes aggressive toward it. The resident cat may take a slow, steady approach as it stalks, or it may immediately and aggressively chase the new cat. The focus on the intruder is usually very intense and the resident cat can be very determined in pursuing and attacking the newcomer. Defensive displays by the new pet may include hissing, growling, yowling, and piloerection.

Problems involving play aggression occur when the object of play is a weak, fearful, or old cat that cannot tolerate the young cat's playful behavior. Domestic feline play behavior typically involves elements of predation, including stalking, chasing, attacking, catching, and biting. Play partners are often swatted, pounced upon, and bitten. Sometimes, the pet arches its back and hops sideways toward the play object. Bites tend to be inhibited and swatting is usually done with retracted claws. Vocalizations are rare compared to other forms of feline aggression. Some cats become so distressed by constantly being the target of play assaults that they spend a considerable amount of time hiding, show signs of generalized anxiety, become anorectic, and may housesoil.

### **Treatment**

Treatment involves controlling the environment and/or using pharmaceuticals to bring the pets'

## ANXIOLYTIC MEDICATIONS FOR THE FEARFUL CAT

### **Amitriptyline**

Tricyclic antidepressant

#### *Mode of Action:*

- Mildly sedating
- Blocks serotonin reuptake at receptor sites; serotonergic
- Peripheral and central anticholinergic action
- Variable degree of antihistaminic activity
- Bitter taste

#### *Caution:*

- Side effects: dry mouth, constipation, urinary retention, inappetence, disorientation, sedation, depression, ataxia, cardiac arrhythmias (tachycardia, syncope)
- Must have normal hepatic and renal function

#### *Dose in Cats:*

5.0 to 10.0 mg/cat q 24 h

### **Buspirone**

Azapirone

#### *Mode of Action:*

- Serotonin agonist; inhibits serotonin reuptake
- Anxiolytic agent

#### *Comments:*

- Wide margin of safety
- Nonsedating

#### *Dose in Cats:*

5.0 to 7.5 mg/cat bid

### **Diazepam**

Benzodiazepine

#### *Mode of Action:*

- Acts on limbic system and reticular formation
- Potentiates gamma-aminobutyric acid (GABA), an inhibitory neurotransmitter

#### *Comments:*

- Acute, fatal hepatopathy documented in a small number of cats
- Long-term use may produce habituation
- Gradual weaning off medication required to avoid withdrawal
- May cause hyperphagia, ataxia, depression
- In rare cases, may cause paradoxical increase in activity

#### *Dose in Cats:*

1 to 2 mg/cat sid–bid

arousal levels down. The introduction of the pets to each other must be closely controlled so that the adjustment to living with each other is very gradual.

For play aggression, it is important that the playful cat has an acceptable outlet for normal behavior. Plenty of play interaction with the cat should be provided so that it is unlikely to chase the other cat. This play should involve tossing or dangling toys for the cat to chase and catch.

### **Steps for Introducing Two Cats**

#### **Separation**

The pets should initially be separated and confined to areas in the home where they cannot see each other. Lots of play, social attention, and food treats should be given to the pets. The confinement areas should be switched every 24 to 48 hours. This allows the cats to get used to each other's odor first. After at least 3 days or more have passed and both cats are relaxed and show no signs of anxiety, irritability, or aggression, the confinement areas should be set up so that the door between the rooms is open 1 inch. This allows the cats to see one another. Canned cat food or

treats can periodically be provided on both sides of the door, beginning in the center of the rooms and very slowly proceeding toward the door.

#### **Conditioning the Recall**

During the initial separation period, the more assertive of the two cats should be taught to come on command. A stimulus to signal the cat to come to the owner should be chosen that the pet will hear only during training (e.g., bell, clicker, whistle). At least 10 times each day, the owner should present the stimulus and immediately give the pet a *very special* food treat. The initial sessions should begin with the owner standing right next to the pet; then the distance between pet and owner should be increased gradually until the pet will immediately come to the owner when it hears the sound from anywhere in the home.

#### **The Introduction**

The less assertive of the two cats should be placed on a piece of furniture in a large room at the far end from the door and fed small pieces of very tasty food treats. A second person brings the assertive cat to the doorway

and tosses a few food treats to get its attention. From then on, the assertive cat is closely watched, and every time it looks at the less assertive cat, the auditory stimulus is provided and the assertive cat is called for a food treat. The session should last about 10 to 20 minutes; the cats should then be returned to their confinement areas. A powerful water gun should be available in case undesirable behavior must be interrupted.

During the following sessions, the assertive cat is allowed to very gradually move a bit closer to the less assertive cat before it is called back for a treat. The sessions must progress very slowly until the cats can spend time freely walking about the room.

### **Environmental Considerations**

When the cats can be trusted to roam in the home without supervision, some steps can be taken to reduce the likelihood of a confrontation. At least two feeding stations and litter box stations should be provided. They must be located in relatively open areas so that one cat can see the other approaching and not be surprised.

### **Medication**

Cats that are very fearful may require an anxiolytic (see Box). Diazepam is a good anxiolytic but may cause acute, fatal hepatic failure in rare cases. For most cases, buspirone is a better choice because of its wide margin of safety. Amitriptyline may help reduce the arousal and reactivity of the assertive, aggressive cat. Although the playful kitten may benefit from a small dose of a sedative prior to being introduced to the older pet during play sessions, a better alternative is to reduce its energy level with a vigorous preintroduction play session.

## **ASSESSING RISK OF INJURY FOR AGGRESSIVE CATS**

### **Predictability**

- Identifiable stimuli and situations that trigger aggression
- Consistent response to aggression-eliciting stimuli and situations
- “Benignity” of stimulus required to elicit aggression
- Existence of warning signals
- Long latency to attack
- Availability of pertinent historical information

### **Potential to Cause Damage**

- Size and strength of animal
- Degree of inhibition to cause injury
- Intensity of focus/level of arousal
- Target for aggression
- Type of aggression

### **The Human Element**

- Ability to provide safe management
- Comprehension of danger
- Ability to understand management and treatment protocols
- Dependability
- History of compliance and consistency
- Family size, lifestyle
- Ages of family members
- Experience with animals

### **Complexity**

- Number of types of aggression
- Number of situations/stimuli that trigger aggression
- Number of concurrent behavior problems

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