Feline Elimination Problems: Behavioural And Environmental Factors Associated With Elimination Problem Behaviour

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Introduction

In recent years there has been an increase in the numbers of cats kept as household pets. This has resulted in a similar increase in cats presented with behaviour problems. Inappropriate elimination resulting in urine and/or stools deposited outside the litter box is one of the more common problem behaviours in cats. Beaver (1989) in a retrospective of 179 cat cases noted 64.25% had housesoiling as a primary complaint. A study of abnormal behaviour in 39 cats referred for behavioural problems to the clinic at the University of Queensland in Australia, reported inappropriate marking in 15% and inappropriate defecation in 8% (Blackshaw, 1989). A later study of feline elimination problems by Blackshaw (1992) found that inappropriate elimination comprised 33% of feline behavioural problems presented to the Companion Animal Practice at the University of Queensland, Australia.

The prevalence of elimination behaviour problems raises questions concerning which variables might be associated with inappropriate elimination behaviours in the cat. In the authors' practice, repeated variables seemed to be more prevalent in the histories of cats with inappropriate elimination problems, but these were not systematically counted or evaluated. These included scented litter, covered pans, household disruption, urinary tract disorders, poor litter maintenance, multiple cat homes and poor elimination covering behaviours. The scientific literature has often alluded to potential association of some variables with problem behaviours. It has been noted that cats in homes with multiple cats are often implicated in spraying behaviours (Hart & Cooper, 1984). Lower Urinary Tract Disorder (LUTD) can cause pollakiuria as a clinical sign and perhaps this could lead to the deposition of urine outside the litter box due to the increased urinary frequency and urgency (Kruger & Osborne, 1993) Borchelt et al. (1986) disruption of household routine as a possible cause of failure to use the litter box. The prevalence of certain variables in case histories does not necessarily imply an association with problem behaviour. Examination of these variables in problem behaviour cats and cats without a history of persistent elimination problem behaviour is a first step to understanding potential correlation. This study analysed variables including type of litter provided, elimination covering patterns, incidence of urinary tract disease, types of litter pans provided, method of litter maintenance and the household composition between two groups of cats, those presented with elimination problems and those presented without a history of elimination problems.

Materials and Methods

This author defined inappropriate elimination as spraying, urination only, defecation only or both urine and stool deposited outside of the litter box in the home. One hundred consecutive case histories of elimination problems in cats were reviewed. All cases had been seen as a behavioural referral to the author for feline inappropriate elimination between July 10th 1984 and January 25th 1993. Cases were acquired for referral from area veterinarians.
who ruled out medical aetiologies for problem elimination behaviours using urinalysis as a medical screening. Medical differential diagnosis included hyperthyroidism, Diabetes Mellitus, Feline Lower Urinary Tract Disease including Interstitial Cystitis, diet/food allergy, renal disease, liver disease, constipation, obstipation, anal sacs, Inflammatory Bowel Disease, parasites, neoplasia and musculoskeletal problems.

The behavioural consultation consisted of history taking either in person or by telephone. Owners were questioned about the following variables: age and sex of cat, type of elimination, spraying (Y/N), covering behaviour in litter box, type of litter, scented vs. unscented litter, covered litter pan, duration of the problem in months, frequency of litter cleaning (no.in days), number of other cats in the home, history of LUTD, recent household change(moving, new baby, new pet, remodelling, travel), and whether the animal was a stray or from a shelter. An attempt was made to determine the duration, frequency and progression of the inappropriate elimination behaviour to aid in formulation of a treatment plan and prognosis.

For purposes of diagnosis and treatment, location of elimination can be important. Owners were questioned as to where in the household the elimination's were found. Proximity to the windows and doors could indicate problems with animals outside the home. Elimination close to the litter box may indicate dislike of litter material or perhaps a litter cleanliness factor. The number locations may help to determine if the behaviour is marking, location or surface preferences or aversions. Location may help to differentiate between urination and spraying.

In the winter/spring of 1993, data were collected on 44 other cats with no known history of persistent inappropriate elimination problems who were presented for routine examinations to the Cat Practice in Birmingham, Michigan. This information was not collected by the author as behaviour histories. Information was obtained through a form compiled by the author and voluntarily self administered by clients. Forty of these control cats used the litter box exclusively for elimination, and four had occasionally sprayed in the home, yet routinely used the litter box for elimination of urine and stools. The spraying cats were included because none were actively engaged in problem elimination behaviour at the time and had not had a persistent history of spraying behaviour. These data were compared to those of the cats with elimination problems using percentages and chi square analysis.

Results
The group of cats with elimination problems consisted of 44 castrated males, 51 ovariohysterectomized females, and 5 intact females. The ages ranged at time of presentation from 4 months to 12 years. The average age was 4 years and 2 months. The control group of cats from the Cat Practice consisted of 27 castrated males and 17 ovariohysterectomized females. Ages ranged from 6 months to 16 years with an average of 7.5 years.

The 100 cats with elimination problems had diverse presentations. Fifty two presented for depositing urine only outside of the litter box. Those cases were further divided with 32 depositing urine on horizontal surface sand 20 spraying on vertical surfaces. 20 cats were presented for defecating outside the litter box. Both urine and stool were deposited outside the litter box by 28 cats. The average duration of elimination problems was 13 months. The duration ranged from 1 to 48 months.

Type of litter material provided to the cats differed. Sixty-eight elimination problem cats used a litter material with an odour control product added, 19 used plain clay litter, 12 had a clumping type of litter material provided in their boxes (1 unknown). Some cats may
have had different litter material provided in their boxes when the problem behaviour began, but this information was not available in all cases. Control cats also showed a diversity of litter materials provided to them. 10 (23%) were provided with odour control clay litter, 17 (39%) were provided plain clay litter without odour control products, 8 cats (18%) were provided a clumping type litter without odour control, 1 (2%) had an odour control clumping type litter, 7 cats (16%) used a product that their owners called "sand" (no brand name given) and one owner did not respond to the question. In this study, cats with elimination problem behaviours were more often provided with scented litter than cats in the control group. There was a significant association ($p<0.01$, $\chi^2=22.82$, $df=1$, $n=144$) of odour control litter on elimination behaviour problems, with 68% of elimination problem cases and only 25% of control cases having odour control litter provided in their boxes. Additionally, control cats were more likely to be provided fine, or clumping litter.

Litter maintenance routines varied among problem behaviour cases. Owners of cats with elimination problem behaviour had cleaning intervals varying from 6-30 days with a mode of 6 days. Control pets showed a similar interval of litter cleaning ranging from daily to every 30 days. People owning control cats were more likely to scoop out the litter daily with 17 owners reporting daily scooping as a litter maintenance routine. There was not a difference in the likelihood of either group of cats being provided with covered litter pans with 38% of the elimination problem cats having covered litter pans and 45% (20) of the control cats.

Household disruptions were common in both groups. For the elimination problem cats, 52 experienced a change in the home. Changes noted were moving, a new baby, a new room-mate, a new pet, remodelling or travel by the owner. In 22 (50%) of control households, the owners had recently moved, got a new job, travelled, remodelled or had a new partner.

Medical causes of inappropriate elimination can often make behavioural diagnosis difficult. The minimum required medical diagnostic test for behavioural referral was a urinalysis. In this study 38 of the problem cats had a past history of LUTD or FUS (Feline Urologic Syndrome) whereas 6 (14%) of the control cats had a history of LUTD/FUS. FUS/LUTD showed a significant association ($p<0.05$, $\chi^2=8.538$, $df=1$, $n=144$) with elimination problem cats having a higher incidence of medical complications. Inappropriately eliminating cats with a history of LUTD did not only urinate outside the box, defecation and spraying behaviours outside the litter box were also found among this group.

Covering of elimination in the litter box also differed between groups. Only 37% of the problem elimination cats buried both urine and stool, while elimination behaviour of the control cats showed 68% (30) of the cats covering both urine and stool in the litter box. When comparing problem elimination cats to control cats there was a significant association ($p<0.01$, $\chi^2=12.239$, $df=2$, $n=144$) between groups and covering behaviour. 68% of control cats covered their elimination, whereas only 37% of elimination problem cats covered their elimination.

Multiple cat homes were prevalent in both groups examined. A multiple cat household was defined as a home with at least one other cat in addition to the problem cat. The totals given refer to the total number of cats in the home including the problem cat. 65% of the elimination problem cats lived in multiple cat households. Of these 65, the majority, 50 cats (77%), lived in a home with only one other cat. In this study, 24 cats in the problem elimination group sprayed urine in the home. 10 lived in homes with only one additional cat, 5 lived in homes with two additional cats, one each lived in a home with 3, 4 or 5 additional cats. 6 of the cats that sprayed urine in the home lived alone. Both control and problem
elimination problem cats were equally likely to live in multiple cat households. 26 control cats (59%) were in multiple households.

The number of litter boxes per multiple cat household was variable. In the 50 homes (problem elimination behaviours) with two cats, 50% (25) had two boxes, 44% (22) had one box, two had 3 boxes, and one had 5 boxes. In the 10 homes with 3 cats, one home had one box, three homes had 2 boxes and six homes (60%) had 3 boxes. As numbers of cats increased, the number of litter boxes did not always increase as well. With 4 cats per home, one home had 1 box, and the other home had 4. In the five cat home, only 2 litter boxes were provided, and in the homes with six each provided 3 litter boxes. 12 controls (46%) lived in homes with one other cat, and eight homes (67%) provided 2 litter boxes and four (33%) had only 1 litter box provided. 7 controls (27%) lived in a 3 cat home with 3 of the homes having 3 litter boxes provided and 4 homes provided 2 boxes. 5 (19%) of the control cats lived in a home with 4 cats in residence. 4 of those homes had 4 boxes provided, and one home had only 2 boxes available. One cat lived in a home of 5 cats with 5 litter boxes provided. The final control cat in a multiple cat household did not have information provided on number of litter boxes.

Discussion

Factors cited in previous papers as possible problems in inappropriate elimination in cats include household disruption (Borchelt et al. 1986) and additional cats in homes that spray urine (Hart & Cooper, 1984). Unlike other studies this one compared elimination problem cats and non-problem cats for occurrence of certain variables. Scented litter, poor elimination covering behaviour and disease of the urinary tract were significantly associated with elimination problems in cats when compared to cats without a history of persistent inappropriate elimination. Previous studies have examined other variables such as diagnosis and location of elimination (Borchelt & Voith 1981, Borchelt & Voith 1982), but did not compare elimination problem cats to controls.

Medical screening in order to eliminate medical causes for the failure to use the litter box is essential in evaluation of inappropriately eliminating cats. In the present data history of urinary tract disease among cats who did not constantly use a litter box for elimination is prevalent. Osbourne et al. (1994) and Buffington et al. (1994) discuss the components of LUTD and interstitial cystitis in cats and these diseases may be important components in elimination problems. Osbourne (1995) suggests that a urinalysis is not necessarily the best means for ruling out all potential urinary tract disease, especially cystic uroliths. Currently the most frequent way of ruling out medical disease in cats eliminating outside the litter box is urinalysis. Future studies should address medical diagnostics when dealing with cats who persistently do not eliminate in the litter box. Medical aetiologies could result in pollakiuria and contribute to failure to use the litter box. This study found that cats that sprayed and defecated outside of the litter box may also have a history of urinary tract disease. Whether urinary tract disease is linked to problem behaviour is not known.

The behavioural history should include locations of inappropriate elimination, elimination problem type (spraying, urination, defecation, or both urine and stool outside the litter box), frequency and duration of non litter usage. This information is useful in making a diagnosis and treatment plan. Factors often cited as influential in inappropriate elimination behaviour include litter aversion, surface preferences, location preferences and location aversions (Borchelt et al. 1981, & Borchelt, 1991). Although part of the history taking, this information was not evaluated in this study. Instead, cats with elimination problems were
only classified by the type of elimination deposited in the home. Diagnostic categories can differ between clinicians, and at the present time standardised accepted diagnostic categories do not exist for behavioural diagnosis. Diagnostic categories are helpful in designing treatment plans and assessing prognosis. Since this study did not look at diagnostic categories, there is the possibility that functionally, cats with litter aversions differ from those that show location or surface preferences and this could affect variables associated with elimination problem behaviour.

Treatment modalities for inappropriate elimination have been discussed in numerous sources. These include pharmacological treatment, surgical treatments, increasing litter cleanliness, changing litter texture, changing litter location, adding more litter boxes, controlling odour and confinement of the cat (Borchelt et al. 1982, Houpt, 1991). Treatment is commonly based on three things; preventing access, making appropriate elimination areas attractive and using aversion to discourage inappropriate elimination. Confinement and supervision are often used to control access to household areas. Litter trials may be indicated to determine a litter substrate that the cat prefers. Attention to influences in the home such as household changes and dynamics between resident cats can help in treatment of elimination and spraying behaviours. Litter cleanliness should always be an issue and the data presented revealed that many of the control cats had their litter cleaned daily (17) and perhaps this contributes to continued litter box usage.

There were differences as well as similarities between the two groups in this study keeping in mind that differences do not imply causality. Cats with elimination problems were significantly more likely to be provided with scented litter material in their boxes, yet equally as likely as control cats to be provided with litter pans. One difference, however, was the high percentage of control cats that had their litter boxes cleaned daily. Problem elimination cats with covered litter pans had an average cleaning time of five days. Control cats were more likely to have fine or clumping litter provided in their boxes and have the boxes scooped daily, covered or not. The variable of litter cleanliness and elimination problems need to be examined further.

Borchelt (1991) compared groups of cats allowed to choose litter type randomly and found only Everclean®, a scoopable litter, to be chosen more frequently than expected. Since control cats were more likely to have scoopable litter provided for them, this may account for differences between elimination problem cats and controls. Only 12 cats in the problem elimination group had scoopable litters provided. Although scoopable litters were not widely available throughout this study, a breakdown of cases by year showed that 76 of the 100 cases from 1990-1993, at which time scoopable litters were prevalent. When only cases from 1990-1993 were used in the chi square analysis, there was still a significant association ($p<0.01, \chi^2 = 26.8, \text{df}=1, n=144$) between scented litter and the problem. However, many cats use scented litter materials and do not eliminate outside the litter box. Further study is needed to determine if any relationship between litter type and problem behaviour exists. As mentioned earlier, medical disease of the urinary tract was significantly more common in the elimination problem cats (38%) than in the control group cats (14%). In addition, cats with elimination problems were significantly less likely (38%) to cover their elimination when compared to control cats (68%).

Although disruptions in the home life of both groups differed only slightly one question that can be raised is perhaps it is not the household changes but rather the individual cats response to them that may be correlated with elimination problems. Travel has been mentioned as a concern in elimination behaviour problems. by Borchelt and Voith (1981), but
was not seen to be significantly associated with elimination problems in this study. When combined, 50% of control cats had had household changes, comparable to the problem group.

Multiple cat households were common in both groups. For elimination problem cats, 65% of the cats lived in multiple cat households, as did 59% of the control cats. Other studies have only addressed the number of cats in the home where the objectionable behaviour was marking behaviour, (Borchelt et al. 1982, Hart et al. 1984), yet in this study spraying cats did not always live in homes with large numbers of cats. Most spraying cats lived with just one other cat and 25% lived alone. The majority of cats in multiple cat households only lived with one other cat, both in elimination problem cats and in controls. Further study of number of cats in the home and the relationship to diagnostic categories may provide additional information about any relationship between number of cats in the home and elimination problem behaviours.

This was a retrospective study and cases were not selected at random. The control cats were obtained by volunteers and that may effect the information given. Both of these factors could have influenced results. Future studies could consider a case control method, however, this is hard to provide in a referral practice environment.

Yet, the importance of comparison of problem cats with controls makes this study different and provides additional information to augment current literature. Prior work has highlighted factors in problem cats, but has not addressed whether any of these factors also occur in samples of cats that do not have histories of elimination problems, or are unique to cats with inappropriate elimination. Looking at differences and similarities between these two groups may help determine areas for future study.

**Conclusion**

While elimination problem cats more often had scented litter provided for them, were more likely to have had urinary tract disease, and were not as likely to cover their elimination it cannot be inferred that these variables are causative of elimination problem behaviours. Continued study and evaluation of these factors may help determine if these factors are causative or merely correlated with elimination problems in cats. A prospective type study that evaluated litter type, urinary tract disease ruled out by additional diagnostic methods such as radiography, covering behaviours, diagnosis of elimination problem and outcome may provide additional answers to this prevalent feline behavioural problem.

**References**


Hart, B.L., Cooper, L. (1984) Factors relating to urine spraying and fighting in prepubertally gonadectomized cats. JAVMA. 184(10) 1255-1258


