Dog and cat socialisation
A sound base for self-assured and friendly

Cat communication
Fear, aggression, body language and social relationships in cats

Pop! Bang! Whizzzz!
Management of noise phobia in pets

Calm pets, happy vets
Reducing stress and fear aggression in the clinic

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Dog and cat socialisation: a sound base for self-assured and friendly pets

Dr Joël Dehasse¹

SUMMARY
Socialisation is a unique learning process that enables young animals to better adapt to their future adult social habitat. Behind this apparent behavioural process is a neurologic structuration of the brain and enhancement of the mind.

Introduction
To become friendly pets, dogs and cats need to learn how to fit into our society by adapting favourably to our wishes, requirements and whims. They need to express goodwill, trust, and respect as well as predictable, kind, pleasant, and congenial dispositions and behaviours.

This is a lot to ask for from these two species that have been removed from their natural habitats; dogs can live as group hunters, herders, fighters, and retrievers whilst cats are solitary hunters. Both species were made to become (unadulterated) human social companions, a condition to which they were not genetically predisposed but for which they were able to approximately adapt to. Human beings have required dogs and cats to shed their own ethological needs to become social creatures, and even friendly not-hostile compliant living stuffed toys. The miracle is that dogs and cats mostly comply with our wishes, because they have genetic programs that allow them to be partly shaped by their social environment.

Socialisation: definition
Socialisation is the developmental process by which dogs and cats acquire the skills necessary to accommodate to other individuals, to perform as a functional member of their social group, and also to behave as a fitting (familiar, attuned and comfortable) member of our (complex) human society.

Socialisation is the degree of freedom an individual gets from its genetics to shape its psychology (temperament, emotions, cognitions, and behaviours), physiology and anatomy, so it can interact with other members of its society to become in-tune with its social environment.

More specifically, it is the learning process needed to acquire social identity, social attachment, social interaction, communication skills, group interaction, and space (conflict) management skills, as well as sexual, reproductive, and parenting skills.

How is the socialisation miracle possible? Genetics and environment.
Genetic and environmental influences act together in a cumulative and shaping manner throughout infant development.

Neuronal hardwiring
The foundation of the neuronal network is genetically based, as shown in an experiment by Cooper and Zubek in the maze-running ability in rats: the environment will add (psychobiological) competencies to a (sound or deficient) genetic basis, making (genetically) dull rats brighter in running mazes.

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Infant dogs and cats, and human beings too, have genetic programs to set-up, develop, organise and consolidate neuronal networks that will influence their perceptions, emotions, cognitions, and temperaments. A neuronal suicidal program that aims to remove meaningless neuronal pathways and keep only meaningful ones follows a neuronal network growth programme. The distinction between meaningless and meaningful neuronal networks is linked to the maturation of the synapses by their effective use: functional synapses (ones that have been used) are saved whilst non-functional ones are destroyed and removed. This helps to clear the brain of unused (redundant) material. The deciding factor influencing the synapse maturation is the environment that is identified through perceptual sensory organs. As shown by the Wiesel and Hubel experiments[2], keeping a puppy in the dark from 3 weeks to 3 months of age leads to blindness (amaurosis): the puppy can differentiate light from darkness but cannot understand (the concept of) images. The same thing happens to all sensorial information, including social interactions, which leads to conceptual enrichment or defects, which are linked to a hardwired neuronal network.

This neuronal hardware is fixed at a specific time in puppy and kitten development, called the imprinting or, for social acquisition, the primary socialisation period. It is followed by software modification, by re-use, re-processing and reorganisation of the hardwired neuronal pathways in new networks: this process is called the secondary socialisation. Imprinting is an easy and effective way to calibrate the brain to adapt to the requirements of a specific biotope, including the social environment. However, the added competencies shaped by the social environment only compensate to a certain degree the genetic (sound or not) predisposition: if early social enrichment can make dull rats brighter to run a maze, it will not make fearful infants fearless, aggressive infants mild, and in general socially inept infants socially skilled. Social enrichment in genetically inept infants will give them a sense of normalcy, not normalcy itself. However, social enrichment is the way to get more social, self-assured and friendlier pets.

**Epigenetic programming**

There is more than just neuronal network hardwiring at play during this crucial phase of infant development. There is also emotional, cognitive and endocrine programming taking place, which is linked to maternal behaviour. In fact, the genetic expression of the offspring is mediated by the effects of maternal behaviour on this programming: “under conditions of environment adversity, maternal effects enhance the capacity for defensive responses in the offspring”, thereby “increasing the risk of several forms of pathology in later life”[3]. This effect is due to “alterations of DNA methylation and chromatin structure at relevant promoter sites”. It leads to lifelong, even multigenerational, silence of (regulatory) gene expression, such as, for example, greater glucocorticoid receptor expression. In summary: less maternal affection will lead to more lifelong stress. Therefore to prevent this propensity to stress: more affection will lead to less stress. This is a simple eugenic epigenetic effect: the mental and physical health of the mother is critical and the most important factor in determining the quality of mother-offspring interactions, which in turn condition the stress response of the infant.

**Social and environmental enrichment at an early age**

The social imprinting programming is set up at an early age during neurological development. It starts with sensory development (i.e. before birth for the sense of touch, and conventionally around 2 to 3 weeks of age with the opening of the eyes and the ears, starting vision and audition) and ends at an average of 9 (5 to 12) weeks in kittens and 3 (2 to 4) months in puppies. The ending phase can be shorter in primitive (wilder) and in working shepherd breeds or unsafe (harsh) environments, and longer in sophisticated and companion breeds and in kind (safe) environments.

This means that if an owner acquires a 3-month-old puppy, the imprinting phase is often over; so enrichment has to be provided by the breeder. Only if the puppy is younger than 3 months is the owner able to adapt the puppy to its definitive environment – but it must be remembered that the puppy might be missing some important education by its mother, particularly acquiring the capacity to manage conflict by the use of freezing posture (Fig. 1), and the control of its social bites (Fig. 2) – skills that are indispensable in the management of social conflict.

**Social and environmental enrichment in practice**

There are a few simple, elementary, and important rules:

1. Puppies and kittens destined for family pets should be selected from social, sociable, congenial, friendly, non-aggressive and smart parents. There is no (validated) test in infants (puppies and kittens) that is predictive of adult social and sociable skills.
2. Pregnant mothers should be kept in secure environments, with as little stress as possible, but with lots of varied activities to satisfy their activity needs.

3. Nursing mothers should be kept in secure environments, with as little stress as possible. Mothers who lack caregiving behaviours should be assisted or replaced by caregiving nurses of the same species (Fig 3), or humans.

4. Educating mothers should be kept with their puppies or kittens for as long as possible until they are 4 months of age, to educate them to acquire or perfect their freezing posture in the presence of adults. Mothers may need assistance from other mothers, fathers and other relatives of the same species, and humans, to teach the puppies or kittens to generalise this posture in all social conflicts with adults.

5. Puppies and kittens from 3 weeks of age should be able to play-fight in the presence of an adult who will stop the fight if biting is painful and harmful.

6. Puppies and kittens should be kept and have cuddling and play contact everyday with puppies and kittens of the same age, with adults of the same species and breed and with other breeds with different morphotypes so they can learn their own species identity and be able to recognise their own species.

7. From 2 weeks of age onwards puppies and kittens should experience affection and play with other species (dozens of various morphotypes, colours, age, clothing) to learn to conceptualise non-hostile species so they can interact socially and respect them (so that they do not hunt, kill, and eat them). This respect will be achieved by rewarding or positively associating social contact with all kinds of human beings (from babies to old people with all kinds of clothing, Fig. 4), cats
and dogs of different shapes, age and colours, rabbits, guinea pigs, and so on.

8. From 2 weeks of age onwards, puppies and kittens should have contact with the stimuli (noise, smells, complexity) of the environment they will be living in when they are adults. For puppies this includes access to streets, market places, cars, trains, stations, and so on; if access to these is unfeasible, puppies should be habituated with all the sensory inputs from these environments, through the use of sound CDs, visiting people, floor textures, mirrors, children, toys and so on.

9. Puppies should go to puppy-school and kittens to kitty-school to encounter various kinds of people, animals, and environments to improve and generalise their social skills (play-fighting, inhibited bites, and freezing posture) but only if these schools are working in a positive (positive reinforcement) and secure way (control of the unruly animals by the trainers and, for puppy-school, by an educating dog).

10. Puppies and kittens can be acquired as late as 4 months of age if the imprinting has been properly done by the breeder and if the mother was motherly and competent, or from 7 weeks of age (and even earlier) if the breeder and/or the mother and/or the breeding environment are not as competent as is desirable, so the new owner will be able to make up for the lack of environmental and social imprinting. The new owner must be aware that in certain lines and where puppies are raised in too harsh an environment, 7 weeks of age might already be too late.

11. Acquired puppies and kittens are separated from their mother and siblings to live with ‘aliens’ (humans)
to whom they have to attach: people should be affectionate and provide as secure an environment as possible to facilitate this transfer of attachment which will lead to bonding, affection, and friendship.

12. Acquired puppies and kittens have to adapt people’s wishes and whims and this will only be possible if their physiological and ethological (activity and motor-pattern) needs are satisfied. These ethological needs, such as herding, hunting, retrieving, sprinting, and so on, vary with breeds.

13. Social and environmental imprinting needs to be regularly repeated for it to be memorised long-term.

Even though these rules are simple, in reality they are rarely met. People choose puppies and kittens on ‘gut instinct’ and emotions more than on rational discernment. And many breeders and pet shops will sell anything to anyone, without fitting the right pet to the right owner. In addition future owners are not yet conscious that early experiences can have an important impact on the rest of the life of their companion animal.

**Losing socialisation at adolescence**

Even when the socialisation process has been enriched in puppies and kittens, genetics will request more influence at adolescence and adulthood. Inhibited genes will start to be expressed, leading to adult behaviours. Numerous motor-patterns will start to emerge: hunting, herding, defending, and fighting in dogs, territorial defence and hunting in cats. The infant behavioural plasticity is reduced to the benefit of instinctive behaviours. The infant starts to be more and more like its parents.

In this process, many dogs and cats lose some part of their socialisation to people, differentiation between familiar figures and strangers is enhanced, and stress responses towards strangers can be expressed. The fight, flight, or freeze strategy is also genetically predisposed; dog breeds selected for fighting (defending, attacking) will show the fight strategy more than other breeds. Cats will show more flight responses.

This means it is essential to select a puppy or kitten on the basis of the behaviour of its parents rather than on its own behaviour. Any unsocial behaviour shown by a parent has a probability to be expressed in the infant when becoming adult.

**References**


INTRODUCTION

Separation anxiety is described as problematic behaviour motivated by anxiety that occurs exclusively in the owner’s absence or virtual absence [1-5]. Anxiety-related disorders and separation anxiety are among the most common behavioural problems in domestic dogs [6] with separation anxiety being diagnosed in 20–40% of dogs referred to animal behaviour practices in North America [7-9].

In the literature, undesirable behaviour problems that occur during owner absence are listed as separation anxiety, separation-related problems, isolation anxiety, separation reactions, separation-related distress and separation anxiety syndrome [5].

Independent from the classification of the disorder, problems that occur when the owner is absent represent one of the principal causes for the breakdown of the human–companion animal bond and can lead to surrender of numerous dogs to shelters [10-11].

Aetiology

Separation-related distress has, for many years, been believed to be a distress response to separation from the figure to whom the dog is attached [12]. In most cases, the attachment figure is the dog’s owner or a person in the household with whom the dog displays a strong affiliation (Fig. 1). The degree of distress is thought to be related to the degree of the attachment to the absent figure [13]. Experiences during developmental stages such as early separation from the mother or other incidents of separation are in fact important for the severity of the stress response in adult animals and may produce subsequent difficulties with routine separation [14-15]. Some authors reported that dogs with anxiety when alone were more likely to be of mixed breed, be a stray dog, or from a shelter [16-17]. Others stated that sex, source of acquisition and, despite what owners commonly believe, the presence of other dogs in the household, have no effect on separation-related problems [5,18].

Fig. 1 In most cases, the attachment figure is the dog’s owner or a person in the household with whom the dog displays a strong affiliation.
Diagnosis and treatment of separation anxiety

Some authors and veterinarians question whether dogs with separation-related problems are truly anxious [19]. Separation-related behaviours seem to have one or several underlying states, such as fear, anxiety, or just lack of appropriate stimuli and require, therefore, different therapeutic interventions [20]. It is possible that different clinical syndromes may have been grouped under the same label. This inaccurate categorisation could explain the discrepancy in opinions on how to treat separation anxiety as well as explain some treatment failures [5,21]. It is likely that separation-related distress in dogs has a multifactorial aetiology, so various authors have advocated symptom-based approaches for data collection since these approaches may avoid inappropriate interpretation of animals’ motivation [17,22-23].

Medical history

With the behavioural history, basic information such as age of the pet, recent and past health examinations, and current medications should be obtained. This information may help in the differential diagnosis, as medical problems can contribute to separation-related problems [20]. It is always essential to rule out other contributing disorders that need to be diagnosed and treated. A complete physical and neurological examination should always be carried out as well as routine blood work (complete blood count, chemistry panel and thyroid panel) and more specialised tests, based on the observed symptoms, which should also be performed [20-24].

Behavioural history

Some aspects should be verified through the behavioural history:

- Onset and circumstances that elicit the distress behaviour
- Daily routine
- The pet’s behaviour prior to owner departure and on return
- Does the behaviour occur in the owner’s absence?
- Does the behaviour occur in the owner presence?

Onset and circumstances

In some cases, animals will have shown separation anxiety since puppyhood [25,26]; in other situations the onset may be associated with changes in the normal routine or in the household, such as different work hours, change in the family composition or moving house [7,20]. For some dogs, separation distress only occurs after boarding, or when the owner has been spending a holiday at home or with the dog. In other cases, the anxiety may be a consequence of a traumatic experience that occurred during the client’s absence (dog was trapped in a home during a fire, thieves, thunderstorm, or an alarm went off). Some dogs show symptoms in the presence of a triggering factor and others combined with other anxiety disorders (generalised anxiety, fear, phobias, aggression) [20].

Daily routine

Information on the amount of time the dog spends alone on a daily basis, on feeding, toileting routine and on what kind of departure triggers elicit the distress behaviours, should be obtained.

- Some dogs exhibit signs every single time the owner leaves
- Some dogs exhibit signs only in case of a change in schedule or routine
- Some dogs exhibit signs only if owner leaves for a second time
- Some dogs exhibit signs only if no other human being is present whereas other dogs will exhibit signs only in the absence of a specific person. Anxiety signs can also be exhibited in the presence other dogs or animals. Anxiety tends to occur within the first 5-30 minutes of departure [2,5,16].

Behaviour prior to the owner’s departure and upon return

Some dogs can show clinging behaviour: following the owner everywhere (in the house, on walks…), clinging to the owner, searching for body contact, and organising their activities around that person. When the owners prepare to leave, some dogs become hypervigilant, shake, pant and pace. Others are completely withdrawn, do not move and have a lowered tail and head with ears drawn back. Some patients are aggressive at the time of client departure “to prevent client departure” [17].

The eating behaviour may also be influenced by anxiety, and questions might include whether the pet will only eat if the owner is present.

Dogs with separation anxiety greet clients profusely at each return with excessive manifestations [27].

Behaviour in the owner’s absence

Separation anxiety is a problematic behaviour motivated by anxiety that occurs exclusively in the owner’s absence or
virtual absence [1,3,4].
The most common distress behaviours seen in dogs showing separation anxiety are: destruction, house soiling, vocalisation, motor activity (circling, trembling, shaking), gastrointestinal signs and self-trauma [5,7,17,18,28].

Anxiety is an emotional (apprehensive) response occurring prior to a stimulus/situation that the animal perceives as inevitable or dangerous. The term ‘anxiety’ is used when an animal anticipates a negative outcome. Anticipation of a real danger may be a normal behaviour. Anxiety becomes a disorder when the animal is in a constant state of anxiety or anticipation of future imaginary dangers [24].

Behavioural signs of anxiety (and/or fear) may include: increased vigilance, reactivity, motor activity (pacing) and environmental exploration, behavioural inhibition, shyness, avoidance, reduction of locomotor activity (freezing), hiding, trembling, aggressive manifestations or displacement behaviours such as self-grooming. Other noticeable signs of anxiety/fear are: licking of lips, yawning (Figs. 2-3), swallowing, salivation, diarrhoea, vomiting, panting, piloerection, shaking and vocalising (normally whining but also repeated barking or howling) [5,28-30]. Some dogs also have panic attacks [4].

To understand whether an animal is experiencing anxiety when left home alone, it is important to know how the animal behaves when exposed to that specific circumstance, collect a description of the posture and behaviours exhibited by the animal in that context, find out how often this happens and if the stimuli could be avoided or not.

Clients often report the obvious symptoms (e.g. abnormal elimination, destruction, vocalisation), however they rarely recognise the more subtle symptoms such as a decreased activity levels, salivation, slight whining or pacing [29].

A detailed history collected by observing the dog or by asking owners to videotape the dog’s behaviour at home can help in pinpointing the exact behaviours exhibited and whether they truly are indicative of a state of anxiety [33].

A critical part of the historical evaluation is determining the trigger or triggers of the anxious and/or fearful behaviour and the threshold of the anxious and/or fearful response. This information is important because it helps the clinician to establish the treatment program.

Obtaining information as regards the initial appearance of the problem and its duration may help to formulate the prognosis and aid owners in their understanding of the reasons behind the development of the problem [23]. This information may dramatically change the owner’s understanding of the animal’s behaviour, in that instead of considering their pet ‘difficult’ or ‘naughty’, the owner may come to realise that the underlying motivation of the behaviour is anxiety. To increase the owner’s desire to collaborate in the treatment process, it is essential that he/she understands the motives behind the undesired behaviour and the logic of the treatment process [24,27].

**Behaviour in the owner’s presence: concurrent behavioural problems**

In separation anxiety cases, other behavioural disorders should not be neglected, since underlying anxiety can contribute to other concurrent anxiety problems [31].
Diagnosis and treatment of separation anxiety

The owner should be asked about:
- any aggressive behaviours shown by the dog
- outdoor elimination – in order to differentiate separation anxiety from a house-soiling disorder
- any destructive episodes while the owner is at home
- signs of cognitive dysfunction. Geriatric dogs with sudden onset of signs of separation anxiety may suffer from cognitive dysfunction, such as changes in social interactions, loss of house-training, disorientations, changes in sleep-wake cycle (Fig. 4).

Punishment
The owner’s response to the fearful animal may influence the animal’s subsequent reactions to the triggering stimuli, worsening the problem. Owners often punish their pets when they return home and find elimination or destruction. Punishment may further increase the animal’s fear and thus lead to an escalation of the fearful and aggressive response without improving the animal’s emotional state. Dogs do not associate the punishment with its act of creating the mess. The use of punishment is never adequate to modify behaviour.

Diagnosis
Diagnosis of separation anxiety is based on:
- Analysis of several key findings in the behavioural history
- Analysis of video recordings
- The exclusion of alternative behavioural and medical diagnoses.

It is important to note that dogs with separation-related problems do not all exhibit the same signs and these signs can vary in intensity. The most common complaints are destructive behaviour directed at the home, self-inflicted-trauma, inappropriate elimination, increased and repetitive motor activity (pacing, circling) and excessive vocalisation (whining, barking or howling) in the owner’s absence. If only minor or no destruction occurs, separation problems may not be recognised by owners. In some cases, owners are made aware of their dog’s problem only because the neighbour complains about excessive vocalisation. If neighbours do not complain, or the destructive behaviour is of no importance to the owner, the problem can be underestimated even if both forms of behaviour are actually displayed by the dog.

Other disorders
It is always critical to rule out other contributing disorders that need to be diagnosed and treated. A complete physical and neurological examination should always be carried out as well as routine blood work (complete blood count, chemistry panel and thyroid panel) and more specialised tests, based on the observed symptoms, should also be performed. Every case should be evaluated individually, as the type and efficacy of the treatment will depend on the correct diagnosis of the problem.

Owner influence
It is essential that owners understand that separation anxiety is a distress response of the dog related to the fact of being left alone at home. Owners of dogs that suffer from separation anxiety are often are angry and feel hurt by the behaviour of their animals, because they are convinced that the dog is being “spiteful” and “knows that it did something wrong”. During consultation it should be explained that the behaviour of their dog is the result of anxiety, not spite, and for this reason need to be properly treated.

Fig 4 Geriatric dogs may suffer from cognitive dysfunction such as changes in the sleep-wake cycle.
Although owner observation may be informative and useful for general identification of behavioural problems, direct observation and standardised behavioural measurement of dogs with separation-related problems when alone, before and after treatment, would be the best way to diagnose and to measure behavioural improvement \cite{5,35}. Some behavioural signs, such as pacing, circling, or other repetitive actions can only be identified if a video recording is made during owner’s absence \cite{5}.

**Behaviours to observe are:**
- Destructive behaviour directed at the home
- Excessive vocalisation (whining, barking or howling)
- Elimination of urine or stools
- Behavioural inhibition, such as freezing, lying around, not moving, refusing to eat or drink or play in the owner’s absence
- Increased and repetitive motor activity (pacing, circling, agitation, restless exploration)
- Panting
- Drooling, vomiting, diarrhoea
- Coprophagia following defecation
- Self-inflicted-trauma

In extreme cases, dogs show a real state of panic: they are insensitive to pain and social stimuli and their reaction is immediate and extreme. In these cases, the flight behaviour can be so violent that dogs may go to such extremes as breaking their own nails and teeth and jumping out of windows regardless of the height \cite{29}.

**Destruction**
Destructive behaviour (chewing, digging and scratching) is usually directed at exit points such as doors, windows and gates \cite{17}. Specific objects in the apartment or the house are scratched, chewed or torn apart. Occasionally, this behaviour may even lead to extensive destruction of furniture \cite{5,27} (Figs. 5-11).

Destruction can occur as an element of play or exploratory behaviour in young active animals without appropriate exercise \cite{7}, or in the course of territorial displays at windows and doors as well as during phobic episodes related to noises or storms. In some cases, there is the possibility that fear responses causing these behaviours are only seen during owner absence \cite{27}.

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Figs 5-11
Destructive behaviour is usually directed at exit points such as doors, windows and gates. Specific objects in the apartment or the house are scratched, chewed or torn apart. Occasionally, this behaviour may even lead to extensive destruction of furniture.
Vocalisation
Vocalisation in dogs with separation anxiety can be seen in the form of barking, whining or howling. Frequently, the different forms of vocalisation are mixed [18]. For some authors, vocalisation in dogs left home alone can occur as a consequence of discomfort, fear or anxiety [4-5,36]. Barking can occur in response to external stimuli and may reflect arousal [18]. In some contexts, barks are acoustically different which means that the acoustic features of the bark depend either on the motivational/emotional state and/or on the actual context [5,37]. Whining is a social signal providing information about the emotional state of the dog calling for attention [18]. The emotional state of a whining dog exposed to social isolation may be distress related to fear [18]. Howling is used in wolves for long distance communication when an individual has been separated from the pack [38,39]. Therefore, howling may be considered a natural response in separated dogs experiencing the discomfort of being left alone [5,18]. Hence, vocalisation in dogs left home alone can occur as a consequence of discomfort, fear or anxiety [4-6,36].

Elimination
Elimination has been interpreted as symptomatic of a general anxiety-like state [40]. Elimination behaviour is reported by other authors [2,7,20] and considered among the most common signs of separation anxiety. It should be remembered that elimination in the owner’s absence can be a consequence of poor house-training, medical disorders of the urinary or intestinal tract, urine marking, and/or cognitive or endocrine dysfunction. Medical disease, lack of appropriate house-training or urinary marking may result in elimination regardless of presence or absence of the owner. When medical causes of house soiling are suspected, blood chemistry, urinalysis, faecal examination and possibly diagnostic imaging studies are always indicated [27]. Dogs with cognitive dysfunction often show loss of house-training, disorientation and changes in the sleep-wake cycle [36].

Behavioural inhibition
Withdrawal, behavioural inhibition and immobility are also considered signs of separation anxiety [5,8,20]. Anxiety elicits behaviour that enables the animal to approach the source of (perceived) threat [41] by increasing attention and stimulating risk assessment [42-43]. Furthermore, during risk assessment, non-defensive behaviours, such as environmental exploration, self-grooming, feeding and social interaction are inhibited [44-46], and the degree of suppression of these behaviours may be used as an indirect index of defensiveness or anxiety [46]. Exploration can in fact be partially or completely inhibited by anxiety, therefore reduced exploration might represent an indirect measure of anxiety [5,43,47].

Other signs
Separation anxiety can be a component of multiple coexisting conditions. Co-morbidity of anxiety disorders is common in human psychiatry and some studies suggest that dogs with separation anxiety are more likely to have thunderstorm and/or noise phobias as well. Noise phobias and separation anxiety may in fact be partially or completely inhibited by anxiety, therefore reduced exploration might represent an indirect measure of anxiety [5,43,47].

Restlessness, pacing and escape behaviours are also frequently observed in fearful or phobic dogs [29,32], as well as reported in many publications [2,4,5,7,17] on separation anxiety. Separation-related problems seem to be the result of different underlying conditions such as phobia, fear and anxiety, where signs of different intensity and frequency overlap [5].

Treatment
Behavioural modification techniques are the baseline of treatment and are necessary even with concurrent medical therapy [34]. The suggested behavioural modification protocol includes a combination of the following five basic strategies:

- Client education
Diagnosis and treatment of separation anxiety

- Environmental modification
- Behavioural modification
- Pharmacological therapy
- Video recordings

For the treatment to be successful it is essential to keep it within the owner's range of possibilities both in terms of time and commitment load, thus it must not require strict and unnatural rules in the owner-animal relationship. Behavioural protocols should be as simple as possible, easily integrated in the owner's daily routine, clarifying the owner-animal communication and keeping to the application of the basic learning principles [24]. Extinction (changing undesirable behaviour associated with departures) and counterconditioning are techniques often used in the treatment of separation anxiety to help decrease the response of the dog to departure cues. However, if done incorrectly, some dogs may become more anxious rather than less [27].

Client Education

The clients' education can help change the patient-client dynamics and thus modify the patient's behaviour. Anxiety-related responses are characterised by a manifestation of a-specific signs when the dog perceives or anticipates the stimuli. The dogs’ ability to anticipate the triggering stimuli is an important aspect in the treatment of anxiety-related disorders and it is very important to help clients recognise even the smallest behavioural manifestation of the dogs’ problem to allow for early and efficacious treatment [29].

The client’s ability to correctly read their pet’s body language allows them to act appropriately and prevent the development of undesired behaviours and/or situations. Once the client understands their animal’s needs and body language and their own influence on the animal’s behaviour, he or she will be less upset, unhappy or worried about their pet, and, as they are more aware of the reasons behind their pet’s behaviour, they will be more likely to cooperate in the behavioural modification program [24].

Environmental modification

In some cases, it may be necessary to change the patient’s environment. For some animals gradual conditioning to a confinement area such as a crate or room can help to alleviate the anxiety associated with owner’s departure [27].

Gradual conditioning to a limited area, even at times that are not associated with the owner’s departure, requires patience and perseverance to make sure that the area chosen for the animal is always associated with pleasant things. While many dogs respond favourably to having a smaller place where they can feel secure, some dogs panic at being put into an enclosed space, and such dogs should never be forced into a crate [27,29].

If separation anxiety can be related to inadequate amounts of exercise, the owner should be asked to increase opportunities to play and exercise the dog [7].

Behavioural modification

The goal of treatment is to reduce the anxiety state of the animal by a behavioural modification that is simple to implement, with the aim to create a clear communication between the dog and owner and the making the dog’s environment, interactions, and life as predictable as possible. Clear communication from owner to dog and implementation of simple rules (e.g. dog must sit before any interaction) are meant to decrease the dog’s overall anxiety [21,28].

The behavioural modification programme consists of teaching the animal to exhibit desirable behaviours, reinforcing them each time they are manifested, and to pre-empt, ignore or interrupt the inappropriate behaviours. This is achieved first of all by establishing a successful method of communication between the animal and its owner [24].

Correct human-animal communication

The client will have to be taught to always praise their pets when they carry out the appropriate behaviours – even if they are exhibited spontaneously (particularly if the animal shows calm and relaxed postures in a context in which it normally exhibits anxious ones) and let the dog know what is expected (by asking it to exhibit a particular behaviour) instead of simply telling it off for doing the wrong things. It is in fact far better to show what the appropriate behaviour is rather than constantly correcting the wrong one. The aim is to increase the probability, frequency and intensity of the desired behaviours [21].

With dogs, this can be obtained by asking it to sit before every interaction with the owner (e.g. to ask for food, play, attention or going out). The client will be asked to reinforce the behaviour; not only each time the dog sits on command but also when it chooses to exhibit this behaviour spontaneously. The aim is to achieve a clear form of communication, calming the dog by letting it know what happens next. This has little to do with controlling or exhibiting ones ‘power’ over the animal but rather it is a way of strengthening the bond between the owner and animal [24].
**Ignoring and interrupting inappropriate behaviour**

Clients often inadvertently reinforce inappropriate behaviour by interacting with their pet as soon as the undesirable behaviour has started to occur. Ignoring the behaviour, on the other hand, minimizes the risk of reinforcing it thus initiating the extinction process. When behaviours cannot be ignored it is best to interrupt them. It is important to interrupt behaviour at the earliest possible moment. The client will be asked to recall the dog and instruct it to sit or lie, i.e. to exhibit a behaviour that is incompatible with the manifestation of an anxious and/or fearful response. Of course the dog should be praised for exhibiting the correct behaviour [44].

The aim of the treatment is to substitute the anxiety or fear response with a more acceptable and relaxed response. It also implies changing the consequences of the animal’s response so that the inappropriate behaviour is no longer successful, but rather the appropriate and alternative behaviour achieves the desired outcome [44].

If the animal is overly reactive or fearful or in a state of panic, it is quite possible that it will be unable to pay attention to its owner [24]. In these situations, it may be necessary to use a pharmacological approach to reduce the anxiety response.

**Pharmacological therapy**

The decision whether or not to prescribe a drug for the treatment of anxiety should be based on the analysis of a number of factors: the severity and type of problem, the clients’ urgency to resolve it, familiarity with psychotropic drugs and their capacity to appropriately follow the behavioural modification program.

The aim of the pharmacological therapy is to reduce the anxiety reaction and the animal’s reactivity without sedation or interference with learning ability and thus facilitate the learning process. It is always important to explain to the client that drugs do not teach the animal the correct response, but rather they create a window of opportunity for learning by reducing the animal’s reaction to the stimuli and allowing a faster recovery [24].

It is equally important to let the client know that the drug treatment must be administered for several months, that relapses are possible, that the response to the treatment may vary from one animal to the next, and that it may thus be necessary to modify the dosage and perhaps even change the drug.

Many drugs used in behavioural medicine are not registered for veterinary use and the information in terms of longer-term effects are relatively unknown. It is thus important to be extremely cautious when deciding to administer such drugs and written consent should be obtained from the client. A complete blood profile is essential prior to prescribing a particular product [24].

**Tricyclic antidepressants (TCAs)**

Tricyclic antidepressants variably block serotonin and noradrenaline re-uptake. The most utilised drugs to treat fears and phobias in veterinary behavioural medicine are amitriptyline and clomipramine. TCAs are used on a daily basis. They are generally tolerated well by cats and dogs, but can have a sedative effect particularly during the first week; additionally they may produce dry mouth, urinary/faecal retention and, for animals predisposed to this condition, cardiac conduction disturbances [49-50]. Thus, before prescribing these drugs it is important to assess the animal’s cardiac condition.

Cannas et al. (2014) showed that the administration of clomipramine together with behavioural modification is significantly effective after only 1 week by reducing some of the signs associated with anxiety, such as whining, pacing and scratching. Other behaviours, such as barking, decreased significantly but only after the second week of pharmacological treatment and after the dosage of the medication was increased. Behaviours associated with a more relaxed state also increased significantly within as early as 1 week at the low dosage of medication. Improvement continued after 2 weeks of treatment. The study showed that clomipramine is efficacious in reducing signs of anxiety in dogs, thereby improving their overall welfare.

**Selective serotonin reuptake inhibitors (SSRIs)**

SSRIs act to block the re-uptake of serotonin at the 5-HT subtype receptors. The most utilised in veterinary behavioural medicine are: fluoxetine, paroxetine, sertraline and fluvoxamine. SSRIs are used on a daily basis regardless of the exposure to trigger stimuli. Changes should be noted within the first 3-4 weeks. Cats administered with SSRIs must be carefully monitored for water and food consumption, weight changes and faecal/urinary retention. Serotonin is closely associated with the modulation of a wide range of behaviour thresholds, thus it can have a particular role in problems relating to impulsiveness. Side effects in pets may include gastrointestinal irritation, sedation, insomnia and irritability. Gastrointestinal signs may include anorexia, loss of appetite loss, nausea or diarrhoea. Side effects can be avoided by starting with a low dosage during the first week and gradually increasing it over time [24,49].
**Monoamine oxidase inhibitors (MAOIs)**

MAOIs (e.g. selegiline) may also be successfully used for the treatment of anxiety, fears and phobias. MAOIs act as irreversible inhibitors of monoamine oxidase (MAO), an enzyme that catabolizes intracellular monoamine neurotransmitters (noradrenaline, adrenaline, dopamine, tyramine and serotonin) [49]. Like SSRIs, MAOIs are used on a daily basis regardless of the exposure to the trigger stimuli. It may take several weeks for the drug to take effect. They should not be combined with re-uptake serotonin inhibitors, tricyclic antidepressants, opioids or any other MAOI. Side effects are mild and normally disappear spontaneously. They usually manifest as gastrointestinal signs [50].

**Benzodiazepines (BZs)**

Benzodiazepines activate the corresponding receptors in the central nervous system, thereby facilitating GABA, an inhibitory neurotransmitter. All the BZs share the same mechanism. Differences in their pharmacokinetic proprieties and clinical behaviour may dictate their specific use. BZs (alprazolam, diazepam, clorazepate) should not be used with animals exhibiting fear-related aggression since the drugs may cause uninhibited behaviour and subsequently more serious aggression [4,32,50]. Where appropriate BZs drugs can be used either on a routine or on a ‘when needed’ basis, since action onset is rapid (within an hour or two). The frequency of dosing, sedative side effects, tolerance, drug dependence and their potentially erroneous use by clients have made this drug rather unpopular for use in the long term, although the rapid effects make it ideal for use in the short term. Since BZs can be combined with most serotonin-enhancing drugs, they can be used in the short term to address immediate needs until the serotonin-enhancing medication has a chance to take full effect [32].

**Video recordings**

In most cases, the diagnosis relies almost exclusively on owner reports, as the actual behaviours are rarely videotaped to confirm the diagnosis or to assess treatment response. The need for better diagnostic tools is essential and has consequences for the treatment of the affected animals by helping individuals cope adequately with their environment [5,43].

Some behavioural signs, such as pacing, circling or other repetitive actions, can only be identified if a video-recorded film is done during owner absence [5]. Therefore, diagnosis based exclusively on owner reports may underestimate the presence or absence of some signs of anxiety, as well as their severity, and may lead to errors in diagnosis or assessing pharmacological treatment response. Whining may not be heard by neighbours. Improvement in passive behaviour and locomotion can only be observed by video analysis.

Filming dogs at home alone is important for the diagnosis but also for the treatment of anxiety, acquiring objective measures of the drug efficacy [28].

**Prognosis**

The prognosis of a particular case depends on numerous factors, amongst which the intensity of the anxiety reaction and the duration of the problem. Owners capable of recognising the desirable behaviours manifested by their pets are much more likely to be successful than owners who expect pharmacological treatment to be sufficient [27].

**Follow-up**

It is important to include a follow-up phase to assess the efficacy of treatment and especially in the first stage, routine contact with the client should be encouraged. In the week following the first visit, the owner should be contacted to answer any questions they may have. Even during the treatment, owners should be encouraged to film the behaviour of their dog when left home alone. Following the first video, performed prior to initiation of therapy and used to make a diagnosis and to formulate an appropriate treatment, it would be appropriate to monitor the therapy with a second video in the week after the beginning pharmacological treatment.

Subsequently, videos should be recorded by owners every 2-4 weeks and owners should be encouraged to keep in regular contact by phone in order to discuss any specific issue that arises.
References


Diagnosis and treatment of separation anxiety


Commissioned paper

Fear, Aggression, Communication, Body Language and Social Relationships in Cats

Kersti Seksel

SUMMARY
As knowledge about the normal behaviour of cats and their social behaviour has increased over the past decades, many beliefs about aggressive behaviours, its causes and management, have changed. Failure to understand what will promote friendly, amicable behaviour and what will promote aggressive behaviour can lead to various behaviour problems, including aggression and conflict over resources, such as food, resting sites and litter boxes. Thus, understanding the natural social organisation, relationships and communication of the cat and how this impacts on cats is essential if we are to better manage cats, especially those that live in multi-cat households.

Introduction
Fear is a feeling of apprehension associated with the presence or proximity of an object, individual, or social situation. Fear is part of normal behaviour and can be adaptive. The determination of whether the fear or the fearful response is abnormal or inappropriate must be determined by context. If a cat is fearful of stimuli that are innocuous such as walking on carpet or going outdoors, such fear would be considered irrational and, if it were constant or recurrent, probably maladaptive. Normal and abnormal fears usually occur as graded responses, with the intensity of the response proportional to the proximity of the fear-provoking stimulus.

Aggression is a complex and often emotional issue. Aggression is one of the most common behavioural complaints reported by owners with respect to their cats. Many studies have shown it is the most frequent reason owners seek help from a veterinary behaviourist. The variety of targets, intensities and manner of presentation means that there is no “one size fits all” approach that can be applied to every case. Additionally, aggression can be a normal part of a cat’s behavioural repertoire, something that many clients have not considered when assessing their cat’s problems. This makes dealing with cases of aggression not only challenging but also rewarding.

Treatment of fearful or aggressive cats usually involves the 3 M’s: behaviour Modification, environmental Management and in some cases the use of psychotropic Medications. This paper will not discuss any treatment protocols.

Fear
Fear is a physiological, behavioural and emotional reaction to a potentially injurious stimulus. Experiencing fear is a survival mechanism, it is an adaptive response, and usually occurs in response to a specific stimulus. Fear is often connected to pain or a traumatic event. For example, if a cat falls down a set of stairs he or she may develop a fear of stairs.

There are four emotional stages of fear (the 4 F’s), which correspond with the physiological effects of the sympathetic nervous system:

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the flight, fight or freeze responses. The muscles used for physical movement are tightened and primed with oxygen in preparation for a physical fight or flight response. For example, a cat may try to run away from a fear-evoking stimulus such as a veterinarian. However, if cornered it may freeze or become defensively aggressive.

The fourth emotional response is the fiddle response, when the cat may exhibit displacement behaviours. Displacement behaviours are normal behaviours but not in the context in which they occur. For instance the cat, when faced with the fear-evoking stimulus, such as the veterinarian, may yawn or lick its lips. In another context yawning, for instance when tired or licking lips after a meal would be considered normal behaviours. Many owners have seen this response but have never realised that it means that the cat is fearful or anxious.

The physiological reaction results in an increase in heart rate, increased respiratory rate (panting), sweating, trembling, pacing and possibly urination and defecation. Cats will exhibit changes in body posture and activity when afraid, and may engage in an avoidance response such as fleeing or hiding (Fig 1).

The neurotransmitter serotonin has been identified as a mediator of fear and anxiety.

Normal fear is adaptive and transient in nature. However, abnormal or irrational fears must be treated for the welfare of the cat.

**Aggression**

The word aggression has different meanings depending on the context. Aggression can be described as a wide variety of overlapping behaviours that are directed to and often originate from outside stimuli such as sights, sounds and smells. However, internal stimuli, such as cold, hunger and fear, may also play an important role.

Several factors influence an individual cat’s propensity to aggress. The genetic make-up, past experiences and learning and the current environment all play a role in determining the cat’s behaviour.

Some cats that exhibit aggressive behaviours are actually abnormal or “ill”, that is they have a mental health disorder. This means that they are not able to respond appropriately in social situations as they are unable to learn what intra or interspecific signals mean. In many cases it is because they have an anxiety disorder.

A thorough physical examination and appropriate pathology testing will assist in ruling out any physical problems that could be contributing to the behaviour. Any illness can lead to increased irritability and enhance the tendency to become aggressive. A good behavioural history will help to determine any external stressors, which can also play a critical part in determining when the threshold for aggression is reached.

**Signs of Aggression**

Signs of aggressions in cats vary between individual animals but in general may be:

- visual (changes in body posture, piloerection)
- auditory (growling, spitting, hissing)
- olfactory (spraying, scratching) as well as
- tactile (scratching, biting and may involve the use of teeth and claws).

**Predisposing Factors for Aggression**

Behaviour is influenced by three main factors. These are the influences of inheritance, learning and the environment. The genetic or inherited component predisposes a cat to behave in a certain way and will influence the behaviours expressed.
All previous experiences, (particularly those in the socialisation period which occurs between 3 and 7 weeks in cats), and what the cat has learnt from these experiences, also affect later behaviour, as does the current situation in which the cat finds itself.

Environmental factors such as the presence or absence of others, fear-provoking stimuli such as odours, noises, loud voices, shouting, sudden movements, an assertive manner, and staring may increase the cat’s likelihood to respond with aggression. Fear or anxiety is now recognised as the underlying reason why a cat may respond aggressively in a given context.

These three factors also influence how a cat may respond when it is fearful or anxious. These responses generally fall into four categories: fight, flight fear or fiddle. The fight and flight responses are probably the best known and certainly the responses that owners may be most familiar with, however the freeze and fiddle (displacement behaviours) responses, while also common, are less well recognised. All responses designed to increase the distance between it and the fear-provoking stimulus.

In any discussion of aggressive behaviour, the behaviour of victim(s) as well as the context in which the behaviour occurs needs to be considered, as aggression does not occur in isolation.

Most intraspecific aggression is highly ritualised, appears to serve some ethologically significant function and is commonly associated with competition between members of the same social group. Interspecific aggression, however, is most commonly associated with protection of self but may also involve some competition depending on the context.

To understand why some cats may act aggressively it helps to view the surroundings and the circumstances from the cat’s perspective. That is, “walk in their paws” and understand feline social behaviour.

Pathophysiology of Feline Aggression

In situations where the aggressive response is not considered normal contextually, there will be an underlying pathophysiological condition.

Currently, anxiety is thought to be the underlying factor in many categories of aggressive behaviour. Thus managing the underlying fear or anxiety will be an important part of dealing with cats exhibiting aggressive behaviours.

It is thought that the hypothalamus and amygdala are involved in aggression. Excitation of the ventromedial hypothalamus (VMH) and amygdala leads to a defensive response. The medial amygdaloid nucleus is involved with intra species aggression. Stimulation of the lateral amygdala facilitates predatory attack and defensiveness. Monoamines and androgenic steroids act as modulators of established offensive and defensive aggressive behaviours. Medical conditions such as toxoplasmosis, ischaemic vascular problems, hepatic-encephalopathy, encephalitis, lead poisoning, arthritis, sensory (hearing and / or sight) deficits, hyperthyroidism, epilepsy and rabies have all been associated with aggression, as has the use of medications such as some anaesthetic agents and corticosteroids.

From several studies it appears that socially mature, intact males are most often implicated in exhibiting aggressive behaviour. However, aggression is not restricted to males and there is considerable variation in time of onset of aggression in animals capable of serious aggression.

Feline Communication

Cats can communicate complex signals in such a way that they are very clear not only to other cats but other animals such as dogs in the family as well as people. They do this by using sounds or auditory signals (meows, purrs, growls and hisses) in combination with visual signals changes in body language (expressive tails, ears, whiskers and bodies). They also use odours and tactile signals.

Communication requires a sender, a message, a medium and a recipient, although the receiver does not have to be present or aware of the sender's intent to communicate at the time of communication; thus communication can occur across vast distances in time and space. The communication process is complete once the receiver understands the sender’s message – and this is where most problems between cats or between cats and people occur.

Put simply, communication is about sending and receiving messages between two or more parties. The messages may be sent instantaneously like a hiss or a stare, or can be ‘posted’ to be read by other cats as they encounter it, like scratch marks (Fig 2) on a tree trunk or urine sprayed in a prominent place.

Despite the differences in the way messages are presented, feline and human communication has much in common – this is probably one reason that cats and people are able to get along so well.

Both species rely on vocal messages and visual signals (commonly called body language) to add meaning and nuance to the messages sent. Humans also leave signs to be read at a later date in the form of signposts, books, blogs, graffiti and internet postings. While the technology is different, the intent is the same - to leave a message
Body language

Body

Cats send messages to other cats, animals and humans using their bodies. The size and shape of the body, the position of ears and tail and the visibility of potential weapons such as teeth and claws all convey important messages to others. In general terms, confident cats stand tall and evenly on all four feet, with their tail up or level with their back, and their ears forward. In general attacking cats try to make themselves appear larger to their opponent - they do this raising their fur (also known as piloerection). The tail will be raised and the fur piloerect (Fig 3). When a cat really wants to convince another cat or person that it means business the cat will arch its back. The more fearful a cat is feeling the lower their body gets to the ground. Uncertain cats may take the middle road, often lowering their rumps while keeping their forelegs available for striking.

Adult cats will respond to a silhouette of their own species as they would to a real animal. Adults will show piloerection on the first presentation of a cat silhouette. This response should be fully developed in kittens by the age of 8 weeks.

Ears

A cat that is interested in what is going on around it will have its ears forward. A frightened cat will have its ears flat and backward facing. Often cats that are attempting to bluff another cat or who are not certain will hold their ears halfway between these positions, sideways.

Eyes

Interested cats tend to look at the person or object of their interest. Cats will stare at other cats or people as an aggressive signal (fig 4). This should not be confused with
making friendly eye contact. Aggressive stares are intense. Friendly eye contact can be soft and often the cat may blink in an exaggerated manner. This can also be seen when they are trying to decrease tension between two cats. Less confident cats and cats that wish to avoid a physical altercation will avoid looking at another cat or a person who is staring at them. By avoiding eye contact, the cat may simply look away or if it is feeling really uncomfortable, it may engage in some intensive grooming activity or displacement activity (which in feline terms means a common feline rule of thumb - “When in doubt groom”). Other cats often avoid looking at a cat that is engaged in a bout of composure grooming. The grooming behaviour is displacement behaviour motivated by feeling threatened but unsure if it is best to run away or stay put.

Tail
Cat tails are extremely expressive and very rarely still - they swish when a cat is agitated or annoyed and sway gently when a cat is happy and relaxed. Vertical tails are seen at greetings, during play and in the female during sexual approaches. Horizontal tails are seen during amicable approaches. Lowered tails are seen in aggressive incidents and a tail held between the legs is seen when a cat really wants to avoid any altercation. The concave tail position where the tail is held vertically from the base and then curves over so the tip points at the ground is often used in aggressive incidences but may also be seen during play.

Vocalisation
The vocalisations cats make have been studied for many years, partly as their sense of hearing is so much greater than that of humans and also because they were used as a model for the development of the bionic ear. Vocalisations are a very important part of intra-species communication along with body language and visual and olfactory communication. Vocal communication is important for the spacing of individuals and can prevent direct confrontation.

The frequency limit and range tend to fall with age. It is interesting to note that deaf kittens tend to vocalise more loudly than their hearing counterparts - so feedback is important in that respect. However, it is not required to learn vocalisations.

Kittens are also known to be able to recognise familiar “voices” by the time they are 4 weeks of age. They appear not to take note of one another’s communication patterns until they are about 9 weeks of age.

The sounds cats make can be divided into three main categories
- sounds made with the mouth shut
- sounds made with the mouth initially open but then closing
- sounds made with the mouth held open.

Some sounds are specific to particular circumstances such as the sounds a queen makes for her kittens.

Closed mouth
There are two sounds made included in this group. They are the purr and the Trill/Chirrup/Greeting meow. Purring has fascinated people for a long time. It is a monotone sound made by cats in a wide range of situations - the common feature of all the situations appears to be cat-cat or cat-human contact. Interestingly, cats also purr when in extreme pain. There is little information to explain why this occurs but some think this may be an attempt at self-calming by the cat.

The Trill/Chirrup or Greeting Meow is, as its name suggests uttered upon contact with a known, and liked, cat or person.

Open-closing mouth
There are four sounds included in this group, the Meow, the Long Meow, the female call and the Mowl (a male call). Only the Meow and Long Meow will are discussed here as they are social communications that are often directed at humans. The other sound that is common is used during the mating season (Spring).

The meow is a general communication sound for cats, with the long meow being a high intensity version of the ordinary meow. Many cats have expressive meows that can be identified as having different meanings by their human
families. Most cat owners learn what their cat’s meow means— for example when it wants to go out and when it wants some food. The variety in the meows of cats appears to be due to the individual differences between cats and, for meows directed at people the result of interactions with humans. The role of the long meow in cat-cat communication is unclear at present, but many cat owners know what their cat means when the direct a long meow at them, for example – “Open the door please! Hurry up with the food!”

Open Mouth
These sounds are the sounds of aggression; that is the growl, the yowl, the snarl, the hiss, and the spit. Growling, yowling and snarling are used when the cat signals it is threatening or actively attacking while hissing and spitting tend to be used in defensive aggression, when the cat feels threatened or is attacked (Fig 5).

It has been suggested that this behaviour forms a group scent that identifies members of their particular social group. Members who go missing from the group may initially be rejected until they smell “right” again. This is why it can be useful in multi cat households to rub a newcomer or a recently absent feline family member with a towel that has been rubbed over the other cat members of the family. The fact the cat smells ‘right’ can speed its acceptance into the group. The synthetic feline pheromone analogue Feliway® can also be used for this purpose.

Urine
Long-term odour signals are posted prominently using urine sprayed on vertical surfaces. The urine can smell very pungent, and acts to inform other cats of the sex and sexual status of the cat claiming the territory. Spraying increases when queens are calling (in oestrus and looking for a mate). Some cats will also spray if they feel worried or anxious. However, cats do not spray because they are angry or spiteful or mean.

The flehmen or gape response to conspecific urine is not seen in kittens less than 5 weeks of age but is of a similar frequency and nature in 7-week-old kittens to that seen in adults.

Feline Social Behaviour
Cats should be thought of as a social species. Animals that are considered social live in companionship with others. They tend to have a higher tolerance to the presence of familiar as well as unfamiliar conspecifics. The
relationships between members of the group tend to be friendly rather than agonistic as cats recognize members of their own social group. Aggressive behaviour is exhibited by most cats toward unfamiliar cats that are not members of the group. Research has shown that when food resources are scarce feral and free-living domestic cats can survive in the solitary state. However, when food is plentiful they tend to live in a group or colony and these social groups have an internal structure in which group members recognize each other and engage in a variety of social behaviours. But domestic cats are solitary hunters. This has sometimes led to the mistaken belief that they are asocial. As domestic cats have a small body size and relatively high metabolic rate, it is efficient for them to hunt small prey, such as rodents, alone. However, social living can provide benefits such as allowing easy access to other cats for mating purposes, allowing the young to learn more about the environment and providing better options for protection against environmental stressors. Group living can also help in defence against predators. Territory boundaries are maintained with visual and olfactory signals in the form of scratching on vertical surfaces and urine and/or faeces. Surrounding the territory is the home range, which may be shared in part with other cats. The size of the home range is directly related to the density of food sources. Where food is abundant, home ranges may be as small as 0.2 acre for females and 2.1 acres for males. In areas with less abundant food, ranges have been measured at 667 acres for females and 1038 acres for males. A cat colony is matrilineal and the affiliate, co-operative relationships between females provide the social structure in the colony. There is co-operative care of the kittens by a queen and her female relatives, or other familiar queens. Within the group, a number of affiliate behaviours are exhibited, particularly between cats that are preferred associates. Preferred associates are cats that can be found close together more frequently than they are found with other members of the group. Preferred associates can be found together in a variety of contexts and locations and come together because of their social bond. Nose-touch is a greeting behaviour that is exhibited most commonly between preferred associates, as is allogrooming, where one cat grooms another cat, usually on the head and neck. Members of the social group also allorub, where cats rub up and down each other’s sides. The head, sides and tail are all involved in this behaviour, which may go on for several minutes. This contact is thought to facilitate the exchange of scent to help cats recognise members of their own group. In multi-cat households there is not necessarily one social group within the household. For example two cats that live together in one household may actually form one social group of two cats or two groups that contain one cat each (fig 7a and b). Likewise if there are three cats in one household they may form one social group of 3
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cats, 2 social groups (i.e. two cats in one group and one cat in another) or three social groups each consisting of one cat. This is important for owners to understand, as the resources in the household need to be tailored to the number of social groups (or cat families) in the household. This means that the provision of adequate resources for resting, feeding, drinking and toileting is essential for group harmony.

**Conclusion**

The domestic cat is a social species with complex group dynamics. By understanding feline social systems we can maximise friendly interactions and minimise aggressive encounters within the household. When we recognise how cats communicate, whether by visual, auditory or olfactory signals we can recommend appropriate management of multi-cat households to prevent problems or after when disruption occurs. By recognising that fear and anxiety are the underlying reason for most aggressive behaviour we are better equipped to intervene appropriately and so increase the welfare of the cat and prevent disruption of the human animal bond.

**References and Further Reading:**

Commissioned paper

Calm pets, happy vets.
Reducing stress and preventing and managing fear aggression in veterinary clinics

Sophia Yin, DVM, MS

SUMMARY

While cats are often routinely scruffed or stretched for procedures and dogs are frequently forcefully restrained, even for simple procedures such as toenail trims, we know that such handling can greatly increase anxiety in pets. Low Stress Handling techniques can replace these traditional methods and ultimately create safer and more efficient visits. From creating a calm, inviting environment, to using towel wrap techniques, to multiple methods for handling pets of different sizes and temperaments, there are many principles and techniques that can allow you to adjust to the patient’s needs. The overall result is a pet that is friendly and cooperative, staff with less injuries, and clients who are happier.

Introduction

It’s 1.00 pm and everyone’s dreading the arrival of Miss Kitty, a cat who has been coming for appointments sporadically for 14 years. Each visit has been memorable for the staff, starting with piercing yowls emanating from the crate, and rapidly crescendoing as attempts are made to remove her from her crate. Even at their lowest level her hisses and screams reverberate through the hospital such the waiting room clients have been heard asking, “Is that cat possessed?”

This is Miss Kitty’s past history. Her appointment is tomorrow. Will the situation play out as it always does or will you do something new differently?

Problems with current veterinary care…

Every day, dogs and cats are brought to our hospitals in this state of confusion and fear and we expect them to remain calm and cooperate for procedures. We poke them and prod them and carelessly flop them into various positions when they have no clue what we want. Then, in the name of speed, we react to the struggling pet by imposing some type of “death grip” hold instead of taking a step back and evaluating whether a more thoughtful approach might work better. As a result we get animals that are more and more difficult to handle, even fractious and overtly aggressive and as a result our examinations and treatments take increasingly longer to complete.

Not only does the handling that leads to these situations result in inefficient examinations and treatments, there is additional harm and it is four-fold. First, dog and cat bites as well as cats scratches are the top causes of injury in the veterinary hospital.

Second, we may send the patient home behaviourally worse. In fact we can cause fearful animals to become aggressive both at the hospital and at the home. Hence, by handling animals poorly we are creating a behavioural issue that may become life-threatening in the future.

Third, according to the 2011 Bayer veterinary care usage study (funded by Bayer HealthCare LLC, Animal Health), a major reason why owners fail to bring their pets to the veterinary hospital is that the visits are unpleasant. 58% of cat owners and 37.5% of dog owners say their pets hate
going to the vet. 37.6% of cat owners and 26.2% of dog owners get stressed out just thinking about going to the vet hospital. 39.4% of cat owners and 23.7% of dog owners will only take their pet to the hospital if the pet is sick. So handling poorly can reduce the number of visits by a given client.

And fourth, forceful or unskilled handling causes the client to doubt the staff’s skill and credibility and creates the perception that the hospital is interested only in money and not in caring for animals.

...and a simple solution
The solution to this situation caused by traditional handling procedures is to set up the hospital and handling to help the patient feel comfortable and safe. One might think that switching to a low stress handling hospital environment would need too much time. In reality, updated handling methods will decrease the time spent handling for procedures, and a majority of the changes needed are a matter of setting up a more inviting hospital, improving the ability to recognize the body language of fear and anxiety, approaching the patient correctly, knowing more restraint techniques and handling with more skill.

For cases where more time is needed to train pets that the procedures and environment are safe, this time can be turned into a value-added service that is carried out by veterinary nurses and assigned an appropriate fee. Veterinary hospitals can offer these sessions as part of hospital best practices just they would recommend pre-anaesthetic blood work or heartworm testing. Owners can be informed of their options and the potential consequences and make the choice on whether to proceed.

Overall, the main point is that if we provide an environment where the animal feels comfortable and safe while also providing clear guidance regarding what we want the animal to do, the pet will be less fearful and more cooperative which in turn will help us get through the procedures more quickly both now and on future visits.

This article provides a six-step approach to setting your hospital up to help reduce stress while actually increasing hospital efficiency. The six steps include:

- Preparing the patient (what owners can do at home)
- Preparing the hospital
- Recognizing signs of anxiety and approach the pet appropriately
- Handling the pet in a calm, skilled manner
- Scheduling technician sessions with desensitisation/
- Management of fearful and aggressive pets

**Step 1: Preparing the patient: What the owner can do at home**

Frequently, our canine or feline patient is anxious even before he arrives at the hospital and by the time he’s in the exam room, he’s in a high stress state. For instance some cats have been chased around the house and finally captured and forced into a crate. These clients often arrive late and with a cat that’s hissing and attacking before he’s even been handled.

Similarly, the dog that rarely rides in the car may enter pacing, panting, whining and barking due to stress and when compounded with his fear of unfamiliar dogs and people, his fear may escalate to aggression.

One way to consistently address this issue is to routinely asking all new clients if their pet is comfortable riding in the car and if he’s a cat, does he view the carrier he will be transported in as a safe place? If their answer is no or they are unsure, the next step is to send them to your web site to download an instructional hand-out or provide verbal instructions on training their pet to be calm and relaxed in a carrier and on car rides. These new calm behaviours can be trained through a process of desensitisation and counterconditioning (DS/CC).

**Counterconditioning and desensitisation to crates and car rides**

The basics of teaching pets to view being in their carrier or car ride as a positive event is to pair each one with something they already like, such as food. When we make this pairing we are using a technique called counterconditioning (CC), so called because we are
countering a previous association—that of fear or dislike with the car or crate. Generally we also need to add in desensitisation (DS). That is, we can’t just put the animal in the crate, shut the door and offer food, because the animal may be too scared or distressed to eat the food. So we often have to start with the stimulus (the car or crate) at a level that the animal can tolerate and when he shows no fear to that stimulus at that level we can increase the intensity systematically.

A common misconception is that DS/CC takes a long time. When performed systematically and with skill, it can go quickly. For instance, crate training generally takes under a week. The standard procedure for teaching cats and dog to willingly go into their crate is to just feed their regular meal in the crate. If they won’t immediately go in, then start with the food outside of the crate until they readily go near the crate to eat. Then once they readily go near, you can start placing the meal inside the crate. Be sure to make the crate comfortable with a blanket or towel in preparation for when they go in. First place the bowl near the entrance so the pet only has to place their head and neck in, and then when they are comfortable at this stage, moving the food further in. The objective is that you only move the food further in once they readily go into the crate to the current distance of the food bowl. Once they are readily going all the way in, you can also sprinkle treats for them to find throughout the day. When they have a well-established positive association (usually within a week) they will go in and lie in their crate on their own with the door open. Owners can even put this behaviour on cue by saying “kennel” or pointing at the kennel and tossing a treat in. Once this is trained it’s easy for your feline clients to make their appointments on time. (download the hand-outs from the EJCAP online page of this paper).

A similar procedure can be used in the car where the pet is first put in a non-moving car and given treats or his meal. Once he’s readily eating, which is a good indicator of his comfort level, at this stage, take short trips that end in locations he likes. Cats should be secured in a carrier and dogs either tethered to a seat belt or in a carrier too. Once they are in give treats frequently enough to keep them in a positive emotional state (download the hand-outs from the EJCAP online page of this paper).

Dogs with a history of biting or snapping should additionally be trained to enjoy wearing a muzzle (DS/CC) and also to wear a Gentle Leader or other head collar so that you have better control of their head. (download the hand-out on training dogs to accept a muzzle on EJCAP online).

For some pets additional techniques or tools may help. Placing a Calming Cap (Thundershirt, Durham, North Carolina or www.thundershirt.com), that covers their eyes, hindering their vision, can help them feel calmer or more relaxed. For dogs that get car sick, consider using maropitant (Cerenia, Pfizer Animal Health, New York). Some nervous dogs and cats also do better if they wear an anxiety wrap (e.g. Thundershirt®, Durham, North Carolina) or tight-fitting T-shirt. Another option is using a dog appeasing pheromone (D.A.P®, CEVA) or facial pheromones (Feliway®, Ceva Animal Health) for cats. These pheromones have marked calming effects on some dogs and cats. If these products are used, the veterinarians should establish measures to observe that will help judge whether the products are working. For instance the owners may observe for signs of anxiety in the car and once back home and the veterinarians may measure heart rate, respiration and ease of handling as well as blood parameters if blood is taken.

**Step 2: Preparing the hospital**

Once the client has done their part to help their pet, there are many ways we can help them too. The first step is setting up the hospital environment so that it appears inviting and safe. This starts with the waiting room, but then includes the exam room, treatment rooms and kennels.

**Create a calm, quiet environment with privacy**

Blocking visual access to people and animals that may cause anxiety is essential, especially in the entry area and the waiting room. These rooms may be the most important rooms in the hospital, in that they determine the pet’s first impression and consequently set the tone for the rest of the appointment. Ideally, a hospital should have a separate cat area and dog area and additional visual dividers within each section. In that way, pets afraid of other animals can feel safe. If your hospital has not been built with a separate area already, inexpensive portable dividers can be strategically placed. Within those species-specific areas, further divide the space by using half walls, information displays, screens, planters, fish tanks and partitions so pets can avoid direct eye contact with other pets, because many pets are fearful of others of their own species. Additionally, cats should have their carriers covered with a towel. Pets that are highly anxious with other animals can be brought in during quiet
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Out of view
Blocking of visual access is also important in other areas of the hospital. In the exam room, fearful cats may be easier to examine if they can hide under a towel or be examined in a comfortable basket or in an open crate with the top removed. Sometimes you may need to examine a difficult cat by using a towel to get it out of its crate (Figs. 2, 3, 4). Note that dogs should not have locations for hiding, such as under a chair, within an exam room. Fearful animals can be more aggressive once they have stationed themselves in a defensible space. In the kennel situation, cats and dogs do best when they cannot see unfamiliar animals. A towel can be placed on their cage door to partially block visual access. This will also decrease the noise levels due to barking. Cats can also have a hiding place such as a cardboard box or their carrier.

Dampen noise
Noise levels, especially in the treatment and kennel areas, should also be controlled. Acoustic dampening panels can be placed on walls and ceilings and acoustic door seals can be placed so that sounds do not leak from one room to another. Companies that specialize in these products can be found online and can provide you with guidance based on your hospital’s architecture (www.acousticsurfaces.com). Additionally calming music such as Through a Dog’s Ear or Through a Cat’s Ear (www.throughadogsear.com) or a sound machine (www.homedics.com) that help block out sudden noises, should be used. For treatment rooms and kennels, the sound of cages opening and closing can be startling. Consider using cages with sound-dampening designs so that they open and close more quietly.

Comfortable surfaces
The surfaces used in a hospital can make a huge difference in the demeanour and emotional state of the pet. One predictable stress that routinely awaits dogs early in their visit is the cold steel surface of the step-on scale. While many dogs are nervous and forced onto the scale, if a towel or rug with a non-slip liner is placed underneath, many dogs will step up. If treats are strategically placed to lure the pet on, then the weigh-in can actually be a positive experience instead of a scary one.

Fig 2-4: To remove difficult cats from the crate using towels, open the back, slide the towel over. Then place your hands behind the elbow and lift the cat. Many cats that were hissing will relax when covered by the towel.
Treat & Toys
When animals visit we want to provide them with a positive association. Rooms should be stocked with tasty treats — preferable semi-moist treats broken into bite-sized pieces. However, spreadable cheese, peanut butter, liverwurst, canned pet food or meat baby food can work well too. Cats often like tuna or Greenies® cat treats. Ask clients to bring their pets hungry by skipping the prior meal and also to bring their pet’s favourite treats. In the author’s experience, in hospitals designed for a pet’s comfort and safety, 90% of dogs and over 50% of cats will take treats.
Having a few rubber or vinyl squeaky toys in the room can be a huge benefit to dogs that love toys. Some that remain tentative when you offer treats will suddenly relax or switch to play mode when they see a toy.

Step 3: Recognize the body language of anxiety and greet the pet appropriately
The pet’s first impression of the hospital is not only based on the environment but also on how people interact and approach them, especially upon first greeting. One of the most common reasons people get bitten by unfamiliar dogs is that they approach the dog incorrectly. Staff approach too quickly, stare, approach head-on, crowd too closely or lean over them or reach out to touch them. While those dogs that are well socialized to different people and environments may feel comfortable with this inappropriate greeting, those who are fearful or less confident will tend to feel threatened. They may show obvious signs of fear such as cowering, placing their tail between the legs, leaning and looking away, hiding. Or they may show more subtle signs at first such as yawning, licking their lips, putting their ears back, averting their gaze, panting when not hot, hypervigilance and pacing, or the opposite, looking sleeping and moving in slow motion. When pressured enough they may bark and then growl and later learn that offense (lunging, barking, biting) works best as their defence.

Often staff members do not understand why a dog would be afraid of them when they are trying to be friendly. If you look at it from a different viewpoint, it may become clear. If you’re afraid of spiders and someone places a spider up to your face, this act will scare you even if the spider is friendly and trained. Similarly, with fearful dogs, if you walk into a dog’s personal space or even stand and reach out to let him sniff you hand or to pet him he may feel threatened or be unsure of your intentions (Figure 5).

Greet sideways
It is safest to greet dogs facing sideways to the dog, averting your gaze and standing or kneeling or sitting in a way that you are not leaning over or towards the dog. Then give the dog time to approach you at its own rate at first. You can speed up developing a positive relationship by inconspicuously tossing or dropping tasty treats close to you but far enough away so the dog approaches the treats with little hesitation. Once he’s taking these without any hesitation, toss them closer, and later progress to hold treats in your hand while averting your gaze so that he can choose to take them. If you need to get closer the dog, do so while facing backwards or sideways.

Move slowly, smoothly and confidently
Be sure to avoid sudden movements and specifically work to counter-condition the dog to all of your movements. Move slowly and smoothly in order to give him a chance to move if he’s scared. Remember to remain facing away from him and, if using treats, be sure to toss treats rapidly.
The same principles apply to getting fearful dogs out of cages. Avoid squaring off and then reaching for the dog — thereby causing them to go into an emergency escape mode. It is better to have your side to them or move closer by backing up towards them but having a loop of leash for them to walk into. When approaching the dog to get situated, move slowly enough so that you do not incite an emergency escape mode but move in a clear, confident manner so that you do not look nervous, causing him to become more fearful.

Step 4: Handling the pet in a calm, skilled manner

Once we have greeted the pet correctly and made a good first impression, it is important to know how to handle him in a way that guides him into the positions and locations you want rather manipulating him in ways that cause him to become confused or scared. For instance, when we try to place an animal from a standing position into lateral recumbency, we often restrain the dog in a way that causes him to fall and to struggle (Fig 7,8). This treatment is analogous to having a physical therapist pull your legs out from under you because they wanted you to lie on your back instead of guiding you in a clearer manner. How do we learn to provide better direction? Here are some principles that will help:

Control movement

First: It is important to control movement and prevent the pet from pacing or squirming because doing so may increase their arousal level or anxiety causing them to become more reactive. In dogs, this can easily be done by shortening the leash but holding it at a consistent length so he knows what to do to keep the pressure loose. What people tend to do is lengthen and shorten the leash subconsciously by letting their leash holding arm swing around, such that the dog has no predictable control over whether the leash is tight or loose and more comfortable (Figure 9,10).
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Avoid scruffing
With cats, the traditional method for restraint is scruffing. The Association of Feline Practitioners Feline Friendly Handling Guidelines\(^1\) generally recommends against scruffing and many cat-only veterinarians and veterinary behaviourists avoid scruffing as they feel it may cause stress. Alternatives to scruffing include putting a hand on the front of the cat’s chest, by examining the cat in a place it feels comfortable, such as in its carrier or on the scales or under towel, or by placing a specific towel wrap restraint around the cat in order to help the cat feel comfortable so that it does not feel a need to struggle. Regardless of the technique used, choose one that makes the cat feel relaxed and more likely to hold still. (Fig 11).

Provide support
Secondly, when trying to control movement and guiding a pet into different positions, it is important to provide support and to place pressure in the right locations to guide them. We need to control movement in all 6 directions — right, left, up, down, forwards, and backwards. Multiple types of holds can be used in the front end and multiple in the back. Veterinary staff must know many different holds, which directions each hold controls, and which holds are minimal vs. maximal surface area holds. Additionally, they must be able to switch quickly and smoothly between holds and know how to position the dogs to get into the hold in a non-threatening manner.

Clear signals
For instance if you try to get a dog to sit by pushing pressure cranial to his hip or on his hip you will just cause him discomfort and he may become confused and protective of himself. In order to sit, the hind legs need to be bent, the weight needs to shift from the front legs to the back, and the front end needs to shift up while the back end shifts down. So one way to get a dog to sit is to raise the front end slight with gentle pressure across the chest.

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while placing gentle pressure on the rear end just above
the tail base. These signals are clearer.

**Steps 5: Desensitisation and counterconditioning the fearful pet**

When all of the above steps are followed, even without
desensitisation and counterconditioning (DS/CC), clients
will notice a huge difference. Pets who would be nervous
in another hospital will start the consultation in a
comfortable manner in the low stress environment of a pet-
centric hospital. However, some pets will need to develop a
positive association with procedures such as a toenail trim,
injections, pilling or even contact with the people in the
hospital.

The basics of DS/CC are simple and straightforward
although there are many nuances that affect the speed and
rate of success. Some DS/CC procedures can be done within
minutes within the hospital; thus saving the need for extra
technicians or sedatives. The greater the staff’s skills, the
quicker the process can go.

**An example: DS/CC to injections**

Start by making sure the dog is hungry. Use semi-moist
treats or baby food, canned cat food, peanut butter or
cheese spread thin on a spoon. First present the food and
once the dog is eating, introduce the syringe at a distance
where you know the dog will not respond and will continue
eating. After 3-10 seconds, remove the syringe and stop
the food. The goal is that the dog then looks eagerly
for more treats. Repeat this step several times and then
gradually present the syringe closer. In the next stage of
training, once the dog is eating, tent his skin, first gently
and then more roughly and then while pinching the skin.

The goal is that the entire time you are handling him,
it is done at a level where he fully focused on eating.
His mouth is actually licking the can or bottle or spoon
or up against your hand so that you have full control of
where his head is. Once he is reliably only focused on
food with one step, then go the next step of making the
handling more intense. In the final stages you also poke
with the syringe while he’s eating. If needed, cut the tip
off a needle to make it blunt and poke with that. And
then finally you give an injection. If the stimulus level is
gradually increased while staying under his threshold for
reacting, and you gave clear times when he’s getting treats
and other times when he’s waiting for more treats while
not being handled, this process can go very quickly.

**Step 6: Management of fearful and aggressive pets**

If the pet is fearful or aroused and cannot be sufficiently
calmed during the visit, the first step is to go back and
have the client prepare him for the examination and
to have the pet only come to the hospital for “happy
visits” where you desensitize and counter-condition him
first. Even with this, you may need to use sedatives. At
minimum, the dog should be trained to enjoy wearing a
muzzle, which generally takes less than a week.

**Sedation**

Oral sedatives should be given before the animal leaves for
the hospital. Avoid the use of acepromazine unless used in
conjunction with an anxiolytic such as a benzodiazepine.
It is also important for staff to realize that a pet sedated
with oral medications, especially acepromazine without
an anxiolytic, may become more sensitive to sounds and
can look tired but still be highly reactive and lunge or
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Most cats can be injected while remaining in a carrier with the top removed with skilled use of a thick towel wrapped over and tucked down by your arms. The hands should hold the neck in a “ring” hold. The injector can lift towel and inject in the lumbar region. The process should take under 3-4 seconds.

Dogs wearing muzzles can be restrained quickly and calmly with practice and the process should take 2-3 seconds. Once injected, the pets should be placed in a quiet room with a comfortable surface to lie down and lack of stimuli so that the sedation can take effect. During the exam, the dog should be wearing a muzzle and cotton balls should be placed in the ears to decrease auditory stimuli. All talking should be kept at a whisper and ambient noises should be kept low. The animal should be asleep but still a technician should restrain it lightly so they can evaluate the sedation level of the animal and look for response indicating that further sedation is needed. Typically wait 30 minutes. At the end of the examination process, reverse with atipamezole (Antisedan®, Orion Pharma), let the animal wake up and then clear the hallways so the pet can be taken directly to the car. The goal is that the animal does not remember the exam and the actual hospital experience is neutral or even positive (See video on Dr Yin’s YouTube channel). These techniques must be practiced beforehand so that they can be performed in a skilled manner.

Conclusion

Most of the techniques described in this chapter do not increase the time of consultation. They simply require staff to interact with pets in a more skilled or refined manner and the hospital to be set up with the patient’s best interest in mind. Overall, by focusing your hospital’s practices around keeping the patient both comfortable and feeling safe, we get back to the roots of veterinary practice. It’s about helping pets to be healthier and happier while forging a great relationship with both patients and client.

Reading and references


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1 Please note that these compounds are not registered for veterinary use in the EU.
2 https://www.youtube.com/watch?v=kkInVGuPL8s
Commissioned paper

Pop! Bang! Whizzzzzzz!
Management and prevention of noise phobia in pets

Jon Bowen

SUMMARY

Noise fears and phobias are unique in behavioural therapy. There is a range of drug treatments, and plenty of evidence that behavioural therapy works and produces lasting benefits. The only remaining problem is that treatment takes time and as clinicians we tend only to see cases when they become urgent for the owner, usually a few days prior to a major firework or thunder event. However, with some forethought, and use of tools like the sound sensitivity questionnaire, we can detect and treat cases more effectively.

Introduction

Fear of loud noises is very common in dogs. In a recent survey for the RSPCA, 49% of UK dogs were found to exhibit some degree of fear of firework, thunder or gunshot noises[1]. However, the severity of response to loud noises will vary greatly between individuals, with some being relatively mildly affected, and others reaching a level of severity that could be equated with phobia.

Also, it is likely that the prevalence and impact of fear of loud noises will differ between countries and regions. This, in turn, affects the type of treatment that can be used. For example, in places where thunderstorms are seasonal and very severe, the behavioural therapies that we use to treat mild to moderate level noise fear problems may be less effective, and medical or management approaches may be more appropriate.

Apart from disrupting the lives of dogs and their owners, recent evidence suggests that fear and anxiety may also have an impact on health. A study by Nancy Dreschel found that dogs with non-social fear and separation anxiety had a significantly increased severity and frequency of skin disorders, and dogs with a fear of strangers had a significantly shorter lifespan[2]. This is supported by work in humans, which indicate a significant positive correlation between anxiety disorders and mortality[3]. Given the extreme physical and mental stress resulting from phobia, combined with the life limiting effects it can have on exercise and social functioning, it is perhaps even more likely to be an underlying cause in health problems in dogs.

For the clinician, the seasonality of thunder, firework and shooting events tends to create periods of peak demand, during which the clinic is inundated with last-minute requests for help that make it hard to prioritise cases. This article will cover an approach to the detection and triage of cases that has proven to be effective in managing and treating noise fears and phobias, together with a summary of the main treatment interventions.

Detection and triage

There are a number reasons why it is important to actively seek out cases, rather than relying on clients to contact the clinic when they need help.

Firstly, the range of interventions we can offer is wider when we start well in advance of the fireworks or thunder season (fig 1).

Behavioural therapy, long-term medication and even some management options will take time to implement. Behavioural therapy, such as desensitisation, may produce an effect within 8 weeks, but could take much longer in severe cases. Long-term medication, such as
with a serotonin re-uptake inhibitor (clomipramine) or monoamine oxidase inhibitor drug (selegiline), will take 4-8 weeks to reach effect. Even the short-term anxiolytic drugs, which are often prescribed in response to last-minute requests for help during the few days before an event, should only be used after the effects have been tested in an individual dog.

Assessment of the problem

The choice of treatment will depend on the severity and nature of the dog’s problem, so detecting cases well ahead of a known noise event offers the best chance that effective treatment can be offered.

In terms of assessment, three aspects are important:

- The dog’s response to noise events.
- The frequency and severity of events, and the duration of the firework or thunder season.
- The impact on the dog’s lifestyle and routines.

With regard to the dog’s reaction, certain features appear to be particularly important:

- Anticipation.
- The level of sound required to trigger an emotional response.
- The intensity of arousal and the emotional response.
- The time it takes the dog to recover after an event has finished.

These characteristics can help to differentiate dogs with normal fear problems from those with what we might call “phobia” (See Box 1).

Dogs with severe problems will show anticipatory anxiety in situations when a noise might occur (such as after dark), an intense fear response even to quiet presentations of the noises they fear (e.g. distant thunder or fireworks), and will take an hour or more to recover after an event has passed. In some cases they will even remain unsettled the day after an event.

Sound sensitivity questionnaire

The intensity of the dog’s reaction to a noise event appears to be connected with this pattern of intense reaction to mild noise stimuli and delayed recovery. In a series of studies looking at the behavioural response to noise events, we developed a short “sound sensitivity questionnaire” which has now been translated from English into several languages, including French, German and Spanish [4,5]. The questionnaire has been tested in a population of several thousand cases, checked for validity and retest reliability, and is now widely used in the UK. The questionnaire can be completed online in the clinic, or clients can be sent a link so that they can fill in the questionnaire at home. This has the advantage that it is easy to contact a large number of clients very easily.

There are three parts to the questionnaire:

- Behavioural signs of stress.
- Evidence of failed coping behaviour.
- Physical signs of stress.

For each part of the questionnaire, clients receive a score that enables them to interpret the severity of their dog’s problem (Fig 2).
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This also enables the dog to be classified as “mild”, “moderate” or “severe, so that an appropriate programme of treatment can be delivered.

**Behavioural signs of stress**

Behavioural signs of stress include trembling, panting, and restlessness, and clients are asked to rate each behaviour so that a score can be calculated. This is the primary score, which is used to assess overall severity, as it has been shown to provide the most reliable discrimination between classes of severity. Dogs that are classified as severe using behavioural signs of stress show significantly higher sensitivity to low level noises, an intense emotional reaction, and a delayed recovery of the type that we could consider to be evidence of phobia.

**Failed coping behaviour**

Dogs with high scores for freezing behaviour, repeated failed attempts to hide, and low body posture are those which show evidence of poor coping ability. This is often due to the absence of a suitable hiding place in the home. This may be because the owner has not provided permanent access to a hiding place, or that the owner has deliberately prevented the dog from hiding. Again, owners completing the questionnaire are asked to rate their dogs with respect to these behaviours. Those dogs which had higher scores for failed coping were found to be more likely to get worse over time.

**Physical signs of stress**

The section on physical signs of stress includes several questions that relate to much more severe reactions such as vomiting, defecation and urination. These are signs of a stronger autonomic response and high scores for this part of the scale are indicative of an extreme emotional response. These are individuals whose welfare is potentially severely impaired by a fear of loud noises.

**Evaluation of scores**

The main value of this part of the scale is that for cases that have obtained higher scores for the behavioural signs of stress, this part of the scale provides additional information on autonomic effects. In general, dogs that have a high score for behavioural signs of stress will also show high scores for physical signs of stress. Dogs that have a high score for behavioural signs of stress, and therefore fall into the severe category, are more likely to require drug therapy. This includes

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**Phobic vs. Normal emotional responses**

In normal fear, an unexpected event causes an increase in arousal, which may be experienced as fear if the event is potentially threatening. The animal then performs a coping behaviour, such as escaping or hiding. During the recovery phase, arousal and emotional state return to baseline if coping behaviour has been successful. In phobia, the animal may show greater levels of baseline arousal and anxiety, a very intense emotional response and dramatic increase in arousal. There is then a protracted recovery, which may take an hour or more. The ability to recover quickly reinforces the individual’s confidence in its ability to cope with future events. Delayed recovery has the opposite effect, undermining the perception of the ability to cope.

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**Box. 1**
the use of short-term medication such as benzodiazepine drugs, as well as long-term treatment with a drug such as clomipramine or selegiline. Dogs with mild or moderate scores may respond to behavioural therapy alone, such as the provision of a hiding place and the use of desensitisation and counterconditioning (box 2). Since the questionnaire has high retest reliability, it can be used to determine whether the owner has made the correct changes necessary to enable the dog to cope better with noise events, and to track the improvement or deterioration of a case over time. This enables us to identify whether therapy is effective.

**Owner feedback**

The questionnaire does not include questions about the types of noises the dog reacts to, or the frequency of noise events that frighten the dog. This is because these are specific to the individual animal and its environment. The frequency of fearful noise events the dog experiences is critical to the impact that fear will have on its quality of life. A dog that shows mild to moderate reactions to loud noises and experiences several fearful events each week may require medication just as much as a dog that shows severe reactions but is exposed to events much less frequently.

It is also important to ask the client to list the sounds the dog reacts to, including:

- Fireworks, gunshots, thunder and other similar noises.
- Everyday noises in the home (kitchen equipment, doors slamming, noises on TV/radio).
- Everyday noises outside (traffic, machinery).

Dogs that react to a wider range of noises are more likely to experience a higher frequency of fearful events. The most important indication of severity relates to the impact the noise fear/phobia has had on the dog’s quality of life. With severe fears and phobias, dogs may react to a wide range of noises including everyday sounds that they previously ignored. They may refuse to go to certain places where they have previously heard noises that frightened them, or they may start to react to stimuli and events that are associated with loud noises, such as the onset of darkness, flashing lights, rain or wind.

Owners may report that the dog is happy to leave the house, but will suddenly stop in the middle of a walk.

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**Creating a suitable hiding place**

Typically, dogs will want to hide in a place that is dark, quiet and away from disturbing activity, but they may also want to be close to someone they are bonded to, for security.

The following can improve the quality of a hiding place:

- Windows, curtains closed, lighting dimmed.
- A comfortable, familiar bed with extra blankets and some items of recently worn clothing carrying the scent of the owner.
- A water bowl, chews and toys nearby in the room.
- An Adaptil® diffuser in the room where the hiding place is located, close to where the dog’s bed is located. This hiding place must be available to the dog at all times regardless of whether the owner is at home or not. The hiding place should be set up at least a week ahead of any expected loud noise event. This allows time to let the dog get used to the hiding place and associate it with pleasant experiences. The dog is more likely to use the hiding place if it likes to go there at other times. Owners should be encouraged to give the dog treats and chews when it is in the hiding place, and show attention and approval when they find the dog there.
and refuse to go any further. This can be tremendously frustrating for owners, who often do not understand the intense emotions underpinning the dog’s behaviour. It is therefore urgent to tackle cases before this state is reached, because treatment becomes progressively more difficult as the problem has a greater impact on the dog’s normal behaviour and routines. By combining scores from the sound sensitivity questionnaire with information about the dog’s circumstances, it is possible to quickly choose the most appropriate therapeutic strategy.

Management

The main methods for dealing with dogs that have noise fears are:

- **Management to prevent the problem from worsening** (e.g. provide a hiding place and minimise exposure to noise events).
- Use of behavioural therapy, such as desensitisation and counterconditioning, to reduce sensitivity to the noises the dog fears, and change its emotional reaction to them.
- Use of long-term medication to control the dog’s emotional response to fearful sounds and situations.
- Use of short-term medication to control acute responses to fearful sounds, or alter the dog’s memory of them.

The choice of specific treatment depends on the severity of the dog’s reaction, as well as the amount and intensity of sound exposure it experiences. From our studies in UK and Spain using the sound sensitivity questionnaire we estimate that about 30% of noise-fearful dogs are severely enough affected to classify as phobic [5]. These dogs will probably require short-term medication to enable them to cope with individual loud noise events, and long-term medication to improve their quality of life and response to behavioural therapy. The remainder are mildly or moderately effected and likely to respond very well to desensitisation and counterconditioning alone.

In the UK, there is an extended firework season from late October into early November, followed by another event on New Year’s Eve. Fireworks are heard at other times, but restrictions on commercial use of fireworks has reduced their use somewhat. Storms are common throughout the year, but thunder is less common, and its intensity is rarely exceeds moderate sound levels. As a result, in most parts of the UK it is possible to use behavioural therapy to treat dogs with sound sensitivity problems. However, in areas where thunder is extremely loud and can occur frequently during a storm season, behavioural therapy may be less effective; the events are genuinely hazardous, and the sound intensity so great and of such duration that behavioural therapy alone may not be enough. The key aim of management is to prevent noise fear problems from getting worse and to enhance the animal’s ability to cope while treatment is undertaken.

General advice includes:

- Wherever possible, avoid exposing the dog to the sounds that it is afraid of.
- Do not restrict the dog’s access to hiding places; instead, try to increase opportunities for it to hide when it is afraid.
- Do not try to comfort a fearful or phobic dog, or get angry with it when its behaviour becomes disruptive, because these actions will add to the emotional intensity of the situation and can increase the likelihood of future problems.
- Do not force animals to confront their fears by, for example, cutting off opportunities to hide or dragging them to places where they are reluctant to go.

Many dogs have already learned to hide somewhere in the home where the sound level is reduced and they feel safer. This is usually in a room with small windows and a sound absorbent piece of furniture that the dog can get underneath or behind (e.g. a bed or sofa). However, dogs that show freezing, low body posture and repeated unsuccessful attempts to hide (e.g. going from one hiding place to another, never fully settling) have not found a suitable hiding place. The owners of these dogs should be encouraged to provide a hiding place in accordance with the instructions in box 2. Being able to hide speeds the animal’s recovery after an event has passed, reducing the duration of its distress and enabling it to enjoy a better quality of life. Provision of a hiding place has also been shown to reduce the intensity of signs of distress during noise exposure, and can help to prevent noise fear from worsening [5]. Owners should also be advised on how to react to their dog’s behaviour in noise events, because inappropriate punishment and reinforcement can exacerbate fear and phobia problems.
Behavioural therapy

Desensitisation and counter-conditioning

Several studies have shown the benefit of desensitisation and counter-conditioning using recorded firework sounds. In one study, clients were asked to follow an 8-week plan of behavioural therapy using recorded sounds (e.g. Sounds Scary, www.soundtherapy4pets.co.uk), after which dogs were tested using a different sound recording, and the clients were asked to evaluate the dog’s response to real firework events\(^\text{12}\). Significant improvements were found after this brief intervention. The dogs were reassessed one year later, and benefits were found to persist, with severity scores remaining lower than at baseline\(^\text{13}\). Clients rated the procedure to be easy and worthwhile. In these studies, behavioural therapy was performed in the presence of a dog appeasing pheromone diffuser (Adaptil\textsuperscript{®}, CEVA Animal Health), as this was recommended by the manufacturers of the desensitisation products as part of their treatment protocols.

However, we cannot be completely confident that behavioural therapy will be as easy to perform or as effective over such a short period of a few weeks in very fearful or phobic dogs. It is likely that the process of desensitisation and counterconditioning will be slower and less effective in these dogs.

Information about desensitisation and counterconditioning is provided in boxes 3 and 4. The most critical aspect of treatment is salience; the level to which the animal is aware of the sounds being heard. With phobic dogs, an intense fear response may be elicited even by very quietly played firework or thunder noises, so it can be very difficult to perform behavioural therapy. For desensitisation, salience only need be minimal; the dog is just aware that the noise is present, and gradually the sound level is increased over a number of therapy sessions, always remaining at or below minimum salience. One major benefit of desensitisation is that it is not context-specific; the positive benefits of the therapy will be seen in any situation where the fearful noise is encountered. However, desensitisation is easily reversed by a single very frightening event. Hence the need to go on to do counterconditioning.

In counterconditioning, the dog is trained to associate the previously fearful sound with a more positive experience such as eating food or playing a game. For it to work, the dog must be fully aware of the sound that is being conditioned, so the sound must be played at above minimal salience. This is why desensitisation is the first step for treating very fearful, or phobic, dogs. The advantage of counterconditioning is that it is more resistant to a relapse, but the disadvantage is that it is context specific; dogs must receive training in 3 or more different locations (contexts) in order for the learning to generalise to all others.

Drug therapy in phobia treatment

Medication can be used as a short-term strategy to enable a patient to deal with an inevitable event or circumstance, or as a long-term treatment, which assists in the application of behavioural modification techniques over a period of weeks and months.

Short-term drug therapy

The traditional pharmacological approach to treating fears and phobias in dogs has been to prescribe a neuroleptic drug like acepromazine. This will make the animal less reactive, and remove the observable symptoms of fear that owners find so distressing. However, it will not reduce fear or anxiety, and the favoured approach is now the use of benzodiazepine and triazolo-benzodiazepine drugs. The most frequently prescribed example was formerly diazepam, but in the UK this has largely been superseded by the triazolobenzodiazepine drug alprazolam (0.02 to 0.1mg/kg).

Alprazolam has a short half-life of approximately 4-6 hours, and a wide therapeutic range. Unlike diazepam, ataxia and hyperexcitability are uncommon with this drug. However, a test dose should always be administered in order to check a patient’s response before using the drug for a real event. This means giving a dose of 0.02mg/kg on a quiet day, and observing the dog for any adverse effects.

In animal models, alprazolam has been shown to have retrograde and anterograde amnesic effects, which are also anecdotally observed in dogs receiving treatment for noise fear. Alprazolam may therefore be given at low dose (0.02mg/kg) either before, during or after a fearful event in order to impair memory of it. Alprazolam has been shown to be an effective short-term treatment in noise fears and phobias\(^\text{14}\). However, there is some evidence, and anecdotal experience, that the regular use of alprazolam alone during a season of noise exposure can reduce reaction to loud noises.

Alprazolam may be used as a “safety net” after the completion of long term drug and behavioural therapy in order to prevent relapses; it can be given after an
**Desensitisation**

Desensitisation should be done when the dog is already in a calm, relaxed state. For it to be effective and non-stressful for the dog, the stimulus must be minimally salient; the dog should initially notice the sound is present but must not show signs of fear or anxiety. Typically this means gradually increasing the volume from zero until the dog shows a slight twitch of the ears as if it is aware that it has heard something but cannot quite identify what it is. The dog is exposed to the stimulus at this level for 10-15 minutes, several times each day until it shows no awareness of the noise. At this point, the sound volume is slowly increased to the minimally salient level again and the process is repeated.

This cycle is repeated until the dog shows no emotional response to the sound even when played at moderate to high levels. At this point the dog is desensitised, but this process is easily reversed; an intensely fear-eliciting noise event could cause the dog to relapse. For this reason, behavioural therapy should be concluded with counter-conditioning.

**Counterconditioning**

In counterconditioning, the previously fearful sound is associated with something pleasant, such as food. Before beginning counterconditioning, there must be minimal reaction to the stimulus at the intensities at which it will be presented during training. In a typical procedure, the sound begins before the dog is given food, and then continues until the dog has finished eating. In this way the sound both predicts and accompanies the food. Sound level is gradually increased over a number of exercises until the dog shows signs of positive anticipation of feeding whenever the sound is heard.

(For examples of sound therapy recordings, go to www.soundstherapy4pets.co.uk)
intense noise event in order to block memory that might undermine therapy.
Gradual withdrawal is recommended if a benzodiazepine is to be stopped after a long period of daily treatment. It is also important to consider the potential for human abuse and to be wary if repeat prescriptions are requested too frequently, if the owner reports the use of increased doses to gain the same effect, or if the owner repeatedly claims to have mislaid or lost medication.

**Long-term drug therapy**
Long-term drug therapy may be used in noise fear/phobia cases for several reasons:
- To improve response to behavioural therapy.
- To alleviate debilitating effects of fear/phobia and improve the welfare of the animal.
- To limit progression (e.g. generalisation).

**Clomipramine**
Clomipramine (Clomicalm®, Novartis) is a serotonin re-uptake inhibitor drug from the tricyclic antidepressant (TCA) group of drugs. It holds an EU license for the treatment of separation anxiety in dogs. The immediate effect of this drug is to increase intrasynaptic concentration of serotonin in relevant neurons, which can lead to a brief period of increased anxiety at the start of treatment. It also produces antagonistic effects at H1 histamine, alpha-adrenaline and muscarinic acetylcholine receptors, leading to a wide range of adverse effects including dry mouth, sedation, and weight gain. TCA drugs can also lower seizure threshold, cause urinary retention, and hyperglycaemia. The effects of clomipramine, which are seen after 4-6 weeks of treatment, result primarily from regulation of serotonin receptor expression (e.g. down-regulation of postsynaptic receptors).

Clomipramine reduces anxiety and panic, which makes it suitable for the treatment of dogs with noise phobia. This has been confirmed in an open label prospective study. Typically the drug is used for a period of 6 months, and is gradually withdrawn after a period of 6 or more weeks without clinical signs. Gradual withdrawal is general recommended for serotonin reuptake inhibitor drugs in order to avoid relapse, rebound anxiety and discontinuation syndrome. Typically the dose is reduced in three steps over a period lasting one week for every month of treatment.

**Selegiline**
In the EU, selegiline (Selgian®, CEVA) is licensed for use in behavioural disorders of an emotional origin, including fears and phobias. It is a selective irreversible inhibitor of monoamine oxidase B (MAO-B), the enzyme that metabolises dopamine and phenylethylamine. However, it also has some effects on serotonin metabolism, through its effects on monoamine oxidase A. As a result, it must not be co-administered with TCA, SRI or SSRi drugs, and a washout period of 14 days must be allowed between selegiline and these drugs (and vice versa). Selegiline also interacts with pethidine and can cause a range of adverse effects including nausea, sedation, and constipation. A small proportion of dogs show signs of increased excitability during the first 1-2 weeks of treatment. Clinical experience suggests that selegiline is effective in the treatment of sound phobias associated with behavioural inhibition and symptoms of social withdrawal. For example, dogs that hide and refuse to leave the house. Effects are usually seen within 8 weeks, sometimes in less than a month.

In multi-dog households, selegiline has been associated with an increased assertiveness between dogs, and it should be used with caution in cases involving owner directed aggression.

**Post-treatment management**
Current evidence is that the effects of behavioural therapy persist for at least 12 months after treatment. However, it is generally recommended that dogs that have had serious noise sensitivity problems should undergo regular “top up” therapy sessions to maintain their resilience to loud noises. There is also a persistent risk of a sudden relapse if a dog is exposed to an extreme noise event in these cases.

**Prevention**
Evidence from studies such as those by Appleby et al and Blackwell et al, support theoretical predictions that dogs reared in environments which are less complex, and relatively barren of physical and social stimuli typical of those which they will encounter in adulthood are predisposed to fear and aggression problems in adulthood. Animals reared in complex environments develop into adults with more complex central nervous system organisation that can more easily organise and
accommodate new information, and a permanently superior nutrient and oxygen supply that can maintain highly metabolic activity in brain tissue even when it is placed under heavy workload \[8,9,10\].

**Seasonal predisposition**

With respect to fear of noises, UK dogs born in the autumn have been found to have a reduced incidence of fireworks fear\[1\]. This is likely to relate to early exposure, as it is around this time when the main celebration involving fireworks occurs. The same group went on to show that firework fear was 2.26 times less likely in puppies that had experienced thunder during the first 4 months of life, compared with those who had not experienced thunder\[7\], and that exposure to sound recordings of thunder and fireworks during the sensitive periods (For example, at a puppy socialisation class) reduced problem risk by 5-7 times\[11\].

The evidence is that the best way to produce psychologically healthy puppies that are able to adapt to and cope with life as a domestic pet, is to provide an enriched early environment and controlled exposure to recordings of specific “high risk” stimuli such as fireworks and thunder sounds played at safe, non-fearful levels.

**References**