

## Topic 12: Aggression in dogs: What does it mean for Westie owners?

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One of the most controversial issues for owners, breeders, veterinarians, and the public is canine aggression. This Topic is written from the viewpoint of both a dog owner and veterinarian. It is, unfortunately, also written with personal insights; I was 11 years old when severely mauled by a German Shepherd Dog. This Topic is not written by an animal behavior expert, but contains the current thinking of a number of behaviorists. One point needs to be emphasized – **Westies, as a group and statistically, are not a breed of dog for which there are profound public concerns over aggressive behavior! In a word (see photo right, courtesy of the Chapmans) Westies are solid and predictable canine citizens.**



### Problem dogs

An old adage is that there are no bad dogs, only bad owners. However, each year, millions of dogs are surrendered at shelters and many/most of these dogs are euthanized. According to shelter managers, dogs are surrendered to them primarily for one of four reasons:

- Dogs are aged or ill, or both,
- Dogs are homeless/ownerless,
- There was a weak bond between the dog and owner (the dog did not fulfill the expectations of the owner),
- Dogs are not good pets because of behavioral problems (40% of dogs surrendered).

There have been major strides in reducing the number of unwanted animals surrendered to shelters. Public education and outreach campaigns by animal welfare organizations, veterinarians, and governments have raised public awareness about pet animal overpopulation and the need for neutering pet animals. However, even as these campaigns succeed, many dogs are still taken to shelters. In a survey conducted at 12 animals shelters, adolescent and young adult dogs comprised a significant proportion (29-31%) of the dogs surrendered (Arkow, 1991). While many dogs surrendered at shelters are of mixed parentage, roughly 30% of dogs are purebred animals. Many professionals and concerned groups note that even if pet overbreeding and overpopulation were virtually eliminated, many dogs would still end up in shelters and would be destroyed.

Shelters receive “ownerless” dogs from animal control officers and from the public. Homeless dogs may be strays (have escaped from owners), abandoned, or may be truly feral (breeding and roaming without human intervention or ownership). Dogs that roam individually or in groups are problematic. These dogs may suffer from starvation, disease and trauma. Ownerless dogs may harbor infectious diseases that can spread to other ownerless dogs or to pet dogs. Ownerless dogs may predate wildlife, livestock and pet animals while searching for food or raid waste bins. In many cases, ownerless (feral) dogs may avoid human contact – like other “wild” animals such as coyotes. At times, ownerless dogs may threaten or attack humans or pet animals. The public health problem associated with biting dogs is discussed more fully below.

In a study of socialized pet dogs presented at 12 humane shelters, Salman, et.al. (2000) noted that there were several common behavioral problems that were the cause of surrender. Most common was **inappropriate elimination** (dogs resist learning or observing housebreaking and soil the home). Dogs that could not be housebroken were seven times more likely to be taken to shelters than other dogs. Some dogs displaying inappropriate elimination may, in fact, be marking territory within homes. This normal behavior, while completely appropriate out-of-doors, is definitely not desirable indoors.



**Canine aggression** was the second most common behavioral problem that resulted in dogs being surrendered for adoption or euthanasia at shelters (Salman, et. al., 2000). Ten percent (10%) of all dogs relinquished had displayed aggression toward people and of the dogs surrendered, 69% had bitten at least one person. Eight percent (8%) of all dogs relinquished displayed aggression toward other animals. A number of studies have shown that approximately 40% of dogs presented for evaluation and treatment of 'behavioral problems' at veterinary practices are dogs displaying aggression, with a majority of dogs showing aggression toward people.



Dogs that bite people are a significant public health problem. According to information published by the Centers for Disease Control in 2003 (the latest published and summarized data available) **4.7 million dog bites** occurred in 1994. It is pretty clear that this number has increased substantially since then. Approximately 799,700 people required medical care for bites in 1994 (CDC, 2003). Dog bites are both a financial and legal burden for owners of dogs that inflict the bites.



In 2001, an estimated 368,245 people sought acute treatment for dog bites at hospital emergency rooms. The rate of injury and the severity of injury were highest among children aged 5-9 years old. Forty-two percent (42%) of dog bites occurred in children less than 14 years old. The incidence rate was significantly higher in boys than in girls, probably a reflection of outdoor and unsupervised contact. The injury rate declined with increasing age; adults are much less likely to be bitten than children. For persons over 15 years old, there was no difference in incidence between males and females. Cases increased slightly in the warmer months (April to September, peaking in July). Between 4-7% of dog bite-related injuries were work-related (delivery and service people, staff and professionals involved in animal care) (CDC, 2003).



The most common sites of injury included bites to arms and hands (45% of all injuries), legs and feet (26%) and head and neck (23%). The majority (65%) of the injuries to children less than 4 years old were head and neck injuries. The incidence of extremity injuries increased with age. The types of injuries inflicted included punctures, lacerations, contusions and hematomas, infections, and crush/amputation injuries, and fracture/dislocations (CDC, 2003). About 98% of all people seeking care at emergency departments for dog bites are treated and released.



Between 1979 and 1996, more than 300 people were killed as a result of unprovoked dog attacks, according to data collected by the Humane Society of the United States (Sacks, et. al., 2000). In a study of 227 human fatalities for which breed information and attack data was available (1979-1998), Sacks and co-workers were able to demonstrate that 25 breeds of dogs (including crossbreds but with a predominating phenotype) were involved. Pit Bull Terrier/Pit

Bull Type dogs, Rottweilers and German Shepherd Dogs accounted for 147/227 fatalities. In the 20-year study period, there was one fatality due to a West Highland White Terrier. Single fatalities were also recorded for Yorkshire Terriers and Dachshunds. A majority of deaths (58%) involved an attack by an unrestrained dog on the owner's property. Most fatalities (160/227) were caused by an attack from a single dog. A trend was noted in the number of attacks and breed popularity. When Rottweilers and Pit Bull Terrier type dogs increased in breed registrations, the number of attacks attributed to these dogs went up. (Photos above, left, courtesy of the Sarasota County Sheriff's Department; subjects are all listed as aggressive dogs on a public warning list).

The contribution of dog genetics to behavior is discussed below.

### **Nature versus nurture: Is there a genetic connection to behavior?**

I think there is a popular perception that dog behavior can be predicted fairly well by the breed of the dog. Jack Russell Terriers are feisty, Golden Retrievers are great with children, and Rottweilers are stalkers. And as everyone knows, Westies are Lovers! (Photo courtesy of the Chapmans) Let's take a look at evidence and opinions about breeds and behavior.



The influence of genetics and breeding on canine aggression and other behaviors has been studied for thousands of years. It is very clear that domestication of dogs was a process of selecting not only desirable body shape and size, but also selecting useful behaviors including guarding, hunting and herding. Roughly 100 years ago, scientists began to collect observations and perform studies to determine potential genetic links to behavioral characteristics. As early as 1921, MacDowell noted differences among litters of Dachshund puppies in reactivity to visual and auditory cues. Whitney (1926) noted that some behaviors were characteristic of certain breeds and that these behaviors were inherited independently from phenotype (physical appearance). Some of the traits studied included shyness, intelligence, levels of energy and aggression (defined as a tendency to bite). Whitney concluded that while some behavioral traits seemed to show classic patterns of inheritance (caused by expression of dominant and recessive genes), many traits were complex and probably inherited as expressions of multiple genes.

Mahut (1958) studied the differences in emotional responses in 10 breeds of dogs. In a standardized test setting, young dogs were evaluated for curiosity, response to 'teasing' (approaching and pawing/mouthing objects), approach-avoidance (excitement at seeing objects and stalking them), wariness (tensing and trembling, growling), and frank avoidance. She classified dogs studied as belonging to one of two groups. Fearful dogs (Collies, German Shepherds, Poodles, Corgis, and Dachshunds) had high scores for wariness and avoidance. The other group was classified as 'fearless' based on low scores of wariness and avoidance. Fearless dogs included 'fighters, ratters, and killers' such as Boxers, Boston Terriers, Bedlington Terriers, and Scottish Terriers. Mahut found that the environments dogs were raised in significantly affected the display of behavioral traits.

Animal behaviorists consider the work of Scott and Fuller (1965) to be a cornerstone of our understanding of the genetic basis of dog behavior. Work they conducted in a very controlled environment, over decades, showed that within each breed of purebred dog studied, there is a

wide variation in emotional responses to various stimuli. **They suggested caution in ‘accepting the idea of a breed stereotype’ of emotional behavior.**

Many other studies (too numerous to list here) on heritable behavioral characteristics in purebred dogs have yielded contradictory and sometimes confusing results. Studies of lineages and pedigrees of several breeds of dogs have appeared to clearly demonstrate a heritable link of aggression. This was shown in studies of Golden Retrievers (Van den Berg, 2006), Cocker Spaniels (Podberscek, et. al., 1996) and English Springer Spaniels (Reiner, et. al., 2005). While some authors believe that there is a heritable tendency toward excitability, fear, or nervousness in some dog breeds, other authors feel that factors such as length of time puppies stay with dams, sex of dogs, and early experiences are just as important as parentage.

The influence of early socialization cannot be underestimated. A significant number of dog breeders feel that the more time a puppy can spend in the controlled environment of the breeder, the more predictable the puppy’s behavior will be. There is ongoing (and probably unresolvable) debate about the optimum age for puppy adoption. Many breeders believe that adoption between 6-8 weeks does not allow for adequate dog:dog and dog:human socialization. It would seem clear that delaying adoption of puppies might allow breeders to more easily identify puppies with potential behavior problems and to decide how best to manage these dogs. On the other side of the debate, many veterinarians and some behaviorists believe that an optimum time for bonding of puppies with their new owners and environment is between 6-8 weeks. This debate is not going to be settled unless there are objective research studies that demonstrate how best to socialize puppies. Additional thoughts on this are to be found below where prevention of aggression is discussed and also in Dr. Meyers-Wallen’s topic on breeding practices.

Pfleiderer-Hogner (1979) analyzed the heritability of performance from records of 2046 evaluations conducted on a total of 1291 German Shepherd Schutzhunden (photograph of Schutzhund “Schatze”, right, courtesy of Dr. Mark Plonsky). Dogs were evaluated with the standard measures of Schutzen performance, including tracking, obedience, man-work and character. A correlation was found between man-work (such as guarding and commanded confrontation) and character, but not other traits. She concluded that there is little heritable basis for performance and that early evaluation of dogs for performance could not predict behavior. The very comprehensive review authored by MacKenzie, et.al., (1986) exhaustively covers these controversies.



Hart, et.al., (1985a, 1985b) discussed behavioral profiles of 56 dog breeds and factors which might influence selection of purebred dogs as pets. A panel of 96 ‘authorities’ (48 small animal veterinarians and 48 obedience trial judges) **expressed opinions** that were used to score breeds of dogs on 13 traits, including such things as excitability, snapping at children, watchdog barking, and affection demand, among others. A very complex scoring system was developed and tested statistically for validity.

Authorities were asked to determine a predisposition to excitability based on the following statements “A dog may normally be quite calm but can become very excitable when set off by such things as a doorbell ringing or an owner’s movement toward the door. This characteristic may be very annoying to some people. Rank these breeds from least to most excitable.”

Data collected on Westies is interesting, for a number of reasons. First, Westies ranked highly as a breed in terms of excitability. In contrast, Bloodhounds, Bassett Hounds and Rottweilers ranked lowest in terms of excitability.

Second, a separate behavioral category, watchdog barking, was analyzed. To assess this behavior, the following statements and scenario were given as a definition “Now we would like to find out your opinion regarding watchdog capabilities of these breeds. A woman living alone in a city wants a dog that will sleep by her bed and frighten intruders by barking if anyone breaks into the house in the middle of the night. Rank these breeds from least to most as to which will most consistently sound an alarm when it hears something unusual and will bark at intruders”. Westies were ranked in the most effective watchdog category (with Rottweilers, German Shepherd Dogs, Doberman Pinschers, and Scotties).

Taken together, one might well argue that high scores in terms of both excitability (alertness) and watchdog barking, are a desirable combination in some circumstances (family protection) but a detriment in others (continual barking at sounds in an apartment environment).

In terms of housebreaking (a measure of trainability), Westies scored in the middle of the rankings.

Hart and co-workers (1985b) used their data to create ‘behavioral profiles’ of breeds, based on scoring in all 13 categories. Using statistical tools including cluster and principal component analysis, they created a scheme that classified different dog breeds. Needless to say, their work suggested very strongly that although there were variances in individuals within breeds, there were inherited behavioral predispositions in breeds. They specifically concentrated on ‘reactivity’, ‘aggression’, and ‘trainability’ to cluster breeds. Reactivity was defined by the aggregate scoring of dogs in the following categories: affection demand, excitability, excessive barking, snapping at children, and general level of activity. Aggression was defined by the aggregate scoring of dogs in the following categories: territorial defense, watchdog barking, aggression to dogs, and dominance over owner. Finally, trainability was defined by the aggregate scoring of dogs in the following categories: obedience training and housebreaking ease.

Based on the analysis of all data, Westies were placed in a cluster of “very high aggression, high reactivity, and medium trainability”. Other dog breeds in this cluster were Cairn Terriers, Scottish Terriers, Airedales, Miniature Schnauzers, Dachshunds and Fox Terriers. By contrast, German Shepherd Dogs, Akitas, Doberman Pinschers, and Rottweilers formed a cluster characterized by “very high aggression, very high trainability, and very low reactivity”. We have to remember that this is an artificial system of data classification, based on interviews with ‘authorities’ and their subjective experiences and opinions with these breeds.

Hart and co-workers (1985b) also analyzed the effects of gender on behavioral characteristics. Not unexpectedly, they found several measures of aggression (snapping at children, territorial defense, aggression toward other dogs and dominance over owners) higher in intact male dogs than in intact female dogs. They felt that their data demonstrated that neutering of male dogs altered hormonally-driven behaviors (mounting, urine marking, and aggression) in about half of dogs in which these undesirable behaviors created problems for owners. Neutering did not appreciably alter other behaviors such as playfulness, destructiveness, snapping at children, and territorial defense.

Scientists are just beginning to understand the relationship of brain anatomy and chemistry to behavior and aggression in dogs. Jacobs and his colleagues (2006) found actual differences in the centers in the brain that regulate emotion and reaction when they compared tissue samples from aggressive and non-aggressive dogs. Reisner and co-workers (1996) also found differences in neurotransmitter metabolites in aggressive and non-aggressive dogs, perhaps indicating a higher potential level of reaction to stimuli in aggressive dogs. This area of neurobiology is rapidly evolving. We can expect that more study of the triggers of dog behavior will lead to a better understanding of genetic factors controlling brain development and metabolism. This may lead to the development of drug and behavioral therapies for problem dogs (See below).

### **What is canine aggression?**

Aggression is broadly defined as a behavior that is manifested as growling, snarling, baring of teeth and biting (Scarlett, et.al., 2002). There are times (see below) when aggression in dogs is appropriate and times when it is not. Haug (2008) stated that there were three underlying reasons for canine aggression: fear; resource-guarding (territory, owner and other animal protection); and predation. There are not clear boundaries between these reasons and some dogs may display aggression for several reasons. Haug further noted that aggression may be normal and functional, or it may be normal but inappropriate or considered unacceptable, or it may be a frank behavioral abnormality, with dogs acting completely inappropriately in many situations.



It is possible to distinguish several forms of appropriate and predictable aggression. First, as shown in the figure at the left (Tank and Bruiser Robertson, age 7 weeks!), puppies will play out aggression as they become socialized in litters. Much of this controlled and playful aggression serves multiple purposes. Most breeders will readily acknowledge that dogs quickly establish a hierarchy within litters for attention, for access to food, water, toys, and for the most desirable places to sleep. In the past, this was broadly classified in terms of seeking and learning dominance.

Playful aggression is a component of socialization during the critical period of 4-14 weeks of age, when dogs learn about their relationships with other dogs (adults and littermates) and people (Scott, 1950). It is during this critical period of development that puppies also learn (in general terms) what they need to fear and what they do not need to fear. As discussed later, many animal behavior specialists and veterinarians now believe that the basis for much of the inappropriate aggression shown by dogs is fear-based, not dominance-based (Tynes, 2008). It is critically important to assure adequate socialization of dogs between 4-14 weeks of age and to help them overcome fear and anxiety. A study by Roll and Unshelm (1997) showed that about half (44%) of dogs that were aggressive to other dogs had not had a significant amount of contact with other dogs between the ages of 5 weeks and 5 months old. Dogs that fail to understand their hierarchical position with owners, familiar and unfamiliar people, and other animals during the critical period of socialization may develop unacceptable behavior later in life. This is discussed more fully in terms of 'leader recognition' later in this Topic. Unfortunately, no one really knows how much early socialization is optimal for any individual dog.

Second, there are appropriate and acceptable forms of aggression shown by adult dogs. A major value of dogs after domestication must have been protection of people and livestock from marauding animals and from unfamiliar people (resource-guarding). Warning humans, by barking, of impending threats and also displaying more direct forms of aggression (biting) was highly desirable (and rewarded) behavior. Shown to the lower right (photograph of “Schatze” courtesy of Dr. Mark Plonsky) a well-trained Schutzhund is displaying normal, trained and *highly desirable* but *highly controlled* aggression in response to commands at a field trial. Aggression displayed in these circumstances is normal and is expected, based on training. It is critically important to understand that such aggression terminates on command and is therefore not problematic. Haug (2008) specifically notes, “All forms of aggression are modified by learning”. In fact, if working dogs do not display aggressive performance, according to training and on command, they are considered to be behaving abnormally.



Animal trainers and behaviorists disagree about the source of aggression in working dogs. Some believe that some dog breeds possess inherited behavioral tendencies to aggression that can be exploited and controlled by training. This would appear to be in agreement with studies by Scott and Fuller (1965) and multivariate cluster analysis developed by Hart and co-workers (1985). Pfliederer-Hogner (1979) was not able to show this with Schutzhunden. Some trainers of protection dogs feel that aggressive tendencies are more individualized.

There is virtually no disagreement that dogs of any breed, subjected to unexpected stimuli that cause fear can create stress for the dog. Likewise, dogs that are abused learn to be fearful and learn aggression.

### **Inappropriate and unpredictable aggression: familiar and unfamiliar people, dogs, and situations**

Haug (2008) wrote a comprehensive review of canine aggression directed to unfamiliar people and dogs. Fear of unfamiliar stimuli (people, dogs, situations) was considered the most common cause of aggression (also see Luescher and Reisner [2008], below). The proximity of the stressful stimulus may be a factor. Some dogs will be observant and mindful when unfamiliar or unexpected stimuli are far from them, their owners, and their territory, but may become increasingly fearful as the stimulus moves closer. Haug notes that some dogs may display aggressive reactions (posturing, snapping, barking) while leashed or restrained, but not otherwise. Fear-related aggression may be well-developed by about 6 months of age, and this helps to differentiate it from territorial guarding and aggression that may not occur until at least 6 months of age or at a time of social maturity.

Luescher and Reisner (2008) reviewed the complexities of canine aggression to familiar people and situations – something of the greatest concern to owners and breeders. They note that the domestication of dogs and wolves from a common ancestor (roughly 12,000 years ago) was based on selection of many different traits. In terms of behavior, they believe dogs were selected to retain characteristics as adults that generally are seen in immature wolves. These ‘immature characteristics’ include playful behavior, the need for extensive physical contact, and highly social interactions (barking, pawing, licking and nuzzling). Adult wolves form structured hierarchical packs in which body language and conflict avoidance is important (feral dogs do not form such packs).

These authors (Luescher and Reisner) define many different types of aggression, including:

- Fear-induced aggression
- Resource guarding aggression
- Conflict-related aggression (“dominance”)
- Territorial aggression to unfamiliar people and animals
- Predatory aggression
- Play-related aggression (see photo of Tank and Bruiser, above)
- Excitement-induced aggression
- Pain-induced aggression
- Maternal aggression
- Disease-associated aggression (with brain tumor growth, for example)

Many people (including veterinarians, owners, and breeders of dogs) believe that dogs that bite owners or family members do so to assert dominance, potentially challenging the owner for leadership. **Luescher and Reisner question this.** Citing data from a number of studies, they found that in many cases of aggression in young adult (2-3 year old) dogs, aggressive behaviors emerged in puppies and became amplified as the dogs aged. In many cases, early aggressive behavior was correlated to fearfulness and resource guarding, not to the evolution of social bonds and relationships that appear to form after 6 months of age.

Guy (1999) extensively studied aggressive behavior toward familiar people and other dogs (termed ‘household aggression’). This study found that approximately 40% of dogs presented to veterinary practitioners for evaluation of inappropriate behavior had growled at family members, 20% had growled and snapped when owners tried to remove food or toys from the dog (characteristic of resource guarding aggression), 15% of dogs had bitten owners, and 12% had bitten with sufficient force to leave a bite mark or penetrating wound.

For most dogs, conflict management and avoidance is important. Body cues that signal stress and conflict may include repetitive yawning (not related to sleepiness), gazing and gaze avoidance, and changes in body posture. Erect, heightened and rigid postures may be signs of stress, fear, and potential conflict. Play bows, rolling, licking, whining, and submissive urination all may be strategies for avoiding conflict.

**Luescher and Reisner (2008) advise owners, breeders and others in contact with known or potentially aggressive, stressed and fearful dogs, to watch for changes in body language that may indicate thoughts of conflict are escalating or that conflict is imminent.** Dogs that display overt signs of offensive aggression (erect body posture, erect tail and ears, lip curling with display of canine and incisors) are sending clear signals that they may act out and bite in a short period of time. Many veterinarians and behaviorists note that confident, offensively aggressive dogs will stare at a potential target before initiating an attack. Dogs that display defensive aggression appear to have different body language; this is usually seen in fearful dogs, placed in unpredictable situations (veterinary clinics, unfortunately). Defensively aggressive dogs may withdraw, lower their hindquarters and overall body position, and may lip curl, displaying many teeth. It is important to lower levels of stress and fear and these dogs, to prevent escalation of aggressive behavior.

## **Prevention and treatment of aggressive canine behavior**

Veterinarians and other professionals who deal with inappropriate aggressive canine behavior feel it is challenging to treat and that the prognosis for controlling or eliminating aggression is guarded.

Prevention of the development of aggressive behavior is critical for puppies and should be of great concern to breeders. Luescher and Reisner (2008) offer some guidelines and suggestions for development of well-adjusted puppies (growing, hopefully, into well-adjusted dogs). These guidelines include:

- Provide a safe, comfortable, and predictable environment, free of intense stimuli (noise would be one example) that might induce fear and stress,
- Handle frequently,
- Wean at an appropriate time; early weaning may induce stress and fear,
- Be aware of health issues; some work has shown that early, severe illness can lead to fearfulness in adults,
- Encourage controlled socialization and exposure to diverse, safe environments that will help puppies understand and overcome fear,
- Be consistent in interactions and training,
- Punishment-based training may induce fear and later aggression: physical punishment may have poor outcomes; when puppies are punished, and suffer physical discomfort, they may become more fearful and frustrated - an overview of effective training strategies can be found at <http://veterinarymedicine.dvm360.com/Punishment>, (cited in Tynes, 2008)
- Regular meal feeding, regular interactions with humans, and regular exercise set the stage for good human-dog interactions.

You and your veterinarian must be a team when trying to help treat a dog with aggressive behavior. Some general guidelines for evaluation and treatment of canine aggression are outlined by Luescher and Reisner (2008) and Tynes (2008) and are to be found below.

First, it is important to determine the basis for aggression in an individual dog, and not to assume it's "just something in this breed". In some cases, physical ailments (thyroid disease, inflammation and tumors in the brain, liver failure, infectious agent [rabies, for example]) may be a cause of aggressive behavior. A recently published study of 238 dogs examining potential links between "itchiness" (pruritis) and either anxiety or aggression found no relationship (Klinck, et. al., 2008). These authors did find that dogs treated with glucocorticoids ("cortisone") were more likely to be anxious and reactive when confronted by loud noises (thunderstorms or other noise). It is essential to diagnose these problems with a thorough case history, physical examination, and laboratory tests (hematology, serum chemistry, and urinalysis).

Second, if aggression appears to be a primarily behavioral problem, veterinarians specifically trained in dealing with behavior should be consulted. Several professional organizations, including the American College of Veterinary Behaviorists ([www.dacvb.org](http://www.dacvb.org)) and American Veterinary Society of Animal Behavior ([www.avsonline.org](http://www.avsonline.org)) can provide recommendations for certified veterinary behaviorists to help deal with problem dogs. Not all veterinarians in clinical practice are interested in or trained to treat behavior problems. It is very important for owners and breeders of problem dogs to find a qualified person to help.

Third, owners and breeders should realize that problem behaviors like aggression develop and persist for many reasons (genetics, brain chemistry, fear, environment, and so forth) and that controlling the expression of behavior is not a simple matter of giving a pill (discussed below) or subjecting the dog to 'training'. Everyone should be wary of any person who represents themselves as a dog trainer who can 'break' an aggressive dog and whether they can actually achieve a positive outcome. I personally would advise caution in simply seeking someone who 'trains dogs' in dealing with an aggressive dog. I think there is a world of difference between teaching a well-adjusted pet to play Frisbee™ and taking an offensively aggressive dog and transforming them to a well-adjusted and predictable pet.

Fourth, veterinary behaviorists usually approach the treatment of aggressive dogs in a three-part approach (Luescher and Reisner, 2008).

I: Take a general history and assess normal environment and management of the problem dog. Perform physical examination and laboratory studies to detect underlying physical problems that may cause fearfulness and aggression

II: Take a history that assesses how the dog interacts in the environment, with familiar and unfamiliar people and situations, and attitude toward major daily events

III: Study the actual aggression problem: when does it occur, how often, what triggers it, what does it look like, what has been attempted to treat it

Once the nature of aggression is assessed, several approaches can be taken that seem to help. First, the dog has to have as much predictability in their environment as possible. For example, dogs should be fed regular meals twice daily rather than having unlimited access to food at all times. The setting of a regular mealtime creates predictability and structure for the dog. Second, a commitment must be made on the part of the owner to regularly (at least twice daily) exercise the dog in a safe manner. It seems pretty obvious that owners should not take dogs that are aggressive to unfamiliar people and other dogs to places where they will encounter unfamiliar people and dogs! Many behavior specialists recommend walking the dogs with a head halter leash, which encourages owner control and dog attentiveness. Third, dogs that are aggressive should be kept in environments that do not encourage fearful or territorial aggression. Some behavior specialists have noted that crating dogs may both prevent aggressive episodes and allow security for the dog. Crating should be used ONLY for limited periods of time each day and should not be used as a form of isolation and punishment. **Fourth, there is broad, uniform agreement that physical punishment is not effective in modifying the aggressive behavior of dogs. It should be avoided.**

Veterinary behavior specialists (Yin, 2007) acknowledge that traditional training methods based on the concept of dominance and submission are outdated and may, in fact, make aggression worse, due to fear, frustration, and inconsistency. Instead, many advocate a system of rewarding desirable behaviors and not rewarding less desirable conduct. A bond between dog and owner is based on reward, trust, and a lack of fear of punishment (domination). As with all training methods and theories, it only works if the owner and dog work at it consistently, constantly, and to successful goals.

Displacement and desensitization training, done by capable professionals and committed owners, can help control aggressive behaviors of dogs. In this type of training, small changes are made in the environment or triggers that help dogs become less reactive. Luescher and Reisner (2008) discuss how dogs that act aggressively when food is offered or withdrawn can

be subjected to gradual behavioral modification. One method discussed, is simply placing food in a room without the dog being present, allowing the dog into the room to eat, and then removing the dog from the room after eating. This is thought to break down a connection of possession guarding (food) and the owner. Another method involves gradual feeding from a long-handled pot, so that the dog cannot attack the owner nor will it be able to guard its food. Once again, behavioral modification is a job for trained behaviorists.

Finally, let's discuss drug therapy. It is well known that humans suffering from anxiety and depression can, in many cases, be treated effectively (clinical signs of illness decrease) with a combination of psychotherapy and drug therapy. In some cases, drugs alone can significantly help. We are just beginning to understand the complex neurochemistry associated with behavior in dogs. Several studies in this area were noted above. We are also just beginning to understand that some drugs, especially drugs known as selective serotonin reuptake inhibitors (SSRIs) may help modify the behavior of some dogs in some situations. For example, there have been some preliminary studies done that support the use of the drug fluoxetine for treating anxiety disorders in some dogs. There is a presumption that this drug, given to some dogs, will modify the levels of critical neurotransmitter chemicals in the brain (serotonin), helping to calm dogs and decrease inappropriate behavior. There have been no carefully controlled clinical trials of this drug and it should not be viewed as a known effective treatment, especially for canine aggression.

There is a difference of opinion among animal behaviorists about the effectiveness of anti-anxiety drugs, like diazepam, in managing canine aggression. Some behaviorists, based on observations of individual dogs, have seen improvements in behavior. Other professionals caution that by changing an 'anxiety threshold' (essentially removing anxiety that is blocking behavior), such drugs might make aggression worse in some dogs (Crowell-Davis, et. al., 2006). In a recently published study (Herron, et. al., 2008), diazepam was judged only minimally to modestly effective in controlling some anxiety-associated behaviors and was often discontinued by owners who were unhappy with side effects (sedation, agitation/hyperactivity, increased appetite). Bottom line: there is a lot of work still to be done before effective drug therapy for canine aggression can be prescribed.

### **In summary...**

Canine aggression is a significant problem. The contributions of genetics, environment, upbringing and training are discussed in this Topic.

Dog breeders should be aware that there is a complex interaction between inherited breed traits, environment of adult and young dogs, active socialization, and learning that will create adult dog behavior. Responsible breeders should be alert to signs of fearfulness in puppies and to understand that the current thinking on canine aggression is that much of it is fear based. Several research studies have been able to link inappropriate adult behavior with specific breeding animals, but this is a largely unexplored field. Nonetheless, it is very important that breeders regularly follow-up with owners of dogs they have bred to see if there are physical and behavioral problems that emerge in some litters and from some pairings.

Dog breeders, dog owners, and veterinarians should be knowledgeable about the importance of body language and conflict avoidance for dogs. Dogs displaying body language of offensive or defensive aggression should not be pushed to a point of acting out their aggression. By the same token, potentially aggressive dogs should not be physically punished, since this may actually heighten levels of fear and foster biting. Recent studies have noted that dogs may be

acutely sensitive to human body language and even to human odors associated with emotional behavior. At times of potential conflict, humans should not escalate human behaviors that inappropriately aggressive dogs find threatening.

Problem dogs should be examined by veterinarians and by qualified animal behaviorists. Physical problems that may be associated with aggression should be actively investigated. With overtly healthy aggressive dogs, the dog, the owner, and the behaviorist all have to commit the effort needed to help the dog. It is **absolutely mandatory** that once an owner identifies an aggressive or potentially aggressive dog, they must control this dog so that it does not injure people or other animals.

There are no magic pills or quick training methods for treating overcoming canine aggression. The science of using drugs to modify dog behavior and perception is in its infancy and it may take many years of study before drugs to predictably modify behavior are available. Dog owners should understand that there may be significant limitations of behavioral training in eliminating aggressive behavior.



As concerned dog owners and breeders, it is our responsibility not to create fearful, aggressive dogs, and to reach out and educate the public about proper dog behavior and upbringing (Reisner, et. al., 2008). Let's try to be sure that, within our power, we raise great pets and not subject any more children to dog bite scars for life (see left).

(John, Tank, and Bruiser Robertson at the Dog Walk Against Cancer, October 11, 2008. The Boys will be 3 years old on December 25, 2008))

## References

Arkow, P, "Animal control laws and enforcement," Journ Amer Vet Med Assoc 198:1164-1172, 1991

Centers for Disease Control, "National Dog Bite Prevention Week," September 30, 2008 (<http://www.cdc.gov/ncipc/duip/biteprevention.htm>)

Crowell-Davis, S, Murray, T, "Benzodiazepines," In **Veterinary Psychopharmacology**, Crowell-Davis, S, Murray, T, (Eds.), Blackwell Publishing, Ames, IA, 2006

Guy, N, "Canine household aggression in the caseload of general veterinary practitioners in Maritime Canada," Master of Science thesis, Atlantic Veterinary College, University of Prince Edward Island, 1999

Hart, B, Miller, M, "Behavioral profiles of dog breeds," Journ Amer Vet Med Assoc 186: 1175-1180, 1985a

Hart, B, Hart, L, "Selecting pet dogs on the basis of cluster analysis of breed behavior profiles and gender," Journ Amer Vet Med Assoc 186:1181-1185, 1985b

Haug, L, "Canine aggression toward unfamiliar people and dogs," Vet Clin NA Small Animal 38: 1023-1041, 2008

Herron, M, Shofer, F, Reisner, I, "Retrospective evaluation of the effects of diazepam in dogs with anxiety-related behavior problems," Journ Amer Vet Med Assoc 233: 1420-1424, 2008

Jacobs, C, Van Den Broeck, W, Simeons, P, "Increased volume and neuronal number of the basolateral nuclear group of the amygdaloid body in aggressive dogs," Brain Res 170: 119-125, 2006

Klinck, M, Shofer, F, Reisner, I, "Association of pruritis with anxiety or aggression in dogs," Journ Amer Vet Med Assoc 233: 1105-1111, 2008

Lue, T, Pantenburg, D, Crawford, P, "Impact of the owner-pet and client-veterinarian bond on the care that pets receive," Journ Amer Vet Med Assoc 232: 531-540, 2008

Luescher, A, Reisner, I, "Canine aggression toward familiar people: A new look at an old problem," Vet Clin NA Small Animal 38: 1107-1130, 2008

MacDowell, E, "Heredity of behavior in dogs," in **Dept. of Genetics Report** 101-56, Davenport, C (Ed.), Carnegie Institute, Pittsburgh, PA

Mackenzie, S, Oltenacu, E, Houpt, K, "Canine behavioral genetics – a review," Appl Animal Behav Science 15: 365-393, 1986

Mahut, H, "Breed differences in the dog's emotional behaviour," Can Journ Psychol 12: 35-44, 1958

Mendocino Coast Humane Society, "Pet Information Sheets: dog aggressive behaviors," (<http://mendocinohumane.org/html/aggressive.html>)

Moffat, K, "Addressing canine and feline aggression in the veterinary clinic," Vet Clin NA Small Animal 38: 983-1003

MMWR, "Nonfatal dog bite-related injuries treated in hospital emergency departments, United States, 2001," MMWR Weekly 52(26): 605-610, 2003  
(<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5226a1.htm>)

Pfleiderer-Hogner, M, Möglichkeiten der Zuchtwertschätzung beim Deutschen Schäferhund anhand der Schutzhundenprüfung (Doctoral Thesis), Ludwig-Maximilians-Universität, Munich, FDR, 1979

Podberscek, A, Serpell, J, "The English Cocker Spaniel: preliminary findings on aggressive behavior," Appl Anim Behav Sci 47:75-89, 1996

Reisner, I, Mann, J, Stanley, M, et. al., "Comparison of cerebrospinal fluid monoamine metabolite levels in dominant-aggressive and non-aggressive dogs," *Brain Res* 160: 57-64, 1996

Reisner, I, Houpt, K, Shofer, F, "National survey of owner-directed aggression in English Springer Spaniels," *Jour Amer Vet Med Assoc* 227:1594-1603, 2005

Reisner, I, Shofer, F, "Effects of gender and parental status on knowledge and attitudes of dog owners regarding dog aggression toward children," *Journ Amer Vet Med Assoc* 233: 1412-1419, 2008

Roll, A, Unshelm, J, "Aggressive conflicts amongst dogs and factors affecting them," *Appl Animal Behav Science* 52: 229-242, 1997

Sacks, J, Sinclair, L, Gilchrist, J, Golab, G, Lockwood, R, "Breeds of dogs involved in fatal human attacks in the United States between 1979 and 1998," *Journ Amer Vet Med Assoc* 217: 836-840, 2000

Salman, M, Hutchinson, J, Ruch-Gallie, R, et.al., "Behavioral reasons for relinquishment of dogs and cats to 12 shelters," *J Appl. Animal Welfare Science* 3: 93-106, 2000

Scarlett, J, Salman, M, New, J, Kass, P, "The role of veterinary practitioners in reducing dog and cat relinquishments and euthanasias," *Journ Amer Vet Med Assoc* 220: 306-311, 2002

Scott, J, Marston, M, "Critical periods affecting the development of normal and maladjustive social behavior in puppies," *Journ Gen Psychology* 77:25-60, 1950

Scott, J, Fuller, J, *Dog behavior – The genetic basis*, Univ of Chicago Press, Chicago, IL, 1965

Tynes, VV, "Debunking 10 behavior myths," *Vet Med* 103: 504-514, 2008

Van den Berg, L, "Genetics of aggressive behavior in Golden Retriever dogs," *Doctoral Thesis*, Utrecht University, 2006

Yin, S, "Dominance versus leadership in dog training," *Comp Vet Med* (July): 414-417, 432, 2007