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# Inappropriate Feline Elimination Behavior

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Clinical animal behavior is a field rapidly growing in interest to the veterinary practitioner. As the popularity of cats increases and the human population becomes more urbanized, companion animal veterinarians must familiarize themselves with feline behavioral problems. The most common behavioral problem reported by cat owners is elimination outside the litterbox. Any cat, regardless of age, sex, breed or neuter status may develop a problem with inappropriate elimination at some time in its life.

The local veterinarian is often the first person the public consults for advice on behavioral problems. Clients expect their veterinarian to provide accurate information both on prevention and treatment of behavioral problems. The local practitioner is in the ideal position to determine whether a problem has a primarily behavioral or medical basis. Behavioral cases require the same level of care and treatment as any medical or surgical case. Whether or not the practitioner personally treats the animal or refers it to an appropriate referral practice, he or she should be prepared to make the initial differential diagnosis.<sup>1,2</sup>

This presentation will explore the types of inappropriate feline elimination, some of the inciting motivational factors involved and provide an organized approach to treatment.

## Behavioral Definitions

Urinary postures and associated behaviors are quite similar between the sexes.<sup>3</sup> Either sex can void urine in a standing or squatting posture.

In the standing posture (*spraying*), the hindlegs are straight, the tail is held upright and typically quivers, and the cat may step alter-

nately with the hindlegs.<sup>3,4</sup> This posture is used for urine marking. The urine is sprayed horizontally, 1-2 feet off the ground, usually onto vertical surfaces such as walls, car tires or the sides of furniture.<sup>3,4,5</sup>

In the squatting posture (*urination and defecation*) the hindlegs are flexed and the urine is deposited vertically onto horizontal surfaces - ideally the litterbox, but often onto floors, carpets, beds or couch cushions.<sup>4</sup> It is important that spraying be differentiated from inappropriate urination since the treatments and motivational factors vary.

Spraying is a normal behavior for the cat, but often is unacceptable to the owner. The most common form of urine marking, involves expression of urine in smaller amounts than would typically be voided during normal urination.<sup>4</sup> Urine marking functions as a form of feline communication.<sup>6</sup> It most often occurs within the motivational context of territorial, sexual or agonistic behavior.<sup>7</sup> Agonistic behavior refers to competitive encounters between household cats, household and outdoor cats or household cats and people. These competitive interactions typically involve obvious aggressive and/or defensive displays by the cat.<sup>4</sup>

Urination involves voiding the bladder for the purpose of eliminating waste products and not primarily as a form of communication. It occurs in a squatting posture and does not occur in the same motivational context as marking.<sup>4</sup> Defecation involves the voiding of feces and also occurs in a squatting posture. Although it serves a marking function in some species, there is little evidence that it does so for domestic cats.<sup>4</sup>

## Inappropriate Urination and Defecation

Elimination in cats involves a species-typical sequence of behavior. Domestic cats usually approach a specific surface and/or location, dig with their forepaws to make a depression in the substrate, and then urinate or defecate, followed by sweeping and pawing motions to cover up the urine or feces.<sup>3,4,7</sup>

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In the outside environment cats have a wide variety of substrates, surfaces and locations in which to dig, eliminate and cover. For the housecat these are extremely limited. Usually, the only substrate provided is commercial cat litter. The fact that some cats urinate and defecate on surfaces other than the litter provided is not surprising considering normal individual behavioral variations.

#### Surface Preferences and Aversions

Surface preferences must be considered in all cases of inappropriate urination or defecation. Cats may learn to associate the tactile/kinesthetic features ("feel") of a surface other than litter with the act of eliminating, which results in the cat eliminating on that surface.<sup>4,7</sup> Animals that paw and scratch on carpeted surfaces near their litterbox may learn to prefer, seek out and eliminate on materials which provide the same tactile/kinesthetic feedback.

Another learned preference involves cats that paw and scratch at the plastic sides or bottom of their litterbox or on the smooth, hard floor or wall nearby. Some of these cats learn to prefer smooth surfaces and then seek out tubs, sinks, tile, linoleum or wood floors for elimination.

Aversion to the litter(s) provided is a common factor in many cases of inappropriate urination.<sup>4</sup> The cat with a litter aversion typically fails to dig, cover and bury urine or feces, and may stand on the edge of the box, shake its paws after touching the litter or run quickly out of the litterbox.

Aversions to the litter can also result from changes in the litter material, introduction of an additive, such as chlorophyll or deodorants, or more commonly, failing to clean the litterbox frequently enough.<sup>5</sup> An owner may not realize that when additional cats are acquired the litterbox needs to be cleaned proportionately more often and/or more litterboxes provided. Minor illnesses can also affect litterbox habits. A cat that soils its paws digging or covering diarrhea may quickly develop an aversion to the litterbox.

#### Location Preferences and Aversions

Many animals learn to associate specific behaviors with specific locations in the environment.<sup>4,7</sup> For example, many cats that urinate or defecate on carpets are reported to do so only on one or a few spots or areas. Thus, even though a wall-to-wall carpet provides the

same tactile stimulation all over, the cat has learned to associate elimination with only a particular location on that surface. Although the intensity of location preferences vary, some cats will continue to eliminate at a location even when the litterbox is moved. This behavior is characteristic of a strong location preference.<sup>4,7</sup> On the other hand, a cat's location preference may not be strong enough to overcome a surface preference. In this case, placing a litterbox at the location on a carpet where a cat has been eliminating may not result in the cat using the box.

Several factors can cause the location of the litterbox to become aversive to a cat. An aversion to the odor of an infrequently cleaned box or area can certainly develop. A cover placed on the litterbox may also lead to this form of aversion since odors are not allowed to dissipate normally. A cat that has been severely frightened at the location of the litterbox could begin to eliminate elsewhere as a result. A similar reaction can occur if a cat is repeatedly "captured" there for medication or any other unpleasant experience.<sup>5</sup>

Finally, a cat that experiences pain in the act of eliminating will often shift locations and/or surfaces, possibly eliminating on a wide variety of spots as if searching for a nonpainful place to go.<sup>4</sup> A cat's use of a variety of surfaces and locations may be a behavioral clue to the presence of a physical problem.

#### Emotionally Related Elimination

Three circumstances that fall within this category are: (1) cats that squat to urinate in the context(s) associated with marking, (2) cats that eliminate as a result of the owner's absence and (3) cats that are so frightened that they hide in a location which offers no access to the litterbox.<sup>4</sup>

Occasionally, cats may squat to deliver urine in the context of territorial, sexual or agonistic behavior between cats or people. This marking behavior associated with squatting can be difficult to diagnose since the feline interactions are subtle or difficult to interpret. When a urination problem is refractory to a well planned and diligent treatment program, it is reasonable to assume that marking behavior may be involved.<sup>4</sup>

Elimination as a result of an owner's absence is most likely related to separation anxiety. Separation anxiety in cats, while much less common than in dogs, involves similar behaviors: eliminating, vocalizing and escalated

greeting and play when the owner returns. Cats generally do not exhibit anxiety if the owner is gone for short periods, but may if the owner is gone for 24 hours or longer.<sup>4</sup> Cats with a separation anxiety elimination problem often eliminate on an owner's bed, clothing, or favorite furniture. This is often misinterpreted as "spite", but it is more likely that in a state of anxiety the cat is attracted to locations which possess an owner's odor.<sup>4</sup>

Cats which are frightened of an animal or person in the home may hide. If the cat doesn't come out to use the litterbox, they frequently develop new surface preferences.<sup>4</sup>

### Spraying

Urine spraying or marking is basically an innate behavioral pattern which can prove difficult to control by punishment or basic management.<sup>5</sup> Most cats that urine mark do so in a spraying posture. The behavior is normal for intact males, and castration usually decreases occurrence of the behavior. However, castrated males and intact or spayed females may also spray. A study by Hart and Cooper in 1984 revealed that about 10% of prepubertally castrated males and about 5% of prepubertally spayed females take up spraying on a frequent basis later in adult life.<sup>5,8</sup>

As previously stated, spraying most frequently occurs within the motivational context of territorial, sexual or agonistic behavior. Most tomcats urine mark their territory by spraying. The marking familiarizes the male with his home range, communicates his presence to other cats and during the breeding season attracts sexually receptive females.<sup>3,5</sup>

Spraying can develop in female and neutered male cats at any age after sexual maturity. An important cause of spraying is an increase in anxiety or nervousness. Resident cats may spray to scent-mark when a new cat is introduced to the home, one or more cats is present in the neighborhood outside the home or if a cat is defensive toward a person in the home. It also appears that there is a direct relationship between the number of cats in a household and the probability of at least one of the cats spraying. A study by Jemmett and Skerritt in 1979 found that the probability of spraying increased from 25% in single-cat households to 100% in households of more than 10 cats.<sup>7</sup> It has also been found that with castrated male cats, the presence of female housemates

increases the probability of spraying much more than the presence of male housemates.<sup>8</sup>

### Treatment Approaches for Problem Elimination

#### Initial Diagnosis

When a cat is presented for an elimination problem the first step should be to explore the possibility that the behavior is related to a medical condition.<sup>9</sup> Table 1 below lists possible medical causes for elimination disorders. Another factor which should be considered is the age of the cat. In the very old cat there may be changes in eliminative behavior associated with age, such as increased frequency of urination, weakened sphincter control and mild arthritis can decrease the animals desire to move to the litterbox and increase the number of accidents.<sup>3,5,10</sup>

**Table 1**

<u>Medical Causes of Elimination Disorders@</u>
Urination
a) Conditions causing polyuria e.g. diabetes mellitus, diabetes insipidus, hepatic disease, pyometra, renal insufficiency, lymphomas, hyperadrenocorticism, and hyperthyroidism
b) Conditions causing urinary urge/pollakiuria e.g. cystitis, uroliths, FUS, tumors
c) Conditions causing incontinence e.g. estrogen responsive, neurogenic, congenital/structural (ectopic ureters)
d) musculoskeletal diseases affecting mobility
Defecation
a) Conditions causing frequent elimination/malassimilation
b) Conditions causing defecation urge e.g. colitis - parasitic, infectious, eosinophilic, etc.; enteritis (diarrhea) - viral, bacterial, parasitic
c) Fecal incontinence- e.g. neurogenic
d) Musculoskeletal diseases affecting mobility.

@Inappropriate elimination may be a side effect of many systemic illnesses. Landsberg, G.M. Veterinarians as Behavioral Consultants. *Can. Vet. J.* 31; 90; 227.

Once medical causes have been ruled out or treated, the next step should be to determine whether the problem is spraying or inappropriate urination. The owner should be questioned as to both a precise description of the posture the cat assumes at elimination and areas or surfaces eliminated on. This is important as the treatment approaches for spraying differ from those for inappropriate urination and defecation.<sup>10</sup>

#### Therapeutic Approaches to Inappropriate Urination and Defecation

Since environmental stress is known to play a role in inappropriate urination, the first step should be to investigate any recent changes in the cat's environment. Changes such as the addition of a new pet or another person to the household, changes in the type of litter used or a change in the location of the litterbox can all be inciting factors.<sup>9</sup> By identifying a cause, the probability for success is increased, especially if the cause can be eliminated.

The next step is to thoroughly clean all previously soiled areas.<sup>5, 9, 10</sup> Products which have tested effective at neutralizing urine include, F.O.N.R. Spray (Summit Hill Laboratories), Outright<sup>®</sup> Pet Odor Eliminator (The Bramton Company) and club soda, either alone or in 50:50 combination with vinegar.<sup>11, 12</sup> The most common method is to saturate the area, blot it dry with paper towels, and then cover the area with heavy gauge plastic.

Next, the litterbox and its location should be considered. Daily removal of waste from the litterbox is required.<sup>12, 13</sup> It should be dumped completely every other day and washed out once a week. The owner should provide at least one box per cat, plus one additional one.<sup>12, 13</sup> These should be placed in a variety of locations. A variety of litters should be tried such as: sand, potting soil, sawdust, woodchips, shredded newspaper or paper towels, plain clay litter without deodorant and the new recyclable litters (Ever Clean<sup>®</sup>, Soft Paws<sup>®</sup>, Pine Fresh<sup>®</sup>, Fresh & Sweet<sup>®</sup>)<sup>12</sup>, as well as different depths of litter. Many cats who prefer carpeting and other soft surfaces will accept one of these alternative litters.

Owners should reinforce proper eliminative behavior by taking the cat to the litterbox frequently, waiting there with it and praising it if it scratches or uses the box.<sup>12, 13</sup> While it is often difficult to catch the cat in the act of inappropriate elimination, if owners do so, they should

startle the cat with a loud noise. This deterrent action should be used only within the first 30-60 seconds of initiation of the behavior. A cat should NEVER be punished after the fact.<sup>12, 13</sup> Some cats persist in urinating and defecating in only certain spots outside the litterbox. These cats are exhibiting a location preference. These spots must be made unattractive to the cat. Many cats dislike the feel of plastic or certain scents. Scenting the area with cedar chips or a deodorant soap bar can deter a cat from using their preferred spot.<sup>13</sup> If these measures are unsuccessful, the owner may have to resort to moving the litterbox to the cat's preferred spot.<sup>7</sup> After the cat has been using the box 4 consecutive days, it can be moved gradually (an inch a day) back to a more desirable location.<sup>13</sup>

Another ploy which supports the correction program, based on the fact that most cats maintain separate areas for feeding and elimination, involves feeding the animal at the site of its soiling.<sup>10</sup> The food dish, even though empty after meals, should be left down until the next feeding.<sup>14</sup>

Finally, a more drastic measure which can be implemented for any of these problems is to isolate the cat.<sup>5, 10, 12, 13</sup> The cat should be kept alone in a small room for several days with food, water and a litterbox (distanced as far from the food and water as possible). This should help break the habit of eliminating in inappropriate areas. The area of the house that the cat has free range of should be gradually expanded, using constant supervision at first and the negative reinforcement previously described, as needed.

If an emotional response or separation anxiety appears to be involved, temporary treatment with progestins or anxiolytic drugs may be helpful. These will be discussed in more detail under treatments for spraying.

#### Therapeutic Approaches to Spraying

When treating a case of urine spraying it is a good idea to begin by exploring reasons why the animal started to spray and why it continues to do so.<sup>4</sup> Questions concerning any recent moves, new cats added to the household or strange cats observed outside the house are good places to start. Some factors which provoke spraying are transient, such as onset of the breeding season or a move to a new house, and therefore, once the spraying has been reduced or eliminated the problem may be solved.

In multi-cat households there may be a problem identifying which cat(s) is actually doing the spraying. To solve this problem, sodium fluorescein dye can be used to mark the urine of the suspected cat. The dye can be given either orally at a dose of 0.5 ml of 10% solution (100mg/ml) sodium fluorescein or 6 strips of ophthalmic test paper inserted in gelatin capsules, or by subcutaneous injection of 0.3 ml of 10% sodium fluorescein solution.<sup>5</sup> The dye is excreted into the urine within 2 hours following oral or subcutaneous administration. The dye excreted is water soluble, and when diluted in urine, doesn't discolor fabrics. Under conventional lighting the marks are invisible, but under ultraviolet light (Wood's lamp) are quite obvious for at least 24 hours.<sup>5</sup> The possible culprits should each be treated at 2-day intervals until the owner is certain which cat(s) are involved.

If the cat spraying is an intact male or estrus female, neutering is a highly effective treatment.<sup>4,7</sup> It should be remembered, however, that neutered cats may continue to mark.

Next, an environmental approach can be tried. It may require close observation by the owner, but is the least invasive and can be the quickest and easiest solution in some instances. The goal is to identify the eliciting stimuli and change the environment so that these stimuli no longer elicit urine marking.<sup>4</sup> For example, reducing the sight of outdoor cats or increasing the amount of time a cat spends outdoors may affect the frequency of urine marking in the home.<sup>7</sup>

Pharmacological treatment has proven to be effective in many cases, but may involve detrimental side effects. Long-acting progestins and diazepam have been demonstrated to reduce spraying in cats.<sup>4,15</sup> Some of the newer human anxiolytic drugs may also be effective.<sup>16</sup> For a list of these drugs and their suggested dosages see Table 2.

The progestins have long been used for the treatment of urine spraying in cats. The two long-acting progestins of choice are oral megestrol acetate (Ovabar<sup>®</sup> Schering) and repository injectable medroxyprogesterone acetate (Depo-Provera<sup>®</sup> UpJohn).<sup>4,5</sup> Progestins act to suppress male-typical behavior and have a tranquilizing action.<sup>5</sup> The use of progestins should never be taken lightly, nor should the drugs be dispensed indefinitely without monitoring the animal.

Progestins are contraindicated for breeding animals, any intact female, diabetics and patients undergoing concurrent corticosteroid therapy. Undesirable side effects of progestin therapy include increased appetite and weight gain, lethargy, gynecomastia, mammary gland hyperplasia and neoplasia, cystic endometrial hyperplasia/pyometra complex, hyperglycemia, overt diabetes mellitus and adrenocortical suppression.<sup>4,6,17,18,19</sup> No animal should be given a progestin without disclosure and owner consent, prior blood work and frequent follow-up blood work if treatment is continued.

Diazepam (Valium<sup>®</sup>) has also been shown to reduce spraying behavior in cats.<sup>15</sup> The prognosis for effectiveness is higher in castrated male cats than spayed females, and higher in multicat households.<sup>16</sup> Most cats who respond to the drug are ataxic for the first 3-4 days of therapy and then spontaneously recover.<sup>16</sup> Other side effects include increased appetite and friendliness.<sup>4</sup> All benzodiazepines should be used with caution in patients with impaired liver function, because hepatic biotransformation is the primary metabolic route.<sup>16</sup>

Newer benzodiazepines which have also been used with some success in the treatment of feline spraying are chlordiazepoxide, alprazolam and clorazepate dipotassium.<sup>16,17</sup> Chlordiazepoxide apparently has a more variable peak time and half-life than other benzodiazepines.<sup>16</sup> Alprazolam is not yet widely used, but can be effective in refractory cases and clorazepate dipotassium comes in a sustained release form that may facilitate administration.<sup>16,17</sup> It should be noted that all benzodiazepines interfere with the ability to learn. These drugs may, therefore interfere with training programs.<sup>16</sup>

Buspiron hydrochloride is a human anxiolytic drug which has recently found some use in veterinary medicine. One of the applications has been the treatment of feline spraying behavior. Side effects include mild disorientation and gastrointestinal symptoms.<sup>16,17</sup>

A last resort for cases which remain refractory to the above variety of pharmacological options, is olfactory tractotomy. This is a relatively simple, low-risk neurosurgical procedure which eliminates the cat's sense of smell.<sup>20</sup> Since urine spraying behavior is a type of marking and olfactory investigation usually precedes urine marking, elimination of the sense of smell removes much of the stimulus for

**Table 2**

<u>Drugs Used to Treat Feline Elimination Disorders<sup>a</sup></u>	
<u>Drug</u>	<u>Feline Doses</u>
Alprazolam	0.125-0.25 mg/kg PO every 12 hours
Buspirone hydrochloride	2.5-5.0 mg PO per cat every 8-12 hours
Chlordiazepoxide	dosage unavailable
Clorazepate dipotassium	0.55-2.2 mg/kg PO as needed; 0.5-1.0 mg/kg every 12-24 hours
Diazepam	1-2 mg PO per cat every 12 hours 1-3 mg PO per cat every 12-24 hours
Medroxyprogesterone acetate	10-20 mg/kg SC, IM; 50 mg (females) or 100 mg (males) SC 3 times a year
Megestrol acetate	2.5-5.0 mg/day PO per cat for 7 days, then gradually decrease to 2.5-5.0 mg/week; 5-10 mg/day PO for 1 week, then decrease every 2 weeks to minimum effective dose

<sup>a</sup>Most of these agents have not been approved by the U.S. Food and Drug Administration (FDA) for use in cats. Informed-consent forms signed by the animal's owner are advisable before some of these drugs are prescribed or dispensed.

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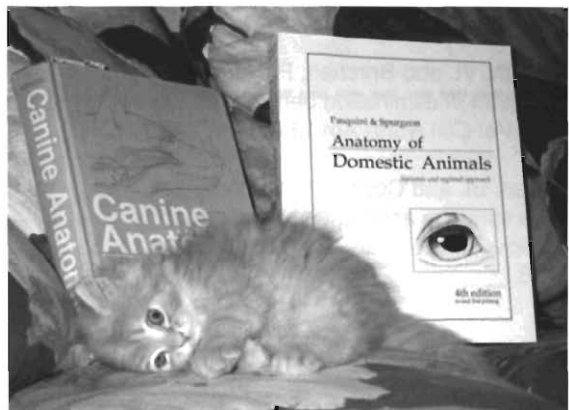


Photo by Kim Brennan

spraying.<sup>20</sup> This is an extreme measure, but may be desired by owners who are considering euthanasia.

As more information is gathered concerning feline behavior and feline elimination behavior in particular, the success rate of treating and preventing inappropriate elimination should increase. Many times these behavioral problems are "life-threatening" conditions. Correction of a behavioral problem may save an animal life as much as any medical or surgical procedure. Despite the inconvenience and expense, many owners remain exceedingly attached to their problem pets and often wish to keep them if there is any way they can correct the problem. The better understanding veterinarians have of feline behavior and current therapy options, the better they will be prepared to serve both their patients and clients.

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