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# Human-directed aggression and pica in a 1-year-old cat, which worsened following international relocation

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## Abstract

**Case summary** A 14-month-old female spayed Arabian Mau cat was presented for preparation for international air travel and relocation. It was also showing aggressive behaviours towards its owners and visitors to the home, with daily episodes of jumping at, scratching and biting the owners' hands and legs. In addition, the cat was chewing on and ingesting wool and fabric items. Diagnoses of aggression occurring as misplaced play/predatory behaviour, fear-based aggression towards visitors and pica were made, and recommendations were given for both the behavioural presentations as well as to prepare for the family's relocation to a new country and home. These recommendations included the use of long-acting psychotropic medications, which were declined at the time. After arrival in the new home, the cat's aggression and pica worsened, so the owners requested a follow-up appointment. At this point, the selective serotonin reuptake inhibitor (SSRI) fluoxetine was initiated and after 6 weeks of medication, the owners reported a significant improvement in all behavioural signs.

**Relevance and novel information** There is limited published information on the development and/or worsening of behaviour problems after stressful or traumatic events, such as international relocation. Furthermore, the management of concurrent behavioural presentations, such as, in this case, human-directed aggression and pica, can be challenging. This case provides an example of how this may be achieved. Finally, this case shows how the use of long-acting psychotropic medication, such as the SSRI fluoxetine, can be important and effective in managing feline behaviour problems.

**Keywords:** International relocation; human-directed aggression; pica; fluoxetine; stress

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## Case description

A 14-month-old female spayed Arabian Mau cat was presented for preparation for international air travel and relocation. The cat's owners were also concerned that the cat was showing aggressive behaviours towards them and were referred to the clinic's behaviour service to assist with the behavioural concerns as well as preparation for relocation. The cat was rescued as a stray at the age of 6 weeks. It was in poor health, with no sign of siblings or mother.

When questioned about the aggressive behaviours, the owners described frequent episodes (daily, sometimes

multiple times per day) of the cat jumping at their hands and legs, scratching and biting them, locking onto their feet and legs with its teeth and/or claws and 'kicking'

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with its back feet. These episodes lasted for up to 20 mins and the cat drew blood from their hands, arms and legs. The cat's body language, facial expressions and vocalisations before and during aggressive events were described as follows: it had dilated pupils; it stared at and fixated on them; its ears were turned sideways or backwards; and it may have shown piloerection while lying on its side with its tail flicking before jumping up to run at them.

With visitors, the cat approached slowly with a fixed stare, then hissed, swiped at and sometimes bit them; its pupils were also dilated and its ears turned sideways if they tried to interact with it.

The first aggressive incident towards the owners occurred when the cat was 12 weeks old. Aggressive events occurred when the cat had been separated from the owners or after being let out of a locked room. The cat became aroused when the owners prepared to leave the home and aggressive incidents occurred frequently at these times. The owners work long hours in shifts, so the cat was spending periods of up to 12h alone in the home. Aggressive events were frequent at the end of a stint of multiple consecutive shifts.

The owners interrupted aggressive behaviours by raising their voices and used verbal reprimands such as 'no, be nice'. They also utilised physical punishment, including tapping its nose, scruffing, and using water sprayers and other repellents, such as 'shaker cans' that make a loud noise. Reprimands and punishments caused the cat to vocalise (angry meows and yowls) and attack more frequently and with more intensity.

A further behavioural concern was that the cat chewed on and was ingesting fabric items, such as woolly socks and towels. It was seeking out fabric items

a few times per week, which was managed primarily by keeping fabric items out of reach.

Based on the behavioural history, owner descriptions and initial behaviour consultation, the following diagnoses were made: aggression occurring as misplaced play/predatory behaviour; fear-based aggression towards visitors; and pica, specifically wool sucking and fabric eating.

The family, including the cat, was due to relocate from the United Arab Emirates to Ireland 2 weeks after the initial consultation and recommendations were made to support the behavioural presentations as well as help manage stress in preparation for, during the flight and upon arrival in a new home. Flight preparation recommendations are detailed in Figure 1.<sup>1,2</sup>

All recommendations were followed, although there was not much time (2 weeks) for crate familiarisation. Alpha-casozepine (Zylkene, Vetoquinol) was used for 4 weeks upon arrival as recommended and gabapentin was used at the recommended dose twice daily until the follow-up.

Management and enrichment recommendations for human-directed aggressive behaviours are detailed in Figure 2.<sup>3-8</sup> Management of likely fear-based aggressive behaviours towards strangers and visitors was not addressed at this time as it was a secondary concern.

To manage pica, it was recommended to feed the cat ad libitum<sup>9</sup> and to continue keeping fabric items out of reach.

The initiation of long-term psychotropic medication such as the selective serotonin reuptake inhibitor (SSRI) fluoxetine or the tricyclic antidepressant (TCA) clomipramine was recommended to help reduce aggression and treat pica; however, this was declined at the time.

- Systematic travel crate familiarisation prior to the flight.<sup>1,2</sup>
- The use of the nutraceutical alpha casozepine (Zylkene, Vetoquinol) at 28 mg/kg (half of a 225 mg capsule) once daily beginning immediately and for at least 2-4 weeks after arrival in the new home.<sup>1</sup>
- The use of gabapentin 100 mg capsules (25 mg /kg) every 12 hours, beginning 48 hours before the flight. The gabapentin was to be given 90 minutes before putting the cat in the crate prior to departure to the airport and every 12 hours upon arrival at the destination until the cat seemed calm and settled in the new environment.<sup>1</sup>
- The use of Feliway Classic (Ceva) spray in the travel crate 15 minutes before putting the cat inside.<sup>1</sup>
- Management of the environment upon arrival  
This included Feliway Classic (Ceva) plug in diffusers in the new home, taking familiar smelling items such as cat beds and blankets from the previous home, preparing a quiet room with all necessary resources in the new home for the cat to acclimatise to slowly and then letting her explore the rest of the home one room at a time. Pre-ordering all necessary resource items such as food, litter trays, food- and water bowls, scratching posts etc. to the new home in advance of arrival was recommended.<sup>1</sup>

**Figure 1** Flight preparation recommendations<sup>1</sup>

- Stop all punishment and aversives as these increase arousal and aggressive behaviours and may contribute to the cat becoming fearful of and developing conflicted emotions towards the owners.<sup>3</sup>
- Learn to read the cat's body language and facial expressions to better pre-empt aggressive events and distract and engage the cat in other activities such as playing with a toy distant from people's bodies or re-direct to a food puzzle.<sup>4</sup>
- Avoid interactions and known triggers that may cause or increase aggressive behaviours.<sup>4</sup>
- Wear long sleeved or thick clothing to protect from cat bites and scratches and redirect aggressive behaviours away from the body and onto a toy or food puzzle as quickly as possible.<sup>4</sup>
- Follow the guidelines of the "5 pillars of a healthy feline environment" to optimise and enrich the cat's environment.<sup>5</sup>
- Use gabapentin to manage arousal levels - give a 100 mg capsule 90 minutes prior to situations deemed high risk for an aggressive event. Gabapentin can be given up to every 8 hours in a 24-hour period.<sup>6 7 8</sup>

**Figure 2** Management recommendations for human-directed aggressive behaviours

Given the role serotonin plays and its effects on the brain, SSRIs, such as fluoxetine, have a broad range of effects and are useful for many conditions, including aggression, high arousal and compulsive disorders.<sup>8</sup>

Reconcile (Forte Healthcare) is currently licensed for separation anxiety in dogs; therefore, its use for any conditions in cats is off-label and obtaining informed consent from the owner is recommended, which was done in this case.

Another medication option would have been a TCA, such as clomipramine, which is also indicated for the off-label treatment of aggression and compulsive disorders in cats<sup>8,10</sup> and is licensed for urine marking in cats in Australia.<sup>11</sup>

A follow-up appointment occurred 2 weeks after arrival in Ireland as there had been significant worsening of aggression towards strangers and pica; aggression towards the owners was the same as before air travel.

The cat seemed terrified of all unfamiliar people coming into the new home, which was not previously the case, and it ran at, hissed and swiped at visitors, and attacked the female owner's elderly mother.

There was an increase in frequency and intensity of wool-sucking and fabric-eating behaviour since arrival in Ireland. The cat chewed large holes into dressing gowns, wool socks and towels (Figure 3), and ingested the material. It had vomited the dressing gown material and there were some pieces of material in the stool in the litter box. This behaviour posed a high risk for a foreign body and potential need for surgery.

The use of long-acting psychotropic medication was discussed again, and the owner agreed to start the SSRI fluoxetine (Reconcile, Forte Healthcare) at 0.5 mg/kg<sup>8</sup>



**Figure 3** Material item with holes caused by the pica behaviour of the patient

for the first 2 weeks to monitor for side effects. The most common side effects are appetite reduction, lethargy and gastrointestinal signs, such as nausea and diarrhoea.<sup>8</sup> A

further side effect is urinary retention. It is thought that increased serotonin levels may cause urethral spasms and increased external urethral sphincter activity by affecting the central micturition nucleus and the motor neurons of Onuf's nucleus in the sacral spinal cord.<sup>8,12</sup> The cat did not show any side effects and the dose was increased to 1 mg/kg after 2 weeks.<sup>8</sup>

The owner reported significant improvements in behavioural signs 6 weeks after the initiation of fluoxetine. The cat was generally calmer and chewed on fabric items less frequently with less intensity and fixation. It was also less fearful of visitors entering the home and showed fewer aggressive behaviours towards visitors and the owners. Twelve weeks after the initiation of fluoxetine, the owner reported that pica had ceased completely and that the cat now sat on the female owner's mother's lap during visits. The ambushing behaviour towards the owners had also completely stopped. The only behavioural sign that remained was agitation and distress as the owners prepared to leave the home, so gabapentin was prescribed at a dose of 100 mg 90 mins before departure,<sup>6,7</sup> which reduced pre-departure arousal within 2 weeks.

## Discussion

There are several reasons for the occurrence of human-directed aggressive behaviours in cats (see Figure 4).<sup>4,13-15</sup> Physical and neurological examination as well as routine blood tests (haematology, biochemistry, T4) and urine tests were within normal limits. Thus, aggression due to a disease process was deemed unlikely.

One way in which human-directed aggression can develop is through inappropriate play or interaction with owners, the progression of which is detailed in Figure 5.<sup>4</sup> Play/predatory aggression may occur more frequently in cats that are alone for large parts of the day.<sup>16</sup>

A differential diagnosis of separation related distress<sup>17</sup> was considered due to the cat's high distress levels before the owners' departure; however, videos showed that the cat settled quickly and slept once the owners had left, which is not consistent with separation anxiety.<sup>18</sup>

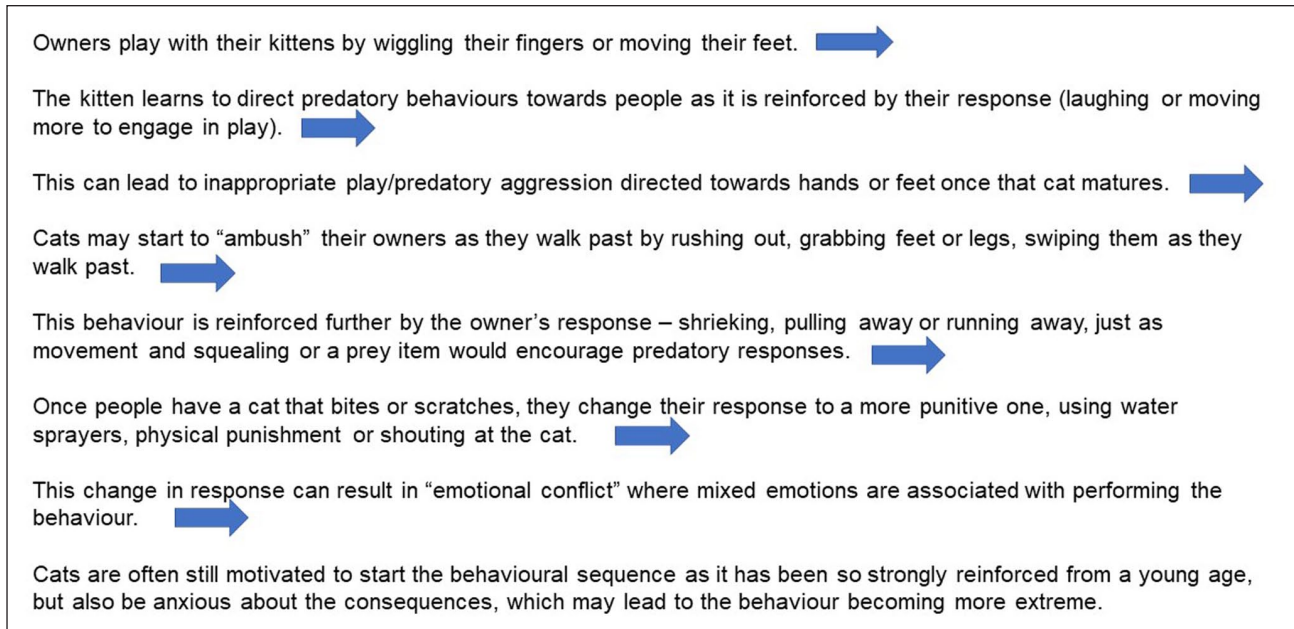
The cat's aggressive responses to unfamiliar people and visitors before as well as after air travel were more likely defensive responses linked to fear. Tolerance or appreciation of human contact is learned during the sensitive period at 2-7 weeks of age.<sup>19</sup> Lack of appropriate handling may cause a cat to be wary of people. Although it may attach to one person or a small group of individuals,<sup>4</sup> it may have a predisposition towards defensively aggressive behaviour if placed in a situation where it feels threatened.<sup>16</sup>

Pica is generally considered to be compulsive behaviour, although many other causative factors have been proposed but not substantiated (see Figure 6).<sup>20-24</sup> Pica may start as a displacement behaviour and progress into a compulsive disorder.<sup>21</sup> Compulsive behaviours may be self-reinforcing, possibly caused by the release of endogenous opioids in the central nervous system, which may enable some cats to cope with conditions that do not meet their species-specific needs. Physical and neurological examination, routine blood tests (haematology, biochemistry, T4) and urine tests, the absence of gastrointestinal signs, such as vomiting (other than vomiting up ingested items because of pica), diarrhoea, flatulence, borborygmus or eructation made a physical medical underlying cause for pica unlikely in this case.

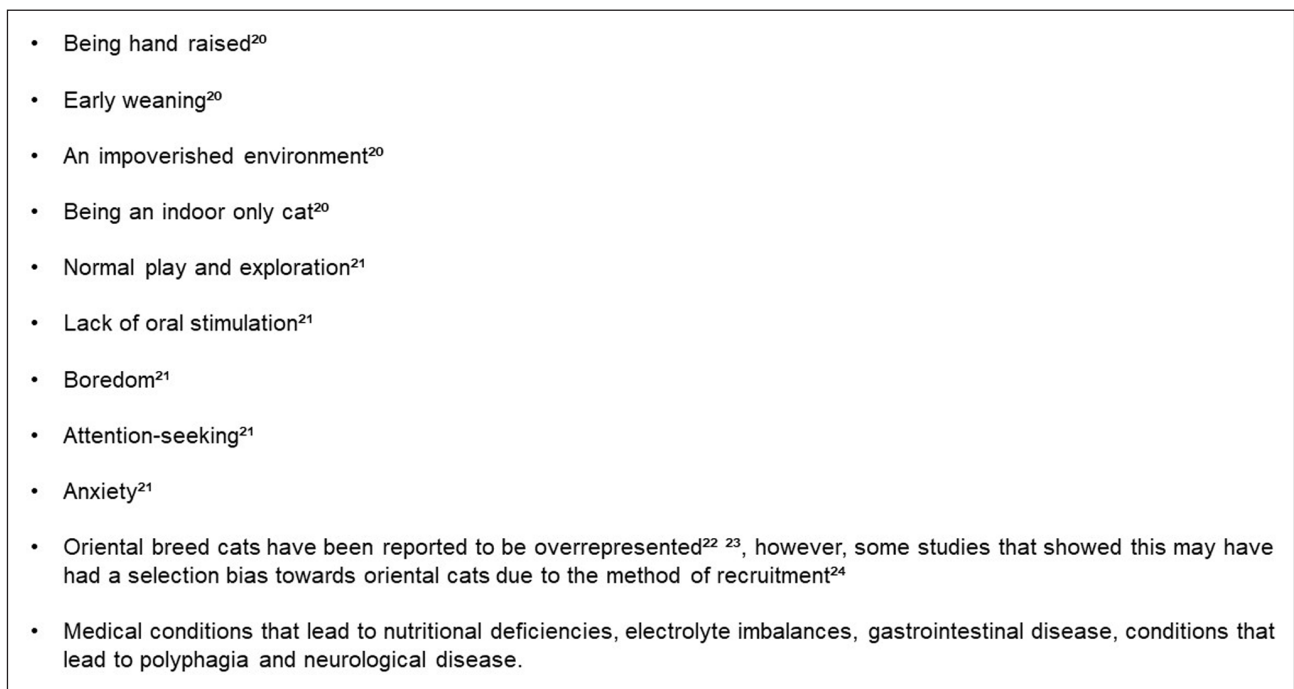
It is difficult to ascertain with certainty whether increased arousal and negative emotional state (fear, anxiety, frustration), likely resulting from air travel and relocation to a new home, were the causes of worsening behaviour problems in this cat. As the cat travelled in

- Fear based or defensive aggressive behaviours<sup>4</sup>
- Aggression occurring as misplaced play, predatory behaviour or attention seeking behaviour<sup>4</sup>
- Aggression occurring as a response to frustration<sup>4</sup>
- Petting induced aggressive behaviours<sup>13</sup>
- Redirected aggression<sup>14</sup>
- Territorial aggression<sup>15</sup>
- Aggression that arises because of disease processes such as pain, neurological disease, hyperthyroidism<sup>4</sup>

**Figure 4** Causes of human-directed aggressive behaviours in cats



**Figure 5** Development of human-directed aggression through inappropriate play or owner interaction<sup>4</sup>



**Figure 6** Proposed causative factors of pica in cats

the hold of the aircraft, there was no information about specific events or incidents during the flight that may have contributed to the cat’s fear or stress. Observations of the cat’s body language and facial expressions before and during human-directed aggressive events, however, point towards emotional conflict with signs of fear, anxiety, frustration and high arousal being present, which may have increased due to the stressful event of relocation.

In pica, events that cause social upheaval or trauma may be contributory factors and it is believed that stressful events, such as moving to a new house,<sup>25</sup> play an important role in its development.<sup>20,26</sup> The worsening in frequency and intensity and generalisation of behaviour to other materials after air travel and relocation makes the consideration that these were contributing factors likely, although other factors such as increased availability of fabric items must be considered.

## Conclusions

Several behavioural changes in cats, including aggressive behaviours and compulsive behaviours, are related to stress.<sup>26</sup> This case demonstrates how an intense stressor, namely air travel and relocation to a new environment, could contribute to the development or, in this case, worsening of behaviour problems in cats.

Managing concurrent behavioural presentations and life events at the same time can be challenging; therefore, diagnoses and consideration of underlying emotional motivations are essential when designing a coherent treatment plan.

The use of both long-term and short-term psychotropic medication is an important and effective consideration in managing behaviour problems in cats.


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**Ethical approval** The work described in this manuscript involved the use of non-experimental (owned or unowned) animals. Established internationally recognised high standards ('best practice') of veterinary clinical care for the individual patient were always followed and/or this work involved the use of cadavers. Ethical approval from a committee was therefore not specifically required for publication in *JFMS Open Reports*. Although not required, where ethical approval was still obtained it is stated in the manuscript.

**Informed consent** Informed consent (verbal or written) was obtained from the owner or legal custodian of all animal(s) described in this work (experimental or non-experimental animals, including cadavers) for all procedure(s) undertaken (prospective or retrospective studies). For any animals or people individually identifiable within this publication, informed consent (verbal or written) for their use in the publication was obtained from the people involved.

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