Canine Body Language:
But What Do You Really Mean?

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Why is it so critical to understand body postures in dogs? There are several reasons why this is an important topic with any discussion of dog behavior. By understanding how dogs communicate we can diminish the amount of miscommunication that occurs between people and dogs, it can help us better predict future behaviors in the dogs we interact with, understanding how dogs communicate can help reduce the incidence of dog bites, and it can increase the enjoyment people can have in their relationships with their dogs.

Behavior evolves just as body type evolves. Behavior can change over time as a dog learns what behaviors work in a given situation and which do not. As a result the successful behaviors will flourish while those that are less successful will tend to fade. This evolution can be seen in the individual animal by observing body posture since this is the principle means by which dogs communicate.

The eyes, ears, tail, mouth and overall posture can give us the best indications of what dogs are trying to communicate. These structures can convey relaxation, anxiety, tension, or confidence and by understanding the subtleties of their expressions, much ambiguity can be eliminated.

Because aggressive can greatly influence the bond and attachment we have with our pets, an understanding of the progression of aggressive responses can help in minimizing exacerbation of problem behaviors. The “Ladder of Aggression” serves to provide a good model of how aggressive behavior can develop from relatively benign “calming signals” to more overt aggressive displays culminating in snapping and biting.

Fear-Based Aggression:
I'm Afraid of You so I Would Like to Eat You

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Aggression is the most common behavior problem presented to veterinary behaviorists followed anxiety related disorders (separation anxiety, phobias). Traditionally, dominance aggression is most often diagnosed, especially when evaluating owner directed aggression. As a result of the label "dominance" being applied in these cases, owners were often directed to establish themselves as higher ranking over the dog through the use of a variety of physical means (punishment, alpha rolls, leash hangs, pinch and shock collars, etc.). Escalation of aggressive responses often followed this approach. By examining the situations in which the aggression occurs, body posture exhibited by the dog and evaluating the early history of the behaviors it becomes evident that not all aggression is related to a question of dominance hierarchy. In many, if not most, of these cases a definite fear component seems to be the driving force behind the aggressive displays. This presentation is meant to clarify terms, differentiate possible diagnoses of aggression and offer thoughts on treatment of fear associated aggression.

Aggression is a normal canine behavior when displayed in the proper context. As a tool, aggression is utilized by dogs for a variety of purposes such as acquisition of food, defense of resource (food, territory, mating access), establishment of pack hierarchy, and self defense when threatened. In addition, submissive displays (averting stares, exposure of the underbelly, urination and retreat) are often utilized when a dog is presented with an overwhelming threat. If these signals are not recognized, a subordinate individual may be forced to rely on aggression (growling, barking, snarling or biting) as a last resort.

When examining these behaviors in the context of human-canine interactions, several factors must be considered. Do dogs and humans communicate in the same manner? While both are social species, methods of exchanging information differ. Often submissive signals are missed by observers not familiar with canine body language. As a result, dogs may be put in a position to use aggression when more subtle signals of submission are missed. Over time, learning can occur such that some dogs will totally abandon these submissive cues and instead more quickly elect to utilize these more offensive strategies to alleviate perceived threats.

Secondly, when punishment is used by humans as a means of exerting dominance, fearful dogs may be forced to respond aggressively while more confident animals may see the use of punishment as an incentive to engage in a so-called "arms race". This involves raising the bar by showing higher and higher degrees of aggression in response to ever increasing levels of punishment. In addition, punishment is often applied in the inconsistently creating an increased anxiety in the fearful animal. Not knowing whether to expect reward or punishment, conflicting emotions result lowering the threshold of reactivity and increasing the chance the dog will resort to the use of aggression.

It also appears that fear can be highly inherited so that fearful, anxious or timid parents can produce a higher number of similarly behaved puppies in a litter. Combine this genetic component with the previously described communication breakdown and the true meaning of nature and nurture can be seen. In addition, failure to positively socialize during the sensitive period (up to 14 weeks of age) results in the genetic prophecy of fearful behavior being fulfilled.

Diagnosis

Body posture at the time surrounding the aggressive episode can be most valuable in determining etiology. Typical signs include:

- Tail dropped or tucked
- Ears laid back
- Dorsal Piloerection (evidence of arousal and non-specific for fear)
- Weight positioned over hind legs, head and neck lowered
- Gaze dorsally or via sideway glance at target
- Autonomic responses (urination, defecation, anal sac expression)
- Lip retraction (Vertical)

This may be the early presentation in a younger dog. Over time, the body language may suggest a more confident dog as it learns to deal with its fear and anxiety by adopting a more offensive strategy:

- Tail raised
- Ears forward
- Piloerection
- Weight shifted forward with head raised
- Staring directly at target
- Lunging at or chasing target

In a fearful animal, the target is often an unfamiliar person or can be a very familiar person when conflict exists. It can be sometimes seen where an initially offensive aggressive dog can revert to a more defensive body posture if the threat does not retreat or is sudden and overwhelming.

The situation often also helps determine etiology.

A typical presentation where fear is induced and has the potential to result in aggression includes:

- Approach from a stranger while on leash walk (leash can transmit owner anxiety, prevents escape by the dog, and also prevents canine specific communication in cases of Interdog aggression).
- Situations where persons are bitten on the hand while reaching toward the dog
- Being bitten on the backside or caudal thighs/feet (common with herding breeds)
- Secondary to punishment by strangers or owners
- Commonly seen with strangers entering the home or moving suddenly
- Young, mobile, active children. Unpredictability breeds anxiety in the dog and can cause biting to prevent movement.

Abuse can cause fearful behavior but commonly is displayed as fear toward a specific trigger as opposed to more generalized responses.

Dominant behavior over another individual normally is not seen until a dog reaches social maturity (12-18 months) whereas fearful behavior is often seen very early (at times as early as 8 weeks of age). Body postures associated with dominance are usually more offensive in appearance, they never have an early defensive presentation and is often associated with control of resources (food, space, items) or secondary to attempts to direct the animal's behavior (commands, pushing, wiping feet, approaches, etc.). Dominant animals can also attempt to block movement of individuals. Dominant behavior can be very calculated and purposeful whereas fear responses are much more sudden and reactionary.

The successful use of aggression in a defensive situation can become a learned behavior. Over time, this response can be used in similar situations with greater confidence. As a result, the aggression can be displayed with increasing efficiency.

The principles of reinforcement and conditioning apply to the use of aggression.

Need to know the situation in which the aggression is occurring and the past history of aggressive behavior in order to make a proper diagnosis. Aggression is not static. Constant interaction of genetics and environmental influences can determine behavior at any one point in time.

Conflict aggression

- Often Diagnosed as Dominance Aggression
- Often show submissive posture. Not confident.
- Ambivalent body language (wagging tail while growling). May show "remorse" after aggression.
- Conflict occurs when put in confrontational situation or when cannot predict interaction.
- Dog learns to use aggression to get out of uncomfortable situation and is reinforced
- Owner directed aggression can occur in fear based situations:
- Inappropriate use of punishment
- Attempt to create owner: canine dominance structure in household
- Inconsistent interactions

Treatment of fear based and conflict behavior

The basis of treatment is to remove exposure to inciting stimuli, utilize counter-conditioning/desensitization and at times prescribe anti anxiety medication.

Removing stimuli – can be accomplished in several ways:

- Response Substitution - Discontinue all forms of punishment. Focus instead on distraction and redirection of inappropriate behavior to more appropriate responses which can be reinforced.
- Head Halter – Can be used to help facilitate response substitution with the use of an indoor drag leash. Head halter decreases arousal and allows safe, efficient, non-emotional interruption of problem behaviors.
- Avoid reinforcement of the behavior by withdrawing in response to aggression or giving positive attention (telling the dog, "it's all right").
- Have unfamiliar people ignore dog at first greeting to allow more time for the dog to assess the situation without feeling threatened.
- Identify any fear inducing triggers and avoid. For example, if house has several young children, isolating dog can avoid potentially negative interactions.
- Increase consistency of owner and dog interaction. Always give a command, wait for a response and reward.
- Avoid inconsistent, casual interactions by ignoring all attention seeking behaviors. Punishment should never be used.

- Often called “Nothing in Life is Free” or “No Free Lunch”

Counter conditioning

Counter Conditioning is the proactive relaxation techniques in all environments that the dog will be in without presence of offending stimuli.

Make use of a palatable treats made available by visitors (while still ignoring dog) as a means of accomplishing Classical Conditioning (associate visitors with positive results).

Desensitization

By using fear inducing triggers that gradually increase exposure while asking for, and rewarding, relaxed behaviors taught during the counter conditioning phase. Examples would be people entering the home or approaches from strangers or unfamiliar dogs.

Medication

The use of medication addresses anxiety issues which can accompany fearful behavior. Anti-anxiety medications are indicated when the degree of anxiety is great enough to interfere with the ability to learn as behavior modification techniques are applied. Common side effects include sedation, anorexia, gastrointestinal disturbances, increased aggression and anxiety.

Typical anxiolytics include

Tricyclic antidepressants (TCA’s)

- Clomipramine (Clomicalm) 2-4 mg/kg BID
- Amitriptyline (Elavil)1-3 mg/kg BID-TID

Common side effects include

Sedation, anorexia, gastrointestinal disturbances, increased aggression, anxiety and drug tolerance.

Selective serotonin reuptake inhibitors (SSRI’s)

- Fluoxetine (Prozac) 1 mg/kg SID
- Paroxetine (Paxil) 1 mg/kg SID

Common side effects include

- Sedation and anorexia
- Long half life results in delay (6-8 weeks) to effect

Benzodiazepines (BZD’s)

Benzodiazepines are contraindicated due to potential for disinhibition of fear and possibly heightening the aggression.

Conclusion

Aggression, even when directed at owners, should not be automatically classified as Dominance Related Aggression. Often, the origin is a fear based response directed at unfamiliar people or, when conflicting signals are displayed by the dog’s owners, can also be directed toward more familiar people. Understanding the animal’s history and body language can be valuable in making the correct diagnosis. Treatment can include avoiding trigger stimuli, utilizing counter conditioning and desensitization (after grading the stimuli) as well as adding appropriate medication where indicated.

Feline Aggression:
Should We Play or Should You Just Stay Away?

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Cats are not asocial animals nor are they small dogs
Cats are social animals and are individuals.

For free ranging cats

- Home Ranges (area traveled during normal activities)
- Time shares (Overlap)
- Social groups
- Stable
- Co-operative parenting
- Little is definitively known about hierarchy
- Not "pack"

Affiliative gestures

Behaviors that ↓ distance between cats

- Characterized by Allogrooming and allorubbing
- Proximity
- Food sharing
- Play

Agonistic behaviors

Behaviors that ↑ distance between animals

- Vocalization
- Piloerection
- Body language
- Facial expressions
- Facial Expressions

Types of feline aggression

- Redirected aggression
- Territorial aggression
- Fear-related aggression
- Play-related aggression
- Petting-induced (Status-related) aggression
- Aggression in the Veterinary Office

Treatment options

- Desensitization and counterconditioning (DS/CC)
- "House of Plenty"/Proper Play Activities
- Remote punishment
- +/- medications
- +/- NILIF
- Desensitization and Counterconditioning
- Gradual (re)introductions
- Start introductions through closed door
- Screen door/carriers/leashes
- Gradually increase time together and proximity
- Rotate cats
- Create a group scent
- Towels
- Feliway?

Counter conditioning and desensitization (CC/DS)

CC/DS is characterized by reintroduction over good things, use of delicious food, brushing and petting, use of catnip and play.

"House of Plenty"

Enough of everything for all cats (food, litter boxes, hiding/resting areas, toys, food based toys, videos, and bird feeders). Functions to decrease competition over resources.

- Decreases competition

Remote punishers

Used at FIRST sign of aggression

Squirt gun, "Spray Shield" (Citronella Spray), SSSCAT ®, Compressed air, Double-sided tape, upside-down carpet runner, Scat Mat ®, Snappy Trainer ®

Redirected aggression

- Signalment: Any gender, breed, age
- Target: Person or other animal
- Cat aggressively aroused & redirects aggression on closest target with arousal lasting hours to days

Treatment

- DO NOT ATTEMPT TO INTERACT
- Isolation when unsupervised
- Prevent exposure to arousing stimulus
- Outside cats (Scarecrow, close blinds)
- Odors from other cats

Territorial aggression

Signalment: Any gender (MC most likely), Any breed but usually adults

Target: Other animals, people

- Guarding specific location
- New cats introduced to a stable group
- Similar to dispersion in wild ancestor
- Spacing is critical
- Personal territory vs. claiming an area as is seen in dogs
- Can be among littermates

Treatment

- "House of Plenty" – Provide ample food and litter
- DS/CC
- Prevent exposure to outside cats

Fear-related aggression

Signalment: Any gender, breed, age

Target: Other cats, people, can occur between "friends"

- See a fearful-looking cat ("Halloween Cat")
- Hissing, growling
- Same house and avoids other cats when possible (w/ fear based intercat aggression)
- Inter-male: testosterone dependent
- Does not seek out target, but may or may not actively avoid the target
- Can be classically conditioned

Treatment

- Separate from target (other cat or people)
- "House of Plenty"
- DS/CC
- Anxiolytics
- Fluoxetine/Reconcile ®

Play-related aggression

Signalment: Kittens & young cats, any gender, breed, and may be more common in orphans

Target: People or other cats

- Threatening posture, stalking, ambushes
- Usually no vocalization

- Becomes a problem when injurious
- Bites, Scratches, Falls
- Victims may become afraid of cat

Treatment
- Encourage object directed play
- Add a playmate
- Encourage independent play
- Redirect to more appropriate play
- Remote punishment

Petting-induced aggression ("Don't Pet Me" bites)
Signalment: Any gender, breed, age
Target: People
- Owners may notice change in body posture
- Cat may solicit petting & tolerate some petting

Many consider petting-induced aggression to be part of Status Related Aggression which is owner or cat directed and is stimulated by attempting to control or dictate some aspect of the cat's behavior (petting, being picked up or moving the cat).

Treatment
Stop petting at earliest sign
DS/CC
Remote punishment

Aggression in veterinary office
Signalment: Any gender, breed, age
- Can occur as kittens or following neutering surgery
- Posture is consistent with fear (hissing, piloerection, arched back, flight)
- Hissing, Growling, Swatting, Biting
- May develop over time into offensive display
- May be exacerbated by painful experience
- Associated with rushed veterinary visits
- Excessive Restraint
- Anxious or Socially Inadequate Cats

Treatment
- Alter handling techniques
- Remove from carrier by dumping or taking carrier apart
- Move slowly with handling
- Use towel to cover head
- Remove from kennel using slip lead and "scoop" technique

Adding a new cat
- Gradual Introductions
- Separate the newcomer
- Start introductions through closed door
- Screen door/carriers/leashes
- Gradually ↑ time and proximity
- Rotate cats
- Create a group scent
- Towels
- Feliway
- DS/CC

Retrospective study on adopted cats
Compared introducing cats:
- immediately
- after a week
- after a month

Equal success rate! Outcome seems to be dependent on resident cat

Noise Phobia:
I Feel the Earth Move Under My Paws

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Thunderstorm and Noise Phobias are defined as a persistent fear or anxiety response that is out of proportion to the stimulus itself (sudden noise, wind, rain, thunder, lightening, etc.). Fear is the response that results from direct confrontation with a perceived threat while anxiety results from the anticipation of that perceived threat.

Symptoms often associated with phobic responses include many autonomic nervous system associated responses including increased heart rate, respiratory rate, and dilated pupils. In addition, we can see increased vocalization, pacing, panting, hiding, attempts to escape, seeking close attention from the owner(s), aggression if interfered with and elimination or destructive behavior.

Symptoms may occur as a result of a sudden exposure to a storm/noise or via gradual exposure over time to these events. Predictive events which may signal the onset of a storm to the animal can include thunder, lightening, change in barometric pressure, rain, wind, or darkening skies.

Co-morbidity may exist such that dogs showing signs of Thunderstorm/Noise Phobia and also displaying Separation Anxiety so it is important to evaluate patients for the co-existence of these behaviors. Be particularly aware of the possibility of worsening of the response to storms and noises at times when the patient is alone if Separation Anxiety is also present. Overall K, Dunham AE, Frank D, *J Am Vet Med Assoc*. 2001 Aug 15; 219(4):467-73

Phobic and anxious behaviors are suspected to be related to alterations in neurotransmitter levels (particularly serotonin) and how this may affect the functioning of areas of the brain related to emotionality, such as the limbic system. When evaluating the behaviors in question consider a behavioral differential diagnosis listing. For the symptoms described for phobic responses, other possible behavioral etiologies include separation anxiety, cognitive dysfunction, territorial behavior, Housesoiling, and play based behavior. A medical based differential list can include ear or skin abnormalities, seizure disorders, intestinal disturbances and hypothyroidism.

Diagnosis (assuming there are no medical issues present) is then based on typical history of the behavior occurring in connection with the onset of storms, activity during the storm, delayed recovery following the storm and possible co-existing anxiety based conditions.

Treatment centers first on determining a reward system (food, play, attention) that is appropriate for the individual animal, using this system in training relaxation in non-distracting situations then teaching this relaxation protocol in “safe locations” where the pet seems most comfortable during a storm, working on desensitization to storm cues (such as using storm or noise audio CDs) during off season for storms (to avoid unintended exposures to the stimuli), counter conditioning by engaging the pet in a pleasurable experience only during storm onset, and being certain not to punish or comfort the pet during phobic episodes.

Some other options for managing storms can include using a head collar with an indoor drag leash to enable the owner to interrupt and redirect anxious behavior to more appropriate activities (training for example). The use of pheromone therapy such as DAP (Dog Appeasing Pheromone) diffusers may also be beneficial. The use of devices such as anxiety wraps or the Storm Defender cape have been praised by some as being helpful. Homeopathic or herbal remedies have also been tried by some and occasionally seem to provide some benefit.

The use of anti-anxiety medications is often the backbone of successful management of thunderstorm and noise phobia. The goal of therapy is to reduce the apprehension that the animal experiences during unpredictable events such as storms and noise exposure. In this way we attempt to achieve drug desensitization such that the animal learns to accept these stimuli with experiencing the physiologic aftermath which can serve to reinforce the fear and anxiety. To this end, medication is dosed both chronically (given regardless of predicted storms events) and acutely (given as an add-on drug when these events are predicted). Chronically dosed drugs are often meant to increase serotonin levels while acutely dosed medications are more short acting and function to further manipulate the animal’s emotional state.

The two most commonly used drugs for chronic dosing are fluoxetine (0.5-2.0 mg/kg sid) and Clomipramine (1-4 mg/kg bid). You can start in the middle of the dosage range, and adjust the dose upwards or downwards depending on the patient’s response or you can start at the low end of the range and increase as needed to achieve the desirable response. For fluoxetine adjust the dose about every 4-6 weeks while Clomipramine (due to its shorter half life) can be adjusted about every 2-3 weeks. Common side effects include sedation, anorexia, hepatic disturbances or increased anxious behavior. With Clomipramine, there is also a concern about lowering the seizure threshold for those patients with previous history of seizures. Clomipramine can also lower TT4 levels and can result in urine retention as well as increase intraocular pressure.

Acute dosing medications commonly include the benzodiazepines (diazepam, alprazolam, lorazepam and clonazepam), Clonidine (an alpha 2 agonist) and trazodone (a serotonin receptor antagonist and weak reuptake inhibitor). Side effects of these medications include sedation and potentially an increase in aggression. Clonidine is dosed at 0.01-0.05 mg/kg prn or up to bid. The

benzodiazepines (BZD) have varying dose ranges and are often used to effect. The development of idiosyncratic hyperactivity is possible with the BZDs and can be managed by a dose adjustment or commonly by changing to an alternate BZD. Trazodone is dosed at 1-3 mg/kg prn or up to tid.

Psychopharmacology:
Might Medications Make Amends?

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Synapse physiology

- **Neurotransmitter** – remain within the synapse to transmit action potential to post synaptic membrane
- **Neuromodulator** – released into synapse in large amounts and diffuse out of synapse to affect the activity of numerous neurons
- **Hormone** – released by specialized cells into the circulation and affects a wide variety of cells, including neurons.

Synapse

Junction of pre-synaptic axon terminal button and the membrane of the post-synaptic neuron

Termination of post synaptic potential

- **Enzymatic Deactivation** – For example, the activation of acetyl cholinesterase to neutralize the activity of acetylcholine.
- **Reuptake** – Reabsorption of neurotransmitter into the pre-synaptic cytoplasm via membrane channels.

Principle neurotransmitters

- **GABA (gamma amino butyric acid)** – inhibitory neurotransmitter. Potentiated by benzodiazepines.
- **Glutamate** – excitatory amino acid.
- **Acetylcholine** – Wide distribution in the body. Many drugs have anticholinergic side effects (dry mouth, urine/fecal retention, cardiac arrhythmias)
- **Monoamines (dopamine, norepinephrine, serotonin)** found in midbrain, hypothalamus and limbic system. Tyrosine is precursor for Dopamine and Norepinephrine. Tryptophan is the precursor for Serotonin.

Considerations when using psychoactive pharmaceuticals

- Drugs are rarely the sole treatment method
- Rule out medical issues (pre and post treatment exams and lab work)
- Allow ample time for drug to take effect. Maximum effect for the TCA's, SSRI's, Selegiline and Buspirone can take as long as 6-8 weeks.
- Safety factors, side effects, lack of FDA approval. Consider signed informed consent
- Clear client communication before and after dispensing medication
- Caution with combination drug therapy particularly with drugs effecting serotonin (SSRI's, TCA's and MAO's)
- Serotonin Syndrome – excessive levels of serotonin causing increased blood pressure, tremors, decreased mental state, hyperreflexia, hyperthermia and restlessness.
- Dosage form (tablet, liquid, transdermal), frequency, ease of administration
- Clear knowledge of a few drugs
- Drug trial
    - Lack of desirable effect then choose drug from alternate drug class
    - If beneficial but side effects then alternate drug from same class

Pharmaceutical classes

Neuroleptics (chlorpromazine, acepromazine)

Act as dopamine antagonists at the basal nuclei and limbic system. Causes atarexia which is decreased emotional reactivity and indifference to stressful situations.

- Side Effects
- Sedation, alpha adrenergic blockade (hypotension), lowered seizure threshold and inconsistency of response.
- Applications:
- Tranquillization and reduced responsiveness (as an adjunct in treating storm phobias and night waking, for example)

Tricyclic antidepressants

Tricyclic Antidepressants (TCA's) block the reuptake of serotonin and norepinephrine from synapse causing higher levels of these neurotransmitters to remain in the synaptic cleft and to exert greater effect on the postsynaptic receptors. Clomipramine is the most serotonin specific of the TCA's.

Side effects

- Sedation, anticholinergic effects, cardiovascular effects (tachycardia, decreased blood pressure, arrhythmias), antihistaminic effects.
- Can also see increased anxiety or aggression. Potential hepatic effects (enzyme induction, hepatic necrosis)
- Less side effects seen with the SSRI's in terms of reduced anticholinergic or antihistaminic effects.
- Imipramine – Also has anti-enuretic effect making it useful in conditions where urine retention may be useful.
- Amitriptyline – Has significant antihistaminic effects and can be helpful when pruritic.
- Clomipramine – Most significant amount of serotonin re-uptake blocking activity.

Selective serotonin reuptake inhibitors

Selectively blocks the reuptake of serotonin into the pre-synaptic neuron causing an elevation of the hormone and increased binding to the post-synaptic receptors. This results in changes in protein production and receptor structure and alteration in learning potential.

- Less side effects than seen with TCA's. Primarily sedation and anorexia. May also see paradoxic increase in anxiety.
- Hepatic abnormalities and leukopenia
- *Longer half life than TCA's. Allow 6-8 weeks for maximum effect.*
- Fluoxetine (Prozac)
- Sertraline (Zoloft)
- Paroxetine (Paxil)

Benzodiazepines (diazepam, lorazepam, oxazepam, alprazolam, clorazepate)

Binds to GABA receptors and promotes inhibitory activity of GABA (cerebral cortex and limbic system). Has a short duration of behavioral effects.

- Sedation, cortical depression, muscle relaxation, idiosyncratic hepatic necrosis, and may interfere with learning.
- Lorazepam and Oxazepam metabolized via conjugation and not oxidation so are better choices in hepatic disease. Only BZD's without active metabolites.
- Discontinuation Syndrome – occurs after rapid withdrawal after chronic use. Rebound anxiety.
- Disinhibition – Caution if used in fear aggression. May cause increased aggression if animal is released from fear based inhibitions.

Miscellaneous agents

Monoamine oxidase inhibitors (Selegiline, Deprenyl, Amitraz)

Blocks the metabolism of monoamines (particularly dopamine) resulting in elevated levels of the amine. Do not use with TCA's and SSRI's to avoid excessive levels of monoamines.

Buspirone

- Blocks pre and postsynaptic serotonin receptors. Effect depends on existing serotonin levels.
- Low serotonin – blocks presynaptic reuptake
- High serotonin – blocks postsynaptic serotonin effects.
- Very Few Side Effects Noted.

Antihistamines (Diphenhydramine, Chlorpheneramine)

Primarily used for its sedative effects. Can be helpful for situations where mild relaxation is needed such as with night waking.

Note: Cyproheptadine can be used for spraying or other male dominated behaviors in cats. (anti-testosterone effects)

Anticonvulsants (Phenobarbital, Primadone, Phenytoin, Neurontin)

Can be used for overactive behaviors related to psychomotor epilepsy. Also used with feline vocalization, feline hyperesthesia syndrome.

Sedation and need for therapeutic blood level monitoring.

Progestins/estrogens (Medroxyprogesterone, megesterol, diethylstibesterol)

- Suppresses male stereotypic behavior (male aggression, urine marking)
- Diabetogenic, gynecomastia, mammary hyperplasia/adenocarcinoma, adrenal suppression, endometrial hyperplasia and pyometra.

Stimulants (Dexamphetamine, methylphenidate)

- Diagnosis and treatment of true hyperactivity or hyperkinesis (paradoxical calming effect)
- Stimulates CNS, increases HR, RR, anorexia, tremors, glaucoma, CV disease

Trazadone

- Classified as an SARI (Serotonin Antagonist and Reuptake Inhibitor)
- Often used as an adjunct to a TCA or SSRI
- Used mainly in anxiety related disorders
- Can also be used in the treatment of night time waking

Clonidine

- Classified as an alpha 2 agonist in that it tends to suppress monoamines in the brain (norepinephrine particularly)
- Often used on a prn basis and is given 2 hours before anticipated exposure to stimulus (thunderstorms, strange dog or person exposure, etc)

Application to behavior problems

Canine behavioral disorders

- Aggression
- Fears and Phobias
- Elimination Disorders

Conflict aggression

Is a learned set of behaviors in which the dog has learned to use aggression as a means of achieving desired goals. This can be cessation of certain activities (petting, movement, brushing, etc.) performed by owners or to obtain resources (food, resting areas, etc.). Punishment tends to create conflict in that the dog becomes more anxious in being not certain how various encounters will turn out with owners. At times the dog may receive attention and at others, punishment. Inconsistency makes this situation worse.

- SSRI's (Fluoxetine, Paroxetine)
- Benzodiazepines (alprazolam, lorazepam, diazepam) for episodic behaviors with predictable triggers.
- Clonidine also an option in these situations

Fear based aggression

Aggression that occurs as a response to perceived threatening stimuli. Aggression is rewarded by a successful outcome and increases the likelihood of aggression being used in future similar situations. Fear can be an inherited trait with aggression as a response developing over time. Inadequate socialization or use of punishment in an anxious dog can worsen the condition.

- SSRI's such as Fluoxetine, Sertraline (Zoloft) or Paroxetine (Paxil)
- Clonidine used prn for triggering situations
- *Avoid BZD's due to potential for disinhibition*
- *Clomipramine – Label exclusion for aggression*

Territorial aggression

Instinctual behavior in which a resource (territory) is guarded. Territory can be extended to attachment to owner during leash walks. Behavior is intensified as animal has more opportunities to practice without redirection. Intensified when behavior co-exists with fear based aggression.

- Use of SSRI's when fear or anxiety is a component of the territorial behavior
- Add Clonidine if insufficient improvement in anxiety using SSRI alone

Anxiety disorders

- Anxiety – Apprehensive anticipation of future danger. May be internally or externally derived.
- Fear – Feeling of apprehension associated with the presence or proximity of an individual, object or situation.
- Phobia – Profound and quickly developed fear reaction that does not diminish with gradual exposure over time. Profound, exaggerated responses (panic).

Separation anxiety

Symptoms of anxiety, distress or panic exhibited when animals are left alone. Characterized by pacing, drooling, vocalization, destruction, and elimination which are not related to other behavioral disorders.

- Tricyclic Antidepressants (Clomipramine, Amitriptyline) or SSRI
- Benzodiazepines (Alprazolam, Clorazepate) of panic at departure is a component of the behavior
- Add Trazodone of insufficient response to initial approach

Thunderstorm/Noise phobia

Overwhelming display of panic and anxiety in response to stimuli related to onset of weather disturbances (wind, rain, thunder, lightening, hail, etc.) or random noises. Behaviors often become anticipatory of triggering stimuli.

- Chronic Dosing: TCA's (Clomipramine/Amitriptyline), SSRI (Fluoxetine)
- Weaning Protocol: Decrease 25-50% if OK after 2-3 storms. Discontinue during off season if no sign of noise phobia
- Acute Dosing (When storm is expected): BZD (Alprazolam, Clorazepate), or Clonidine

Compulsive disorder

Repetition of a normal, species-specific behavior but occurring out of context and interfering with normal daily activities. Often is difficult for owners to easily interrupt and does not require the owners to be present for the behavior to be preformed (not attention seeking).

- Clomipramine - Work dose up to the higher end of the dose range for best chance of reducing CD.
- Fluoxetine

Elimination disorders

Urine marking

Depositing of urine on vertical surfaces (though can see horizontal marking) for the purpose of depositing pheromones for territorial or anxiety driven displays. Associated with mostly normal patterns for the elimination of urine and stool

- Clomipramine
- Fluoxetine (Particularly if aggression is a component of the behavior)

Feline behavior disorders

Fear based aggression

Aggressive behavior (hissing, growling, lunging, scratching) as a result of fear when placed in certain situations (presence of strangers, for example)

- Benzodiazepines (Lorazepam, Oxazepam)
- Buspirone

Territorial aggression

Occurs mostly as a means of defending territory when space is limiting factor. Commonly occurs when an adult cat is introduced to a household or when a resident cat returns from boarding or veterinary visits.

For the aggressor

- Benzodiazepines (Lorazepam, Oxazepam)
- SSRI (Paxil, Fluoxetine)

For the Victim (when fear response is increasing the aggression)

- Buspirone
- Benzodiazepines

Redirected aggression

Aggression which is directed at a stimulus other than the original target. Occurs commonly when an owner intervenes while the cat is aroused by stimuli such as stray cats on the property or during cat fights within the household.

- Benzodiazepines (Lorazepam, Oxazepam)
- Buspirone

Status related/Petting induced aggression

Aggression occurring when owners attempt assertive interactions with the cat (lifting, petting, remove from elevated surface). Can occur with cat soliciting attention.

Drugs are usually not utilized with this type of aggression.

Predatory aggression

Aggression characterized by premeditated stalking and attack of quickly moving stimuli. Is typically stealth (non vocal) in character. Similar to play aggression but without the animated components. Can be very severe and dangerous.

Very dangerous, though uncommon. Best to consider not keeping cat or devise strategy to avoid access to target. Drugs typically not indicated.

Intercat aggression

Aggression between cats of the same household or unfamiliar cats. Has its basis as fear, territoriality or redirected behavior.

For the aggressor

- Benzodiazepines (Lorazepam, Oxazepam)
- SSRI (Paxil, Fluoxetine)

For the Victim (when fear response is increasing the aggression)

- Buspirone
- Benzodiazepines

Housesoiling

Inappropriate litter box use as a result of problems involving “toileting issues”. Can include location aversion or preference issues and/or substrate aversion or preference problems. Isolation with preferred litter. Drugs not indicated.

Marking behavior

Characterized by the deposition of waste material (primarily urine) for the purpose of placement of pheromones due to territoriality or due to anxiety related circumstances in the household. Can be seen as vertical or horizontal marking.

- Clomipramine
- Fluoxetine
- Benzodiazepines (Lorazepam, Oxazepam)

Doses based from

Landsberg G, Hunthausen W, Ackerman L. *"handbook of behaviour problems of the dog and cat"* Butterworth and Heinmann, Oxford 1997 pg 195-198
(Some doses adjusted based on personal experience)

Clomipramine	1-3 mg/kg bid (dog) 0.5 mg/kg sid (cat)
Amitriptyline	1-6 mg/kg sid-bid (dog) 0.5-1.0 mg/kg (cat)
Imipramine	2.2-4.4 mg/kg sid-bid (dog) 1-2 mg/kg bid-tid (cat)
Fluoxetine	0.5-2.0 mg/kg sid (dog) 0.5-1.0 mg/kg (cat)
Sertraline	1-3 mg/kg sid to bid (dog)
Paroxetine	0.5-2.0 mg/kg sid (dog) 0.5-1.0 mg/kg (cat)
Alprazolam	0.02-0.10 mg/kg or 0.25-2.0 mg/dog bid-tid (dog)
	0.125-0.25 mg/cat bid or prn (cat)
	0.1 mg/kg tid or prn (cat)
Clorazepate	0.55-2.2 mg/kg sid-bid or prn (dog)
	0.55-2.20 mg/kg sid-bid or prn (cat)
Diazepam	0.5-2.2 mg/kg tid or prn (dog)
	0.2-0.4 mg/kg sid-bid (cat) – caution in cats due to possible hepatic necrosis
Oxazepam	0.2 mg-1.0 mg/kg sid-bid (dog)
	0.2-0.5 mg/kg sid-bid or 1-2 mg/cat bid
Lorazepam	1.0 mg (sm. dog) 2.0 mg (med. dog) 4.0 mg (Lg. Dog) bid or prn
	0.5 mg tablet – ¼ to 1 tablet per cat up to bid
Clonazepam	0.05-0.3 mg/kg prn to tid
Methylphenidate	0.05-0.25 mg/kg bid (dogs - narcolepsy)
	2-4 mg/kg bid-tid (dogs – hyperkinesis)
Dextroamphetamine	0.2-1.3 mg/kg prn (dogs)
Acepromazine	0.1-2.2 mg/kg sid-qid (dogs)
	0.1-2.2 mg/kg prn (cats)
Chlorpromazine	0.5-3.3 mg/kg sid-qid (dogs)
	0.5-3.3 mg/kg sid-qid (cats)
Promazine	1.0-4.4 mg/kg prn (dogs)
	2.0-4.0 mg/kg prn (cats)
Haloperidol	1- 4 mg bid
Diphenhydramine	2-4 mg/kg bid-tid or 0.5-5.0 mg/dog tid (dog)
	2-4 mg/kg bid-tid (cat)
Chlorpheneramine	2.2 mg/kg bid-tid or 0.2-0.8 mg/kg tid (dog) (max. 1 mg/kg/24 hrs)
	2.2 mg/kg bid-tid or 0.4-0.7 mg/kg (cat)
Cyproheptadine	0.3-2.0 mg/kg bid (dog) 2-4 mg/cat bid-tid (cat)
Buspirone	1-2 mg/kg sid-tid (dog)
	0.5-1 mg/kg sid-tid (cat)
Deprenyl	0.5 mg/kg sid (Cognitive Dysfunction)
	1-2 mg/kg sid (Cushing's Disease)
Trazodone	3-5 mg/kg initial dose range prn or up to tid. 16 mg/kg/day max.
Clonidine	0.01-0.05 mg/kg prn given 2 hrs before exposure up to tid

Resource Guarding:
What's Mine is Mine and What's Yours is Mine

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The focus of the discussion

- Which individual in a dyad (pair of animals) is considered to be dominant in the relationship?
- What criteria is used to make that determination (acquisition of resource vs. defense of resource)?
- Does aggression over the control of resources equate with dominance based aggression?

"Dominance: the assertion of one member of a group over another in acquiring access to a piece of food, a mate, a place to display, a sleeping site or any other requisite that adds to the genetic fitness of the dominant individual…" E.O. Wilson from Sociobiology: The New Synthesis Belknap Press of Harvard University Press, 1975. pg 257

Resource holding potential

"……examples of "aggressiveness" are far more likely to represent long-term differences in subjective resource value." Hurd PL. "Resource holding potential, subjective resource value, and game theoretical models of aggressiveness signaling." J Theor Biol. 2006 Aug 7;241(3):639-48. Epub 2006 Feb 9

"Dominance is a concept found in traditional ethology that pertains to an individual's ability, generally under controlled conditions, to maintain or regulate access to some resource." Karen Overall ("Clinical Behavioral Medicine for Small Animals" Mosby 1997. pg. 115

"Relative dominance is usually tested by giving two dogs access to one bone. The dog that gets possession is considered the higher-ranking dog." Katherine Houpt ("Domestic Animal Behavior for Veterinarians and Animal Scientists" Iowa State U. Press 1982 pg 65)

"…a single bone was brought in, shown to the puppies, and laid between them…."
"…we defined a completely dominant animal as one that kept possession of the bone the majority of the time and was able to repossess it at will." John Paul Scott and John L. Fuller ("Dog Behavior: The Genetic Basis" The University of Chicago Press 1965 pg. 156)

"The dominant dog shows a self-assured gait, a large, confident body posture, raised head, raised ears, large eyes and curled lips, all in different intensities and combinations depending upon the degree of dominance, superiority, or self-confidence." Roger Abrantes ("Dog Language" Wakan Tanka Publishers 1997 pg. 93)

"…Once everyone knows his place, the alpha male need only move toward a lower-ranking male to have that individual hurry out of the way or otherwise signal submissiveness…" John Alcock ("Animal Behavior" Sinauer Associates, Inc. Publishers 2005 pg. 332)

Equal opportunity tests (EO tests)

"In equal opportunity tests (EO tests), both members of a pair had equal chance to seize the bone when it was tossed into the arena" Beach, Beuhler and Dunbar ("Competitive behavior in male, female, and pseudohermaphroditic female dogs." J Comp Physiol Psychol. 1982 Dec;96(6):855-74)

Established possession tests (EP tests)

"During an EP test, the loser of the preceding EO test was given possession of the bone before the former winner was returned to the test arena" Beach, Beuhler and Dunbar ("Competitive behavior in male, female, and pseudohermaphroditic female dogs." J Comp Physiol Psychol. 1982 Dec;96(6):855-74)

"…for a meaningful formal test of dominance, and to rule out differential motivation as a confounding factor contaminating the results, both animals must be motivated equally for the same resource." Wendy van Kerkhove ("A Fresh Look at the Wolf-Pack Theory of Companion-Animal Dog Social Behavior" JOURNAL OF APPLIED ANIMAL WELFARE SCIENCE, 7(4), 279–285)

"A reasonable hypothesis is that the physical restrictions and limitations of captivity define environmental circumstances, engendering the formation of dominance hierarchies in wolves. Much the same might be said for dogs living together in a household." Wendy van Kerkhove ("A Fresh Look at the Wolf-Pack Theory of Companion-Animal Dog Social Behavior" JOURNAL OF APPLIED ANIMAL WELFARE SCIENCE, 7(4), 279–285)

Possessive aggression

Aggressively guarding or maintaining control of a valued object (bone, chew item, stolen items or food, etc.). Guarding is considered to be normal behavior but can increase with opportunities for learning or can be exaggerated as a consequence of fear or defensive behavior/conflict.

"….food guarding was the most common circumstance for bites to familiar children (42%) and territory guarding for bites to unfamiliar children (53%). Behavioral screening of the 103 dogs examined revealed resource guarding (61%) and discipline measures (59%) as the most common stimuli for aggression." Reisner IR, Shofer FS, Nance ML; "Behavioral assessment of child-directed canine aggression." Department of Clinical Studies, School of Veterinary Medicine, University of Pennsylvania, Philadelphia, PA 19104-6010, USA.

- Food Guarding
- Resource Guarding
- Possessive Aggression

These are all terms describing the use of aggressive behaviors to maintain possession of valued items.

The aggression can be directed towards humans or other animals.

Items can include anything which motivates an individual animal. In companion dogs these can be:

- Food
- Bones
- Rawhide
- Stolen Items

Possessive aggression

The sphere of guarding (critical distance in which a dog may react to approaching individuals) can increase over time to the point of the animal guarding a space that the valued object is contained within

The behavior can be seen concurrently with Conflict Aggression and Territorial Aggression

Punishment or forced removal of items or food can increase the likelihood of the animal escalating aggressive displays to maintain control of items. This fear based response can result in the aggressive guarding of benign items that may not contain the same value as the original objects possessed by the dog

The aggressive behaviors can be directed to both familiar and unfamiliar individuals when the appropriate circumstances exist to motivate the guarding response.

Fear based body postures may be present initially but over time, as the dog learns the value of using aggression, body language may appear more confident.

Other possible diagnoses

- Disease Conditions - Is there a medical condition causing the dog to use aggression to prevent pain inducing activities
- Conflict Related Aggression - Does the aggression extend to other situations where the dog is using aggression to have an individual cease certain activities
- Dominance Related Aggression - Does the dog displace another individual from a valued resource?

Medical examination

Always begin with having the animal evaluated medically and appropriate testing should be performed. Conditions which cause pain or conditions which increase appetite may result in an increase in food acquisition and guarding behaviors.

Treatment

- Avoid known triggers (secure food, control access to toys and highly valued items, isolate during feeding and feed small meals)
- Consistent periods of play and exercise
- Avoid confrontation over retrieval of objects
- "Nothing in Life is Free" routine in order to increase consistency of interactions and put control of resources in owner's hands
- Provide alternate items and activities, especially at high risk times, to substitute for the animal focusing on other valued items
- Trade for valued items that must be retrieved
- Utilize a leash and head collar to facilitate redirecting the dog's behavior when needed

Once the level of tension has reduced between the dog and owner, if desired, the owner can work on teaching:

- "Drop It" and "Leave It" commands for managing object possession
- Desensitization to the presence of the owner around the food bowl in order to manage food guarding behaviors

Possessive Aggression is typically managed and controlled and not cured. As with most forms of aggression, the only guarantee can be made with a recommendation of euthanasia. Short of this option, the owner is always accepting some degree of risk.

Separation Anxiety:
Can't You Just Quit Your Job?

John Ciribassi, DVM, DACVB
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Carol Stream, IL

Symptoms of anxiety, distress or panic exhibited when animals are left alone. Separation anxiety can be characterized by pacing, drooling, vocalization, destruction, and elimination which are not related to other behavioral disorders. All or some of these behaviors can be present.

Behavioral symptoms

- Monotonal Vocalization/Barking - Typified by barking and whining which begins soon before or after departure and persists for a large percentage of the time the dog is alone. Often is reported to the owners by neighbors.
- Inappropriate Elimination - Depositing of urine and/or stool in various locations around the home (as opposed to in a single, consistent location). Only occurs when the dog is alone or perceives that they are alone. Stool may be abnormal in appearance (is commonly mucoid).
- Destructive Behavior - Characterized by damage to exit points from the home (doors and windows) or destruction of personal items (pillows, clothing, remote control units). Confinement in a cage often escalates the destruction and can result in injury to the animal (tooth or toenail fracture for example)
- Hypersalivation - Is often considered to be highly suggestive of separation anxiety when the behavior is restricted to those times when the dog is alone or perceives to be alone.

Data collection

- Physical Examination
- CBC
- Chemistry Profile
- Thyroid Profile
- Urinalysis
- Fecal Exam

Behavioral history - who, what, when, where

Who is present at the time of the behavior (is the pet alone or are there people present), before the behavior begins (departure) and afterwards (arrival).

Who is the primary caretaker of the animal and how does the pet interact with this person (follows the person or is willing to be voluntarily separated from that person)

Describe the behavior. What does the pet do when alone? Videotaping the dog's activity when alone can help to verify whether the pet appears anxious (panting, pacing, etc)

When does the behavior occur? Is the pet alone or does it perceive to be alone (while owner is sleeping or in the shower, for example). Or does the pet have full access to the owner when the behavior occurs.

Where does the behavior occur? Are the behaviors directed toward exit points or are there multiple locations vs. single locations in the home.

Previous history

- Age of onset and character of the behavior at onset
- Changes in the pet's environment at onset such as a move, work schedule change, or loss of a house member
- Treatments attempted previously and outcome

Medical differential diagnosis

Hypersalivation

- Dental Disease
- Oral Foreign Body
- Oral Toxin
- GI Distress
- Medical Differential Diagnosis

Vocalization - any condition resulting in pain

- Otitis

- Osteoarthritis
- Dental Disease
- Severe Dermatitis
- Etc

Inappropriate elimination

- Lower Urinary Tract Disease
- Diabetes Mellitus
- Cushing's Disease
- Renal Failure
- Colitis
- Inflammatory Bowel Disease

Behavior differential diagnosis

Hypersalivation

- Only known behavioral cause of hypersalivation is anxiety, most commonly separation anxiety

Vocalization

- Territorial Behavior
- Attention Seeking Behavior
- Hyperactivity
- Play Behavior
- Behavior Differential Diagnosis

Destructive behavior

- Normal Puppy Behavior
- Exploratory Behavior
- Food Acquisition Behavior

Inappropriate elimination

- Failure to Housetrain or Loss of Housetraining
- Marking Behavior

Co-morbidity

- High probability of dogs with noise phobia or thunderstorm phobia to also have separation anxiety
- If any of these conditions are present in a pet, carefully evaluate the animal for the other conditions

Treatment

The overall goals of treating separation anxiety are to reduce dependence on the owners…..

Attention seeking behavior

Owners should not respond in ANY way to the pet's attempts to get attention from them by such behaviors as barking, whining, jumping up, pawing, etc. They should not look at, talk to or touch their dog at these times. Expect the behavior to initially get worse and more physical.

Departure and arrival routine

Have the owners ignore the dog for 30 minutes prior to leaving home. This is meant to prevent inadvertent reinforcement of anxious behavior as they prepare to leave.

Ignore dog upon arrival until it is relaxed

Arrival routine

The owners should not interact with their dog when they arrive home until the pet is completely calm.

Distraction at departure

Use a Kong Toy stuffed with a treat, or some similar product, at the time of departure. This is meant to distract the dog away from the act of the owners departing from the home. The toy should be given approximately 5-10 minutes before departure.

Use of punishment

The owners should not use physical or verbal punishment in response to destructive behavior or elimination. These behaviors are symptoms of anxiety and punishment, especially after the fact, will increase the level of anxiety.

Uncoupling departure cues (habituation)

This refers to making a list of activities the owners perform prior to leaving home which signals to the pet that they are leaving and results in the dog getting more and more anxious. These activities are then performed at times when there is no intention of leaving the home.

Indoor relaxation exercises

Have the owners train the dog to assume a calm, relaxed behavior during gradually increasing periods of separation. This is commonly done when moving casually from room to room.

Graduated departure exercises

Have the owners train the dog to assume calm, relaxed behavior during gradually increasing periods of separation as they leave the home. They may need a "bridge" cue to signal "safe" departures.

Exercise

Consistent exercise in the form of walks and play can serve to reduce anxiety by decreasing the dog's focus on the owner's departure from the home.

Anti-anxiety medication

The judicious use of medication can decrease the overall level of anxiety and enable the pet to respond better to the behavioral tasks just outlined

Clomipramine

- A Tricyclic Antidepressant (TCA) that functions primarily to elevate the levels of serotonin and norepinephrine in the synaptic cleft of brain neuropathways
- 1-4 mg/kg bid
- Allow at least 2-4 weeks for onset of action
- Expect sedation and anorexia as common side effects. Increased anxiety, aggression and hepatic disturbances are less common
- Preliminary CBC/Chemistry Profile and Thyroid Panel pre-treatment
- CBC/Chemistry Profile 4 weeks post-treatment
- Allow 2-3 months on the medication with the behavior being relatively normal
- Begin weaning by decreasing the dose by 25% every 3-4 weeks until off the medication or when symptoms return. Then return to the previously effective dose.

Fluoxetine

- Fluoxetine is a Selective Serotonin Reuptake Inhibitor (SSRI). Only has an effect on Serotonin and not on other neurotransmitters
- 1-2 mg/kg SID
- Allow at least 6-8 weeks for onset of action
- Expect sedation and anorexia as common side effects. Increased anxiety, aggression and hepatic disturbances are less common
- Preliminary CBC/Chemistry Profile and Thyroid Panel pre-treatment
- CBC/Chemistry Profile 4 weeks post-treatment
- Allow 2-3 months on the medication with the behavior being relatively normal
- Begin weaning by decreasing the dose by 25% every 4-6 weeks until off the medication or when symptoms return. Then return to the previously effective dose.

Benzodiazepines

- These are typically used in Separation Anxiety to treat panic behavior seen at time of departure to help ease the transition
- Diazepam (Valium)
- Alprazolam (Xanax)
- Clorazepate (Tranxene)

All have short onset, short half-lives and are used in conjunction with TCA's and SSRI's

Trazodone

- It is a serotonin agonist at 5HT1A receptor and a weak serotonin reuptake inhibitor.

It is unclear which of these effects is responsible for the reduction in anxiety that occurs with its use.

- 1-3 mg/kg dose either as needed or up to 3 times per day
- Begin at the low end of the dose range for 3 days then increase dose gradually as needed
- Can be used along with an SSRI or TCA but use carefully to minimize possible side effects
- drowsiness, nausea/vomiting, headache and dry mouth, dizziness, constipation, urinary retention
- Hypotension, tachycardia, syncope, arrhythmias

Factors effecting outcome

- The older the patient at the time of onset or presentation, the poorer the prognosis
- Multiple diagnoses will decrease the prognosis

- The ability of the owners to follow through on recommendations
- The ability to administer medication and the patient's response to that medication
- The living situation of the owners (neighbor complaints or degree of damage to the home)

Sibling Rivalry:
When Roommates Come to Blows

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Risk factors

Household instability

- One or more dogs in household achieving social maturity (1-3 years)
- New pet or person added to home
- Illness in one or more pets in the home
- Pet returning from an absence
- History of one or more dogs in the home of having poor early socialization with dogs (genetics, early health issues, inadequate exposure)
- Anxiety related condition(s) in one or more dogs in the home (Separation Anxiety, Noise Phobia, CCD, General Anxiety, Fear Based Aggression, Conflict Aggression)
- Medical condition causing irritability (Otitis, Dermatitis, etc.)
- Deprived environment (fewer than ideal resource load; food, resting areas, owner interaction
- Same-sex pairs in the home.
- Most commonly females. Particularly in spayed females
- Young dogs being added to a household or dogs rehomed to a household are more likely to initiate fights

Typical history

- Often between two specific dogs even in a multiple dog household (>2 dogs in the home)
- Various stimuli
- Excitement in the home (greetings, passing through narrow openings, territorial barking, laughter or arguing in the home or running through the home)
- Resources (food, owner attention, toys, space) – recognize the relative value of the items to each individual dog in the household (**Resource Guarding Potential**)
- Hierarchy conflicts – behaviorally appropriate dogs are similarly motivated to maintain or acquire access to similar resources.
- Competition can be over one specific person in the home
- Owners undermine appropriate social structure between the dogs
- Aggressor may persist in attacks even if victim offers proper deferent signaling

Differential diagnosis

- Medical conditions
- Dominance Hierarchy – Resource Related
- Anxiety Related
- Redirected aggression
- Play Related Aggression

Differential diagnosis

Commonly seen with newly introduced housemates

- Fear Based Aggression
- Territorial Aggression

Typically increased social contact between housemates diminishes the likelihood of these interactions. However, socially inept dogs may show a reduced inability to adapt to prolonged exposure and continue to display behaviors more common with contact between unfamiliar dogs.

Medical conditions

Any condition which causes increased pain or irritability can increase the likelihood of an aggressive response between dogs

- Otitis Externa
- Osteoarthritis
- Dermatitis

Dominance hierarchy – Resource related

If there is equal motivation between dogs in a household over the acquisition or holding of a resource we can see an escalation of aggression between those individuals. Commonly a factor between intact males in the same household.

Equal opportunity and established possession testing

Anxiety related

- Behaviorally inappropriate dogs
- Do not adequately recognize normal signaling in other dogs (deference cues such as lip licking, yawning, turning away, moving away or exposure of underbelly, for example)
- Excessively reactive. More likely to target another dog in the home in situations characterized by high arousal (exposure to excitement stimuli)
- Can have poorly inhibited bites

It is critical to recognize, in these instances of aggression between dogs in the same household in which the attacker is socially inappropriate, the victim's quality of life may suffer greatly. These dogs are doing everything they know how to diffuse the aggression and communicate deference or submission to the attacker but the attacks persist.

Stress escalates when the individual has minimal control over the outcome of a situation. This chronic stress results in continued activation of the Hypothalamic Pituitary Axis and thus prolonged cortisol exposure for the victim.

Redirected aggression

- The victim of the attack is the secondary target. The attacker cannot access the primary focus (another dog passing the home, for example, and then targets the other dog in the home which is more available.
- Can result in extreme fear in the victim, who can respond in a likewise aggressive manner thus escalating or maintaining the aggressive relationship between the dogs

Play based aggression

- Typically occurs between younger dogs
- Bites are usually inhibited so that significant injury does not occur
- Frequent reversal of roles during fights such that each dog will take turns showing dominant displays (mounting or biting over the dorsal aspect of the neck, for example)
- If excessive, can escalate to more serious encounters necessitating the owners to intervene

Fear based aggression

- Fearful animals may elect to utilize aggressive responses in order to manage or cope with stressful situations involving new dogs in a household
- May be initiated by the newcomer or the resident dog
- Depending on the age and experience of the fearful animal you may or may not see typical fearful signs (tail tucked, cowering, ears down and back, etc.) Dogs with a longer history of fear based aggression may have abandoned these postural strategies due to perceived ineffectiveness and now depend on aggression as a better coping response.

Territorial aggression

- Resident dog responds to newcomer by preventing access to valuable space.
- May be the home itself, certain areas of the home, the yard or valued sleeping areas.

Prognosis

- The likelihood of a successful outcome is good if both dogs are behaviorally appropriate, if resources can be identified, and the resources can be adequately managed.
- Prognosis is poor if one or both dogs are behaviorally inappropriate (anxiety or fear is a component of the behavior), particularly if response to medication is inadequate
- Prognosis is also poor if aggression occurs immediately whenever dogs come into sight of one another….

Diagnostic evaluation

- Physical Exam
- Neurologic Exam
- CBC, Chemistry Profile and Thyroid Screen
- Further labs as indicated by basic work up

Questions

- Household composition
- When aggression began
- Frequency
- How are resources managed between the dogs
- How do dogs interact outside of aggressive episodes
- How do fights occur. Give examples from most recent to previous fights as well as description of earliest fights.
- How do the fights resolve
- Are there injuries

The most important question is which dog, if any, is acting appropriately in the interactions. In this way, the attention can be centered on the correct dog. That may be changing the response of the dog acting inappropriately in the relationship or, if both dogs are appropriate, managing the resources in the household.

Treatment

- Manage resources (food, toys and attention) – "dogs are not best thought of as a pack in a home environment. They are best thought of as roommates who need to learn to share"
- Identify all situations which trigger aggression and avoid these triggers or separate the dogs at these times
- Safety
- Provide owners with means to break up fights (head collars with drag leashes, blankets, air horns, water, instruct in removing dog by pulling on rear legs)
- Isolate pets when unsupervised
- Address triggers (food, toys, resting areas, access to owners)
- Feed dogs separately
- Do not leave toys out but apportion them as needed
- Deny access to elevated surfaces and have dogs resting remotely away from owners (on mats or dog beds, for example)
- Basket Muzzles

These can be used whenever there is a higher likelihood of aggression between the dogs where the owners are not as likely to be able to quickly intervene. Can result in increased comfort for the owner in knowing the dogs are at least safe from severe injury.

- Separation with gates or tethers
- Used when dogs cannot be closely supervised
- NILIF or "SIT" protocol
- Goal here is to increase the dog's attention to the owner for direction
- Regular periods of basic training (clicker training)

By increasing the dog's level of responsiveness it allows the owner better ability to direct their dog's behavior and therefore having them show less focus on each other. A good recall is important in that it gives the owner the ability to call the dogs away in potentially problematic situations.

- Have owners ignore BOTH dogs if owner attention is causing hierarchy issues between the dogs

The goal here is to reduce the value of the owner as a resource for either dog. Increased owner attention to either dog (as opposed to trying to figure out which dog is higher ranking with respect to this particular resource) can escalate the owner's value and thus increase conflict and also elevate emotionality in the home (problematic for the behaviorally inappropriate dog).

- Support higher ranking dog?

There are several problems with this approach

- Difficulty for owners to identify accurately
- Owners may be reluctant to demote an older, favored dog
- Dogs who are behaviorally inappropriate may not be signaling correctly and thus owners red these dogs incorrectly thus favoring a dog who is showing aggression at the wrong times and putting the victim in a difficult situation
- The aggression in the household may not involve hierarchy at all

Response substitution (operant counter conditioning)

- This involves interrupting the dog and then redirecting to more appropriate sets of behaviors (that the owners have been rehearsing with the dog on a regular basis in non-distracting situations) and reinforcing those behaviors.
- Does not reinforce the aggression since the dog is being relocated and not reinforced until it complies with a request to perform an alternate behavior. We are **conditioning** a behavior that is **counter** to the problem behavior.

Counter conditioning and desensitization to graded triggers such as sounds in the environment

If there are triggers which can be identified as causes of the aggression, and the intensity of these triggers can be adjusted, the owners can gradually expose the dog(s) to the trigger at slowly increasing levels (desensitization) while asking the dog to perform more appropriate competing behaviors (counter conditioning).

Example: Door bell triggering excessive greetings and resulting aggression.

Reintroduction

In some cases dogs have to be separated for an extended time while owners work on getting consistent responses from each dog separately and each dog learns it will receive positive rewards for attending to the owner. This would be needed if the dog's cannot be in each other's company without immediately reacting.

Once each dog is responding well separately from each other, then they can be reintroduced on walks. First at a comfortable distance while going through training individually then gradually decreasing the distance between them as they adjust.

Treatment

If treatment proves to be unsuccessful, other options include:

- Rehoming
- Permanent Separation of the dogs
- Euthanasia (particularly if one of the dogs is behaviorally inappropriate)

Should dogs "fight it out"?

In one study, 42% of dog fights did not require intervention to break them up.

However, if there is a history of injury to either of the dogs involved in fighting, it would be inappropriate to allow them to continue to fight without intervening. The injuries demonstrate that the dogs have been unable to arrive at a mutually beneficial agreement over partitioning or resources. If the fights are motivated by fear or anxiety in behaviorally inappropriate dogs, they will be incapable of regulating the level of violence and injuries are likely.

In these cases, owners need to learn how to safely break up fights

Options in breaking up dog fights

- Wheelbarrow the attacker by picking up the rear legs and lifting while moving back and to the side
- Compressed air or citronella
- Water
- Sudden noises such as with pot lids
- Board to wedge between the dogs
- Blankets or cushions
- Leashes attached to both dogs (with or without a head halter)

Drug therapy

- ONLY if one or both dogs are abnormal in terms of fear/anxiety
- SSRI (05-2.0 mg/kg SID)
- Fluoxetine
- Sertraline
- Paroxetine
- Selegiline if Canine Cognitive Dysfunction (1 mg/kg SID)
- As Needed Options
- Clonidine (0.01-0.05 mg/kg 1-2 hours before needed or up to tid)
- Trazodone (3-5 mg/kg 1 hour before needed up to tid)
- Benzodiazepines (not indicated in fear based aggression due to the possibility of disinhibition).

Pre-treatment blood work

CBC/Chemistry profile/Thyroid profile

Post-treatment blood work (4-8 weeks post onset of therapy)

CBC/Chemistry profile

- Pheromones (Adaptil)
- Neutraceuticals such as Anxitane

Surgery (if hierarchy related)

- Castration
- OHE? No indication that OHE is successful at reducing aggression between females in the same household.

Client education

- Discuss canine body posturing and communication methods
- Regular communication with client to enable adjustment of treatment plan

Prevention

- Add dogs to home of different genders and ages
- Regulate access to resources
- Castration to help prevent intermale aggression
- Proper socialization
- Puppies stay with litter until about 8 weeks of age
- Socialization classes between 8-14 weeks of age and reward based obedience class at around 4-6 months of age

Beyond the Water Pistol:
Treating Feline Behavior Problems

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In an age of quick fixes and television animal trainers, it is tempting to simply punish our companion animals for performing unwanted behaviors. However, as veterinarians we should be encouraging our clients to explore underlying motivations for any behavior that is ostensibly pestering, unusual, or a sudden change from a previous behavior pattern. These issues could be an indicator of medical problem or indication of a more serious anxiety or social stress concerns. Once the human-animal bond has been damaged, a pet owner is less likely to choose optimal treatment plans for any condition. We will review the presentation and treatment of several of the most common feline behavior problems seen at a referral teaching hospital's behavioral service.

Inappropriate elimination is a term often used to describe eliminating outside of the litter box. It is very important to distinguish between marking and toileting. The former is a social stress issues and the latter is primarily a problem with the litter box environment. Inappropriate elimination will not be discussed in depth in this lecture, but conditioning through external punishment and rewards is rarely helpful or needed in the treatment of house soiling. Ensuring proper urinary health and providing the appropriate litter box environment is the only necessary treatment for this issue. Urine marking/spraying can be a very frustrating problem and treatment involves decreasing social tension through behavior modification and often psychoactive medications.

Scratching is a common behavioral reason for euthanasia or relinquishment to shelters. Although proper pain control and surgical technique can decrease discomfort associated with a declawing, this procedure will always be considered a controversial and/or unethical mutilation. In most situations scratching can be easily directed to specific locations. The functions of scratching behavior include nail health maintenance, territorial marking (visual and scent), and possibly an attention-seeking behavior in our pet cats. Owners can do a lot to minimize unwanted scratching by keeping their cats' nails well trimmed, and providing appropriately placed, stable scratching posts. Posts or horizontal scratching surfaces should be placed in high traffic areas in the home. Appropriate deterrents like double-sided tape or compressed air remote punishers can be effective, but only if combined with the provision of appropriate substrates.

Aggression towards people and other household cats is another common presenting complaint to our service. Aggression to other cats can be motivated by fear, status, territory, play, or redirected from another target. Cats may show aggression to people most commonly out of fear/pain, redirection, petting-intolerance, play, and status. Proper diagnosis of the problem should begin with a thorough physical exam. Any condition that increases irritability could potentially lower the threshold for aggression. Pain and pruritus, as well as metabolic and organ dysfunction causing vague feelings of discomfort could be a contributing factor to anxiety and aggression. Cats can become stoic or very fractious in the exam room, making pain and hyperesthesia particularly challenging to adequately assess in the clinic. Veterinarians should ask the cat owner specifically about any changes in behavior that may indicate pain. Owners rarely volunteer this information as they think these behaviors are just part of the cat's personality quirks. Therefore, veterinarians must make a thorough behavioral history part of every appointment. In additional to changes in behavior, owners of aggressive cats should be queried on targets of all aggressive episodes, the progression of the problem, relationship to all people and animals in home, and any triggers of fear and anxiety.

Proper treatment of aggression is rarely a quick fix. Separation of fighting cats is often inconvenient, owners may be unable or unwilling to avoid triggers, and behavior modification can be too time consuming. Therefore, aggression is another common use for aversive treatment without much thought to etiology and proper consideration of the side effects posed by aversive corrections. Most aggression is motivated by fear or apprehension so treatment should involve changing this underlying emotion and not just suppressing the behavioral symptoms of this fear. Aversive punishments may cause an increase, not decrease in the aggression by ratcheting up the fear. Also, the people, animals, and locations associated with the punishment can themselves start to trigger fear in the cat.

Nighttime waking should always be treated with the utmost urgency. Clients' lack of sleep quickly leads to euthanasia or rehoming of any pet causing the nighttime disturbance. A sudden onset of the behavior could be caused by underlying medical (e.g. pain or metabolic condition), but the problem may be a lax circadian rhythm, which typical in housecats. A change in feeding and activity imposed by owners can help remedy the problem. Also clients must understand basic operant conditioning principles – providing food or attention at these times positively reinforces the attention-seeking behavior. Psychoactive medications, deterrents and sound blocking tools may be helpful tools for households. Factors such as age-related cognitive decline can be addressed with additional medications.

Excessive vocalization like any behavior can be caused by underlying medical issue, inappropriate rewarding of the behavior, and genetic predisposition. Clients should be counseled on realistic goals for a highly vocal individual cat, although some recommendations can be made to help the client manage the problem at certain times.

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Kong Company http://www.kongcompany.com/products/cats/treat-dispensers/
Pipolino http://www.pipolino.ca/eng/
Cat puzzle boxes
    Smart Cat, Peek-a-Prize, Cat Amazing-the Best Cat Toy Ever (www.amazon.com)
Cat Shelves www.catsplay.com, The Refined Feline, or any floating bookshelf
Video Catnip www.videocatnip.com and Cat TV www.cattv.com
Fencing
    Purrfect Fence www.purrfectfence.com
    Cats on Deck www.catsondeck.com
    www.paws.org has other products
Sticky Paws www.stickypaws.com
Spray deterents
SSScat spray www.petsafe.org
Scarecrow www.smarthome.com
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    wood post, e.g. www.lovethatcat.com

From Acepromazine to Trazodone: Choosing the Right Medication for Specific Triggers

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Fear and anxiety are the primary emotions underlying most serious animal behavioral disorders. Psychoactive medications can be a critical tool in reducing anxiety and are best used in conjunction with behavior modification and environmental management. In addition, physical conditions may contribute to behavioral signs of anxiety or alter the choice of medication. Therefore, accurate behavioral diagnosis obtained from a thorough history and observation, and proper health screening for any additional medical conditions should be conducted before initiating psychoactive therapy. Once it has been determined drug therapy is indicated, several factors can help guide a clinician in choosing the best drug or drug combinations. The intensity of the fear reaction and the owner's ability to predict and control fear-producing stimulus exposure may influence the choice of medication used in a particular patient. Most of the psychoactive medications used in veterinary medicine alter the fear neurocircuitry by modulating one or more neurotransmitters. Certain medications, like most antidepressants (selective serotonin reuptake-inhibitors (SSRI) or tricyclic antidepressants (TCAs)), moderately reduce anxiety through a slow-acting cascade. These can be helpful to augment severe anxieties, but are not typically the first line as a monotherapy for specific events. The focus of this presentation will be medications that are best used primarily for specific, predictable fear-producing triggers for clients to use in the home setting, although suggestions for veterinary administered medications for clinic sedation will be reviewed.

Various neurotransmitters can contribute to feelings of fear and panic. Norepinephrine (NE) is a catecholamine largely responsible for behavioral arousal when the sympathic nervous system is activated. Beta-adrenergic antagonists (e.g., propranolol and pindolol) can block the peripheral effects of NE and alpha-2 agonists (e.g., dexmedetomidine and clonidine) are centrally-acting inhibitors of norepinephrine release. Both are, therefore, used to treat the physiologic and behavioral responses associated with the autonomic "fight or flight" activation. These medications should be avoided in patients with cardiovascular disease or other severely compromised patients. The mechanism of the antipsychotics/neuroleptics is inhibition of another catecholamine neurotransmitter, dopamine. The result is a general depression of the CNS that causes deficits in cognition, awareness, and motor function. It is debatable whether these medications truly reduce anxiety. Nonetheless, acepromazine may be acceptable when inhibition of motor output is the primary goal. Hypotension, bradycardia, and extrapyramidal signs are possible adverse effects of acepromazine. Serotonin (5HT) is a monoamine neurotransmitter like the catecholamines. The most popular serotonin-altering medications in veterinary medicine are the SSRIs and TCAs, which block the serotonin reuptake transporter on the presynaptic neuron. However, trazodone, an atypical antidepressant that primarily antagonizes the 5HT2A receptor, has become an extremely popular trigger-specific medication as well as an adjunctive maintenance medication. Although rare, the most common side effects with trazodone are cause agitation and aggression. Serotonin syndrome is also possible but rare with this as a monotherapy.

Drugs that affect gamma-amino-butyric-acid (GABA) are some of the most effective and powerful anxiety-reducing medications. The benzodiazepines, such as diazepam, alprazolam, and clonazepam agonize GABA-A receptors, facilitating neuronal inhibition. In addition, to anti-anxiety effects, these medications are also anticonvulsants and may increase sedation and hunger. The GABA-analog gabapentin can also be used as an anxiolytic. Although benzodiazepines can be a very useful class of medication in decreasing anxiety, they do have some undesirable properties. Oral diazepam should be avoided in feline patients due to the potential for hepatic necrosis. All benzodiazepines can cause paradoxical excitement and disinhibition of aggression. To monitor for adverse reactions, a trial dose of ANY situational medication should be administered prior to exposure to the trigger.

Various natural supplements containing supplements such as l-theanine, melatonin, alpha-casozepine, or *Magnolia* and *Phellodendron* botanic extracts have also been shown to reduce anxiety-related behaviors in some controlled studies, possibly by modulating the GABA or glutamate systems.

Common psychoactive drug doses

Benzodiazepine	*Dog*	*Cat*
Alprazolam (Xanax)	0.02-0.1 mg/kg q4h	0.0125-0.25mg/kg q8h
Clonazepam (Klonopin)	0.1-0.5mg/kg q8-12h	0.015-0.2 mg/kg q12
Clorazepate (Tranxene)	0.5-2.0mg/kg q4h	0.5-2.0 mg/kg q12 h
Diazepam (Valium)	0.5 mg/kg q4h	0.1-0.4 mg/kg q12h
Flurazepam (Dalmane)	0.1-0.5 mg/kg q12h	0.1-0.4 mg/kg q12 h
Lorazepam (Ativan)	0.02-0.5 mg/kg q8-12h	0.03-0.08 mg/kg q12h
Oxazepam (Serax)	0.04-0.5 mg/kg q6h	0.2-1.0mg/kg q 12-24h

- Oral diazepam linked to idiopathic hepatotoxicity in cats
- Oxazepam, lorazepam fairly low in potentially damaging metabolites

- Test for desired and adverse effects with low-dose trial prior to trigger exposure

SSRI	*Dog* (all PO QD)	*Cat* (all PO QD)
Citalopram	0.5-1.0 mg/kg	0.25-0.5 mg/kg
Fluoxetine	1.0-2.0 mg/kg	0.5-1.5 mg/kg
Fluvoxamine	1.0-2.0 mg/kg	0.25-0.5 mg/kg
Paraoxetine	1.0-1.5 mg/kg	0.5-1.5 mg/kg
Sertraline	0.5-4.0 mg/kg	0.5-1.5mg/kg

- Potential side effects including vomiting, diarrhea, constipation (cats), urinary retention, seizure, increased agitation/aggression/anxiety, decreased appetite, sedation
- Typically start at 50% dose for 7-14 days

Tricyclic Antidepressant	*Dog*	*Cat*
Amitriptyline	1-6 mg/kg q 12h	0.5-2.0 mg/kg q 12-24h
Clomipramine (Clomicalm*)	1.0-3.0 mg/kg q 12h	0.25-1.3 mg/kg q24h
Doxepin	3.0-5.0mg/kg q 8-12h	0.5-1.0 mg/kg q 12h

- FDA approved for Separation Anxiety in dogs
- Typically start at 50% dose for 7-14 days
- See SSRI for side effects, increased anticholenergic effects with TCA
- Trazodone (SARI antidepressant): *dogs* 2-7 mg/kg PO PRN 60-90 min before stressor exposure; also can be given q 8-12 hour maintenance; *cats* 25-100 mg/cat PO PRN 60-90 min before stressor exposure
- Buspirone (azapirone antidepressant): 0.5 – 2 mg/kg q 8-12 hr
- Clonidine (alpha-2 agonist): 0.007-0.049 mg/kg PRN 30 min before stressor
- Gabapentin (alpha 2 ligand, GABA analog): *dog* 3-10mg/kg BID-TID; *cat* 2-5 mg/kg BID
- Sileo® (orotransmucosal dexmedetomidine gel): 125 mcg/m2 (following package dosing instructions)

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Inside of a Cat:
Do You Really Know Your Feline Patient?

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Cats are often considered affectionate and self-sustaining house pets, although their genetic and behavioral background is remarkably similar to the solitary and territorial wild progenitors from which they have evolved. Many of the health and behavioral problems we see in our pet cats are due to a basic misunderstanding of natural feline behavioral needs. Cats have the amazing ability to adapt to most environments and they will continue to enrich our lives and peacefully co-exist with other animals if cat owners can learn to provide the optimal emotional, social, environmental and physical needs for our feline companions.

Genetic and archeological evidence suggests that cats (*Felis silvestris catus*) started their domestication journey about 8,000-10,000 years ago.[1] Ancient cultures in various geographic locations around the world began to tame wild cats primarily to be vermin hunters and possibly pets. However, domestic cats are all decent from one ancestor *Felis silvestris lybica*, the Middle Eastern/North African wildcat. Modern day domestic cats are extremely similar in physical appearance and physiology to their direct wild ancestor and cousins because their natural hunting behaviors were very useful to humans, eliminating the need for strong human selective breeding pressures.[1,2] Cats are unique among domestic species in that they are obligate carnivores and the feline sensory system is geared exclusively for hunting small prey items. Cat olfaction and pheromone detection is not well studied but is likely a very important source of social and environmental cues that deserves more attention.[3]

Unlike their basic morphology, the social system of house cats has changed substantially with the species' "self-domestication." Domestic cats are the only small cat to form social groupings when free-ranging. By evolving a social system that can allow the individuals to tolerate physical proximity, cats have taken advantage of the often highly concentrated food (prey) sources provided by human dwellings. Group living likely evolved from maternal-offspring and related females cooperatively kitten rearing. Friendly behavior towards other cats or people is very similar to behaviors kittens display to solicit care from mothers. Evidence suggests that the default state for the modern cats is still a solitary and territorial state but learning, especially early in development, as well as individual genetics can allow for cats to live harmoniously within the same environment. Cats seem to have a relatively short sensitive socialization development period (about 2-7 weeks) during which it is extremely important for a cat to positively interact with people or other species it may encounter as a pet.[4]

Several studies have identified various feline temperaments and sociability attributes towards other cats and people.[5] The diversity of temperaments can make determining which cats will get along, or at least tolerate each other, quite difficult. Most aggression between cats in a household is territorial in nature because they never learned to tolerate each other and form a social group. Families with this intraspecific aggression can provide plentiful resources in different "territories" within the house. Client education of natural cat social behavior, such as cats don't necessarily benefit from another cat as a social companion, can prevent distressing environments. However, there are desensitization methods that can help improve the likelihood of cats building a positive relationship.

Similarly, client education regarding positive interactions and feline communication signals can prevent most forms of human-directed aggression. Aggression and other unwanted behaviors, such as urine marking, are signs of social stress. Chronic stress, in turn, can lead to more behavior problems and other medical conditions such as lower urinary tract disease. One of the best treatments for stress and these conditions is environmental enrichment.[6] This can be defined as activities or items that allow an animal to display species-appropriate behaviors. For a cat, this is best provided through small but frequent meals that the cat must "hunt" or manipulate in order to receive. There are a myriad of food-dispensing devices available. Play that mimics predatory behavior, appropriate affliative behaviors (petting/"grooming" to mimic allogrooming, or simply comforting contact), as well as slightly unnatural behaviors, like trick training, can also be form of mental stimulation and very helpful in reducing stress and improving welfare. Safe (contained) outdoor time should also be considered when appropriate.[7]

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Kids and Pets:
Creating a Harmonious Home

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Raising children in a home with pets can help teach kids responsibility and compassion, in addition to providing a lot of fun for the family. However, millions of kids are injured each year by a family pet and millions of dogs are relinquished to shelters or euthanized because of problems caused by careless interactions between children and pets. As veterinarians, we can be an initial and quality source of information to prevent many of these problems.

Not all kids are the same and not all dogs (or cats, guinea pigs, horses…) are the same. Thoughtful pairing of personalities can circumvent frustration. Unfortunately, most of our clients do not talk to us about obtaining a new pet prior to bringing the animal into the home. Even more common and tragic is waiting until the behavior problems are quite severe to broach the issues with the family vet. Providing material throughout the hospital or proactively asking questions may prompt clients to judiciously consider their decision to obtain a certain breed, or even bring a pet into a home with certain toddlers at all. There are several good books and pamphlets that could be left. Questions that you can ask to help guide a family are 1) is that breed of dog or cat appropriate for your family? 2) Should you get a puppy or an adult dog? 3) Should you obtain a dog from a shelter or a breeder?

There are no hard and fast rules to any of these questions. We need to throw out the extreme views that "there are no bad dogs, only bad owners," or, conversely, any individual of any breed is predetermined to behave in a certain way. The truth is in the middle – genetics do play a role in behavior, but the environment experiences (especially the developmental socialization period of about 4-14 weeks of age) can have a strong influence on behavior. Choosing a dog that is anxious and not socialized with children during this sensitive period could be problematic. Successful dog-children relationships exist because an individual animal most likely has a genetic predisposition for tolerance, but also was exposed to young children and handling as a puppy. Children will inevitably hug, pull, grab, chase, stare at, and irritate the family pets. A good breeder or puppy class instructor will gently expose a puppy to these human actions while also pairing with good rewards. Some dogs that have not been around many people or children during their socialization period will tolerate children and threatening actions on the part of the human, but the risk for fear and defensive aggression is much higher in these animals. We must counsel our clients of the risk of obtaining animals from pet stores and large-operation breeders whose facility they cannot visit. As we know, these animals are prone to a slew of anxiety and aggression problems, but the general public still does not understand what constitutes a "puppy mill" and how poorly these animals adapt to life as a family pet.

Veterinarians should also make it standard practice to ask behavior-related questions whenever a client with both kids and pets has an appointment. We see many major behavior problems that could have been curbed months or years before the consult if someone had helped the client recognize their current methods of managing the dog should be changed. For example, a dog has always been a "velcro dog" or constantly following a certain adult around the house is probably not going to tolerate suddenly being locked out of the bedroom when the new baby arrives. A dog that is growls and snarls at strangers who try to pet it is likely to do the same (at least initially) to a toddler that wants to hug the dog. The veterinarian should help the client address any stress or anxiety disorder because dogs that show separation distress or other anxiety disorders are at a higher risk of aggression towards children in the home.

Future parents can take steps to prepare resident dogs or cats for the arrival of a new child. As mentioned above, ask clients about sound sensitivies, fear of certain people, and separation anxieties. Any changes should be addressed before the arrival of the new baby if possible. Adults should slowly ask the pet to spend more time behind a barrier and out of the bedroom at night. Changes for cats can be very stressful too. Environmental alterations like moving down to dark basement in a remote part of the house or not being allowed on furniture may not be readily accepted by the pet, so we may need time to acclimate the pet or even formulate alterative plans.

Data indicate aggression towards children is most likely defensive or anxiety-related, not dominance driven as many TV shows and traditional trainers would have you believe. A harmonious pet-children home should center on helping the pets feel more relaxed around the children, teaching the children proper ways to interact with the pets, sharpening foundation behavioral cues, and having realistic expectations. Pets should be given a "safe haven" (e.g., dog bed in adult bedroom, or crate) to which they can escape when feeling annoyed or overwhelmed by family life. Reinforcing the action of leaving the current area for this spot can greatly decrease defensive aggression, particularly if spot is strictly off limits to children. Reward-based training is critical in home with young children. Children mimic how parents interact with the pets, not how parents tell children to interact. A child that sees a dog leash-corrected and physically punished by adults in the home will also start to treat the dog in that manner. This may have no noticeable consequences when administered by the adult, but is very likely to result in aversion and even defensive biting of the child. There are rare cases, particularly involving infants and toddlers, in which aggression is motivated by predatory, not defensive aggression. These

are very dangerous situations and removing that animal from the home must be seriously considered due to the high risk of serious injury.

Appropriate play can be a fantastic way for kids to interact and reinforce appropriate behaviors (in the kids and pets). Children should NEVER use their body parts in play. Allowing a dog to mouth, jump, or engaging in wrestling will result in injury. Games like fetch and even gentle tug-of-war with a long rope toy is acceptable, and can be great time to teach "drop it/give it," "leave it," and reinforce that the breaking of human rules such as no-teeth-on-skin or over-exuberant play will result in the end of the game.

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ASPCA (https://www.aspca.org/**pet**-care/dog-care/dogs-and-babies)
Stop the 77 (stopthe77.com)
Family Paws Parent Education (www.familypaws.com)

Putting the Shine Back in the Golden Years: Addressing Senior Pet Behavior Problems

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As our pet population enjoys a longer-life span, age-related neurodegenerative diseases also become more prevalent. Cognitive dysfunction syndrome (CDS) is the most well-recognized form of dementia in pets and according to one internet survey, 5% of dogs aged 10-12 years and 41% of dogs 14 years or older show signs of CDS. An estimated 28% of cats 11-15 years and 50% over 15 years of age are affected.[1] A large international study estimated this syndrome at 14.2% in older dogs. This same study found that only 1.9% of the dogs with signs consistent with CDS were diagnosed as such by a veterinarian.[2] Recommendations published by the American Animal Hospital Association Senior Care Guidelines Task Force (www.aaha.org) emphasize the use of structured questionnaires to assess both the current and changing health and behavior of each pet.

Pathophysiology of cognitive dysfunction

Cats and dogs suffer non-specific brain aging changes such as neuronal loss, parenchymal reduction, and increased ventricular size. Widespread neuronal loss, especially pronounced in the frontal lobe and hippocampus, and decreased hippocampal neurogenesis are correlated with more severe cognitive impairments than aged-matched human and canine patients with less pronounced cognitive decline.[3] The major hallmark of CDS pathology is accumulation of β amyloid (Aβ) plaques, similar to human Alzheimer's disease (AD) patients.[4] The mechanism for Aβ deposition is presumed to be oxidative damage. Production of reactive oxygen species by the mitochondria accelerates with aging. ROS levels eventually outstrip the body's natural antioxidant defensive mechanisms and significant oxidative damage develops. The CNS is particularly sensitive to oxidative damage due to the high lipid content and low levels of endogenous free radicals. Furthermore, Aβ aggregates in the cerebrovascular system result in increased cerebral microhemorrhages and this is also thought to contribute to cognitive decline. Some research suggests neuronal dysfunction and neurotransmitter level alterations in the cholinergic, serotonergic, and dopaminergic systems associated with AD and CDS are a result of Aβ damage and this, in turn, may lead to much of the symptomology associated with CDS.[4]

Clinical and behavioral signs

Purpose-bred laboratory beagles have been extremely useful in revealing a correlation between cognitive functioning and brain pathology. Aged dogs show declines in spatial learning, executive functioning, and memory compared to younger animals in controlled laboratory psychological testing. Memory deficiencies preceded noticeable behavioral changes and brain pathologies. The link between cognitive decline, age, and neurodegenerative changes has not been studied as thoroughly in cats to date, but some memory and learning deficits similar to canine subjects were demonstrated in most studies.[3]

This information can be clinically relevant by observation in the exam room and also obtaining a history from pet owners about exploratory behavior, elimination behavior, alterations in daily schedule or sleep patterns, and social interactions in the home environment. The acronym DISHAA describes the behavioral signs.[1]

D – Disorientation
I – Interactions (altered social interactions)
S – Sleep-wake cycle alterations
H – Housesoiling
A – Activity level alterations
A – Anxiety level

Behaviors such as night-time waking, housesoiling (in cats particularly), separation anxiety, environmental fears, and aggression often prompt older cat and dog owners to seek veterinary help. However, the disease is probably quite severe by this stage. Since CDS is a progressive disease, therapies are most effective with early detection. A more detailed survey that can be answered quickly by clients during a clinic visit are available through several sources.[3]

These longitudinal owner-queried surveys are an efficient, reliable, and inexpensive general method of aging assessment and should begin at approximately 6 years of age in our patients.

Medical differentials for behavioral changes

Cognitive Dysfunction is primarily a diagnosis of exclusion. A minimum database of physical exam, complete blood count, serum chemistry profile, and urinalysis should be obtained on any veterinary patient suspected of having CDS. Pain, discomfort, metabolic diseases and neurologic conditions that affect mentation are commonly linked to behavior changes in senior pets. Imaging (radiographs or ultrasound) for metabolic disease and organopathy evaluation should be considered. Magnetic resonance imaging (MRI), computed axial transmission (CAT) and positron emission tomography (PET) imaging can be useful in identifying other neurologic diseases that could show similar signs to CDS and the severity of age-associated parenchymal loss.[6]

Treatment

Treatment of metabolic diseases is essential, but CDS can be concurrent with any other disease. Underlying metabolic diseases and any source of pain should be addressed. However, medications (e.g. steroids, phenylpropanolamine) used in the treatment of other conditions should be evaluated for behavioral side effects. Once a CDS diagnosis is strongly suspected, a multifactorial treatment plan encompassing medical/nutritional therapies, behavior modification, and environmental management should be employed. Current therapies do not reverse the underlying pathology, but research particularly in purpose-bred laboratory beagles, has shown improvement in cognitive functioning with several treatment modalities. This can translate into noticeable quality of life improvements in our patients even if the disease process is not reversed.

Environmental strategies

Maintaining basic social interactions through structured reward-based training and encouraging play can improve cognition. Solitary mental stimulation through food-dispensing toys and scent games may also be beneficial to aging dogs and cats. Sleep-wake cycles often undergo alterations resulting in more night waking. Providing more mental and physical stimulation during the day can promote better rest at night. Behavior modification techniques to foster physical and emotional relaxation are extremely useful to help owners cope with dogs that become anxious and restless.

Pharmaceutical, nutraceutical and adjunctive therapies

The biogenic amine systems (e.g., dopamine, norepinephrine, and serotonin) are compromised in CDS patients. Memory, social interactions, and other cognitive signs can be improved with the use of antidepressants such as selegiline (MOAB inhibitor), which may have the added neuroprotective benefit of slowing ROS production. Anticholingeric drugs should be avoided in senior patients due to the likelihood of age-related compromised in the cholinergic system. Cholinergic enhancers such as donazepil and galantamine are approved in the US for AD, but not commonly used in CDS veterinary patients. The first and still most popular therapeutic modality for CDS is dietary or supplements. The principle disease pathology is presumably a result of oxidative damage, and consequently many of the pharmaceuticals are related to antioxidant effects. Vitamins B, E, and C, β-carotene, β-lipoic acid, flavonoids and carotenoids are contained and diets such as Canine b/d (Hills Pet Nutrition). Senelife (CEVA Animal Health) is comprised of antioxidant (ginko biloba, vitamins B6 and E, and resveratrol) and phosphatidylserine, a factor thought to improve neuronal membrane fluidity and functioning. Studies report cognitive enhancement in laboratory and client-owned dogs on Senelife and Canine b/d. There are no published studies in cats although Senelife is labeled for this species. Melatonin and omega-3 fatty acids may also have antioxidant effects. Omega-3s fatty acids anti-inflammatory and cell membrane health effects may be beneficial in CDS treatment as well. Nestle Purina has tested a blend of antioxidants, fish oil, and the arginine in improving feline cognitive testing. The company has added this blend to their Prime Plus line of Pro Plan Diets. Another Purina diet (Pro Plan Bright Minds and Veterinary Diets Neurocare) is formulated with medium chain triglycerides to increase ketone bodies as alternative source of energy as brain glucose metabolism wanes in senior patients.6 Additional dietary supplements mechanisms that have been tested and marketed include S-adenosyl-l-methionine (SAMe) (Novifit, Virbac; Zentonil, Vetoquinol), which is essential to major metabolic pathways and results in enhancing transmission of neurotransmitters and boosting endogenous antioxidants. Yet another compound - jellyfish protein, apoqequorin (Neutricks) - is a calcium buffer that may protect the cell against excitotoxic and ischemic events related to calcium and ion dysregulation in the aging brain.[7] Behavior problems resulting from CDS can also be treated symptomatically along with most of the aforementioned supplementation or diets. As in pets without age-related cognitive deficits, on-going situational or generalized anxieties may be treated daily with most antidepressants such as fluoxetine, paroxetine, or the mild anxiolytic buspirone. Tricyclic antidepressants (e.g. clomipramine) are typically avoided due to the anticholinergic profile of this class. Use of antidepressants, opioids, and a few other medications (amitraz, trimethoprim sulfa) are contraindicated with selegiline due to serotonin syndrome or neurologic side effect risk. Fast-acting anxiolytics and sedating medications like the trazodone or gabapentin can be dosed situationally for predictable triggers or nighttime waking. Benzodiazepines are an option, but are known to increase cognitive decline in geriatric people.[8] General calming nutraceuticals like l-theanine (Anxitane, Virbac), α-casezepine (Zylkene, Vetoquinol), or non-systemic pheromone products (Adaptil and Feliway, CEVA Animal Health) can also be safe and useful layers to an antianxiety treatment plan in an aging pet.

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Top Small Animal Behavior Tips and Myths Debunked

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1. Dogs are not little wolves

Many myths and misconceptions abound regarding canine origins, social structure and communication. New studies of free-ranging dogs, canine cognition and comparative genomics provide insight into the real world of dogs. Dogs are descendent from the gray wolf but they are not little wolves as many pop culture "dog experts" strongly assert. The domestication process has drastically altered canine genetics resulting in a creature unique from any other canid species in terms of appearance, physiology, and behavior.[1] Dominance hierarchies in dogs (and many domestic species) are a hotly debated topic.[2,3] Behaviorists and ecologists do agree on the existence; however, observations of free-ranging and feral dogs reveal a fairly loose social structure. Both dogs and wolves appear to maintain hierarchies largely through submissive signaling, not physical confrontation. Therefore, when humans try to assert dominance through actions like "alpha-rolling" or physically forcing the dog down, we are not mimicking natural relationships, but likely scaring the dog, conditioning an aversion, and increasing the risk of a bite. Recommending clients try these tactics is dangerous. A structured human-animal relationship can successfully be formed through non-confrontational methods.

2. Dogs are not little people

The human-animal bond is equally at risk when we assume animals have human thought processes. A perfect example is the statement "she knew she shouldn't have done it," implying the dog is feeling guilty or remorseful after destruction, aggression or eliminating in the house. Animals do not have complex language that allows us to discuss the past and future with them. Learning and cognition research confirms that a consequence must occur within about 1 second if the consequence is to be paired with the animal's action. Therefore, when someone arrives home to a guilty looking dog, and the dog did indeed eliminate in the house, it is understandable (but erroneous) to jump to the conclusion that the dog understands he did something wrong. In fact, evidence strongly suggests the dog is taking his cues entirely from his human's current and previous reactions. In other words, last time there were feces on the carpet, the human became very angry. Now that there are feces on the carpet and the human has returned, there may be yelling and physical discomfort. The danger is then punishing the dog at this delayed stage. This doesn't correct the undesirable action but only increases anxiety by making correction and the person unpredictable in the dog's mind. If the undesirable behavior isn't witness, it cannot be successfully rewarded or punished.[4]

3. Look below the surface

Recognizing low-level stress signals is essential in keeping animals calm and averting aggression in many situations. Most of us humans do not recognize a dog or cat is distressed until we see overt body language of crouching, extreme tail tuck, refusal to move, eliminations, or growls and snarls/hissing. Therefore, many aggressive instances appear to be "out of nowhere." In reality, the animal was likely displaying many forms of (to us) subtle behaviors indicating apprehension or fear. Lip licking, yawning, eye aversion, and slow or stiff body postures in dogs are signals we can learn to recognize, and then subsequently change the situation to keep the peace.[5] For example, vet staff may try a different type of approach if the dog stiffens and licks her lips. Clients can be advised to remove the dog from room if she yawns and averts her eyes when kids are rough housing close to the dog resting on her dog bed. A cat bite could likely be avoided if the cat owner ceased petting or approaching a cat when he gave a tail lash, stiffened, or slightly moved away.

Furthermore, some common behaviors are assumed to have a specific motivation when the real reasoning is more complex. Mounting in dogs, for example, has long been attributed as a purely sexual or dominance-asserting action. However, closer observation of the context typically reveals that the animal was feeling stressed or frustrated in that moment. We common see this when one dog behaved inappropriately during play or a visitor is ignoring the dog. Self-directed scratching, excessive licking, or other repetitive behaviors can also fall into this category. Most people using some form of aversive correction to stop these behaviors but this may be self-defeating in the short or long run by increasing the stress in these situations. Redirection to a more appropriate behavior can both stop unwanted behavior and reduce stress.

4. It's all in the approach

Many instances of human-directed aggression, especially in dogs, is a direct result of the way the human approaches the dog. For decades we have been taught to stick a hand out to let the dog smell and become accustomed to us. However, reaching out and over any dog is considered threatening to some degree. Simply being approached can make most dogs somewhat nervous. We should advocate in the vet clinic and in public education that allowing a dog to approach a person, and being aware of unthreatening human body postures– turning to side, kneeling down, avoiding any outward motions towards a nervous dog, and using food to lure – can be the difference between an aggressive and friendly encounter in any setting. [6,7]

5. Training does not solve most behavior problems

Animal "training" is the process of changing the behaviors we can observe. Various techniques can be employed to motivate a change in activity and almost all of these techniques involve either learning how to gain a reward or avoid something unpleasant. Decades of extensive research demonstrates the efficacy of both categories. However, a poor emotional state or association with a person, place, or other environmental trigger motivates many behavior problems. Relying on typical "training" completely ignores this emotional basis, and, in fact, many aversive training techniques, which appear to successfully stop the unwanted behavior, do not solve the problem because the underlying association has not been improved.

The good news is by using simple associative learning (elucidated so well by Pavlov's dog), we can help clients improve many behavior problems without in-depth dog training and the high risk of side effects (e.g., increased fear, increased redirected aggression) associated with aversive tactics. For example, many dogs are reactive to other dogs while on leash walks and 50% cats show severe aggression when first introduced. By adopting some common sense safety protocols (e.g., head halters, baby gates, adequate distance) and providing food just BEFORE and DURING the interaction without any stern correction, the pet will start to associate the trigger with the reward. In essence this tactic addressing that core emotional motivation and not just the surface-level behavior.[7]

6. It's YOUR license and reputation too

Critically assess any behavior professional to whom you refer your clients and beware of the unregulated nature of the dog training industry. There is no licensing, and "certification" terminology is often provided by for-profit entities whose programs do not undergo the scrutiny to the extent of veterinary certification program. Unfortunately terms like "behaviorist" and "specialist" are usually self-labeled. Attending a seminar does not make an expert. Likewise high-levels of success in dog sports, police, protection, search and rescue do not automatically indicate this individual has the knowledge base to identify emotion-based behavior problems. Although most trainers are ethical and many effective, you cannot know that from a brief conversation, marketing material, or even personal testimonials. Ask about continuing education attendance, your role in your patient's care, and client safety for trainers that employee aversive tools (shock collars, chains, prong collars). Do not take specific medication recommendations from a trainer. All veterinary clinics should strongly consider providing additional behavioral education to a veterinary staff member, particularly a technician who can become specialized through Academy of Veterinary Technicians, as the behavior resource for clients. This allows information and revenue to stay within the practice.

7. "Socialization" is not an appropriate behavior modification technique

The socialization development period, which is between approximately 4-14 weeks in dogs and 2-7 weeks in cats, is the critical stage during which the neural system is primed to receive input regarding future social and environmental stimuli. Socialization is critical, evidenced by extreme fear and fear-related aggression in many poorly socialized animals. Unfortunately some people falsely assume that socialization of adult animals can solve existing behavior problems and put pets in dangerous situations for the sake of "socialization." Dogs showing aggression to other dogs should not be indiscriminately exposed to unsuspecting dogs and people in dog parks, day care, or shopping areas. Not only is this not safe, but the tactic ignores the possibility of sensitization, or worsening of the negative emotion. Not all animals will become accustomed to any stimuli with repeated exposures. Solid foundation behaviors, safety measures and practice interpreting body language should be implemented before any type of public exposure. For example, the pet should master a redirection cue for a reward (watch me, leave it) in increasingly distracting situations prior to a walk through the pet store.

8. Early socialization and vaccines

Puppy and even kitten socialization is extremely important for a behaviorally healthy animal.[8] Behavior problems are a factor in almost every case of rehoming or relinquishment to shelters. Encouraging clients to limit a young pet to environmental stimuli until all core vaccines are completed could be a mistake because 16 weeks is past the critical socialization period. Recent studies have shown puppies from diverse areas that received one or two rounds of vaccines and attended puppy socialization classes were no more likely to contract infectious diseases than those that did not attend a class. Of course ensuring other animals that been in the area are properly vaccinated, and that the facility is using proper biosafety standards is important. For this reason, reputable private facilities (including vet clinics!) are the best choice and public dog spaces should be avoided.

9. Avoidance IS a good behavior modification technique

Along the same lines as indiscriminate exposure to triggers possibly causing more problems, avoidance of triggers is an important step for veterinarians to recommend. Safety of our clients, patients, and the public is the top priority. Recommending dogs be exposed to triggers can be a serious public health concern and a legal liability. Assurance from the veterinarian that avoidance is not worsening the problem can provide a great comfort to the family and possibly be the difference between life and death for that pet. On an emotional and biological level, avoidance prevents the problem from worsening by keeping the animal in a calmer state and not strengthening the negative association. Exposure to the trigger can then occur on a gradual level.

10. Psychoactive medications as "the last resort?"

The goal of most psychoactive medication usage is to provide antianxiety effects through various mechanisms. The prevailing public sentiment is psychoactive medications should only be used as a "last resort." Although the use of these drugs should not be taken lightly, early intervention of all behavioral therapies, including medications, can limit the damage and improve success. Most of us would not hesitate to institute pain medications or antibiotics early in the treatment of injury or disease, yet many of the same practitioners wouldn't consider psychoactive medications until the problem is a very severe stage. Mental health should be considered part of overall health. You can decrease your clients' fears that commitment to start medications is somehow a life-long commitment to keep the patient on medication for the rest of that animal's life.

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