A Practical Approach to Managing Urine Marking in Cats
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Urine marking is a common behavioral complaint of cat owners and can be very damaging to the household and the human-cat relationship. Studies have indicated a correlation between underlying social issues between household cats and urine marking and therefore relationships between cats should be explored to obtain an accurate diagnosis and formulate a treatment plan.

History for urine marking problems
A complete and thorough behavioral history is essential for a diagnosis and treatment plan:

- Establish duration and progression of the problem behavior. Is it new or a chronic?
- What type of elimination is deposited outside of the litter box; urine, stool or both?
- Location of the elimination, i.e. vertical deposition of urine or horizontal deposition.
- Information on the litter box, litter box size, covering on the box, box locations, litter type, number of boxes and rate of cleaning,
- A diagram of the locations of urine spraying
- The frequency of urine spraying
- When (time of day) the owners find the urine spraying
- Information about the household routine and any changes in the home.
- How many other pets are in the household especially additional cats?
- Social relationship between cats in the household, including any overt signs of aggression (hissing, growling, chasing) and covert signs of aggression (blocking, staring, supplanting from spaces)
- All previous treatment attempts, behavioral, medical and pharmacological.

Diagnosis
Marking in cats is often categorized as either sexual or reactional marking behavior. Cats will mark with urine to attract mates and also urine mark in response to environmental changes and/or stress. Urine marks are often found in socially significant places such as owner possessions, laundry or in prominent locations. Cats that mark with urine on vertical surfaces usually continue to use the litter box for elimination of both urine and stool. The diagnosis should focus on the location of the urine, the size of the urine spot and possible sources of stress in the household. Although spraying is usually thought to be associated with intact animals, neutered animals will spray and cats will often mark inside the house as a territorial response to the presence of outside cats. Any underlying medical problems present should be identified and treated. While a recent study by Tynes et al found that cats that urine marked usually did not have any urinary tract pathology other disorders can influence urine marking.

Treatment for urine marking
The treatment plan should be designed to address the underlying causes; increasing litter box attractiveness, intact cats should be neutered, scent profile in the home made constant, changes kept to a minimum and attempting to resolve the social issues between cats. Neutering is effective in reducing urine marking in only 90% of male cats and 95% of female cats, and even animals neutered prior to puberty may mark with urine. When there are multiple cats in the household marking with urine may occur to delineate territory, due to a lack of adequate resources or space, or the stress of too many cats and these issues must be addressed to aid in resolution.

Increasing litter box attraction and cleaning urine marks
The litter pan should be friendly and very clean. Recent research has shown that providing appropriate numbers of boxes, cleaning boxes regularly and cleaning urine marks can decrease urine marking in the home. Waste material should be scooped out 1-2 times a day. Owners must empty and wash the litter box by totally changing clay litter material every 3-4 days, and totally emptying and replacing scooping litters weekly. The depth should be adequate, 3-4 inches seems preferred. Research has shown that some cats prefer the clumping materials to clay litter products it may be beneficial to switch to a clumping type product. Litter boxes must be easily accessible, in quiet locations and where the cats spend their time. Where and how to allocate litter boxes should be decided based in information on the household routine, the number of other cats within the home and the social relationship between individuals. In multi cat households there should be an adequate number of pans (one pan per cat) in different locations, not just an increase in the number of pans side by side.

Since urine marking is a normal feline behavior, some cats will respond to the creation of an acceptable spraying spot for the cat. Owners can create an "L" shaped litter arrangement, two litter boxes, one horizontal with litter inside and placed inside one that is empty and vertical or just one litter box leaned against a wall. Some cats will use this set up and limit their urine spraying to this
location. Cleaning urine spots and make the sprayed areas aversive using tactics such as placing potpourri at the spot, food bowls, motion sensors and keeping rooms blocked off are useful environmental changes.

**Dealing with social issues between cats**

Insuring adequate numbers of food bowls, resting places and litter boxes throughout the environment may help diminish social tension and perhaps spraying behavior. In other situations the number of cats in the home may need to be reduced to eliminate or decrease spraying behavior or permanent separation of cats may be needed.

For cats that are dealing with social stresses within the home, a component to a treatment plan is "alone time". This allows the spraying cat to have access to an area all by him/herself without the presence of the other cats in the household. This can be in the basement or a bedroom, but the cat should have a minimum of 4-6 hours of alone time daily. The separate space should have a food bowl, water bowl, litter box and adequate resting and hiding locations. Social interactions with owners must also be regularly provided.

Attempts should be made to limit the inside cats ability to visualize the outdoor cats and to get rid of those cats if possible. Blocking visual access out windows and doors, or closing the cat in a room where it cannot visualize outside cats is useful. In some cases motion sensors or fences may keep some cats out of the yard and away from windows.

**Pheromones**

Feliway® a synthetic pheromone spray or diffuser can also be very useful in the treatment of urine marking. Feliway® is synthetic cheek pheromone of cats and can be useful in decreasing or stopping spraying behavior. In a study by Mills and Mills cats exposed to Feliway in the diffuser form showed a decrease in urine marks when compared to cats treated with placebo. Feliway® is often effective in decreasing urine spraying caused by reactive stimuli such as changes in the cat’s environment (moving, new pets, stress etc.). Pheromone spray has also been used to calm cats in new environments.

**Owner and pet interactions**

An effort should be made to have daily positive interactions with the cat including grooming and playtime. Punishment should be avoided as it can increase anxiety and create fear and anxiety of the owner. Closing doors or blocking them somehow should be utilized to restrict the cat’s access to previously sprayed areas.

**Follow-up for urine marking**

A follow up progress report should be obtained in 7-10 days. Attempts should be made to determine the number of urine marks and whether their has been a decrease compared to before the institution of treatment.

**Prognosis for marking**

Marking behaviors can have a variable response to treatment. Factors such as outdoor cats and the ability to control them, household social conflicts with other cats and ongoing household changes may effect total resolution of the spraying behavior. Ogata and Takuchi found that while urine marking decreased with pheromone therapy, urine marking was sustained at a higher level in households with intercat aggression. Mills and White found that while urine marking decreased, it often was not eradicated. However, the reduction in spraying behavior was acceptable to the clients as an outcome. Marking behavior may persist or return after treatment when medication is stopped. Recent studies looking at control of urine marking with long-term pharmacological treatment have shown no difference between fluoxetine and Clomipramine for the treatment of urine marking and that cats that relapse usually respond to reinstatement of the medication.

**Pharmacological treatment for urine marking**

When considering drug therapy, a complete behavioral and medical history should be obtained prior to choosing a medication. Most drugs used for behavioral problems are not approved for use in cats, and therefore constitute extra-label drug usage. Complete serum biochemistry and possible cardiac work-ups are indicated prior to use. Owners need to be informed of potential side effects and extra label use. Consent and release forms should be obtained from owners. Frequent client contact for efficacy and side effects of drug therapy is necessary. Owners should be encouraged to be home for the first few dosages to assess effect or side effects.

Drug therapy can be a helpful adjunct to behavioral treatment by decreasing the emotional arousal which may motivate urine marking. Drug therapy should only occur when a behavioral diagnosis has been made using the accepted categories which include marking, litter and location aversions, and substrate aversions and preferences. Drug therapy alone is rarely curative and is best used in conjunction with behavior therapy. Behaviors caused by stress, territorial stimuli, or anxiety are more likely to have some response to medication. Elimination outside of the litter box due to litter or location aversions, litter cleanliness problems, location or substrate preferences, are rarely affected by drug therapy. The most commonly used drugs are selective serotonin reuptake inhibitors, tricyclic antidepressants, buspirone, benzodiazepines, and progestins.
In a double-blind placebo-controlled clinical trial, Pryor et al tested the effectiveness of fluoxetine hydrochloride for the treatment of urine marking. In the drug treatment phase each cat received either drug (1.0 mg/kg once daily) or placebo for 8 weeks and owners recorded urine marks observed. Each household utilized an environmental plan; use the same cleaner to clean urine marks, have one more litter box than number of cats in the home, scoop the box daily and change the litter box weekly. Cats on medication showed a significant decrease in urine marks when compared to placebo with 6 out of 9 cats on drug showing no urine marking by weeks seven and eight. A correlation was found between marking at baseline and return to marking after the drug was withdrawn. Fluoxetine can take 2-4 weeks to show some effect on behavior. The most common side effects are gastrointestinal such as anorexia, nausea and diarrhea but may also include sedation, irritability and anxiety.

Clomipramine has also shown efficacy in the control of urine spraying in cats. Clomipramine is a tricyclic antidepressant that is a serotonin reuptake blocker and some norepinephrine reuptake blocking effects and effect may not be noted for 2-4 weeks after initiation of therapy. Clomipramine is a tricyclic antidepressant, and the side effects of urinary retention, tachycardias, depression and inappetence are possible. In the Landsberg study twenty-five cats that were spraying urine in the home were treated with Clomipramine at 0.54 mg/kg orally every 24 hours and no other behavior modification was applied. A statistically significant reduction in urine spraying was noted with 20 of 25 cats showing a ≥ 75% reduction in spraying within 4 weeks. Side effects noted in this study included sedation, decreased appetite and urination but overall side effects were mild. King et al in a randomized controlled multicenter trial obtained results suggesting that when compared to a placebo, Clomipramine significantly reduces the frequency of urine spraying in cats. All cats in this study had behavioral and environmental modification in addition to medication. The recommended initial dose was 0.25-0.5 mg/kg, PO every 24 hours.

Another study examined whether clomipramine differed from fluoxetine in reducing urine marking, whether the reduction of urine marking in cats continues in cats treated for a period longer than 8 weeks, and recurrence of urine marking after abrupt withdrawal of the medication is reduced in cats treated for more than 8 weeks and whether cats successfully treated with either medication that resume marking after drug withdrawal can be treated successfully again with the same drug regimen. Although the study was small, the data revealed that the efficacy of fluoxetine and clomipramine was similar. Animals treated with fluoxetine longer than 8 weeks showed increased efficacy in reduction of urine marking. However, some cats needed to be treated for 32 weeks to reach ≥ 90% reduction in urine marking. When fluoxetine was abruptly withdrawn, most cats reverted to urine marking behaviors; however, those that responded to the first treatment regimen responded again to reinstatement of the medication.

Medicating cats can be a challenge and the interest in administering medication via a transdermal route has increased. Although an attractive alternative, recent studies have unfortunately not been able to demonstrate good absorption and bioavailability of psychotropic medication via the transdermal route. Ciribassi et al showed that although Fluoxetine was absorbed through the skin in cats, the relative bioavailability was only 10% of that for the oral route of administration. Mealey et al. looked at the systemic absorption of amitriptyline and buspirone after oral and transdermal administration to healthy cats and found that systemic absorption of both drugs was poor when compared to the oral route of administration. Appropriate dosages for transdermal administration of these medications has not yet been established.

**Follow-up drug therapy**

Owners should be contacted at least every 2 weeks when first beginning medication. If the marking behavior responds to medication it should be continued for 8-12 weeks. If the behavior has not returned, an attempt can be made to wean the cat off of medication. The dosage is decreased by 25% a week while watching for a return of urine marking. If the cat does begin to mark, it is recommended to remain at that dose for 2 weeks to determine if the urine marking will stabilize. If urine marking ceases, an attempt can be made to decrease the dosage again. If urine marking is ongoing, the dosage can be increased to the previous effective level. If a cat must remain on medication for long periods of time, repeat blood chemistries are prudent to check for liver or kidney value changes.