

About this Book

Welcome to the second edition of the Westie book/website, sponsored by generous support from the Westie Foundation of America. This electronic book is meant to serve as a source of information for Westie owners, breeders, veterinarians and for anyone who loves Westies.

The book is organized as depicted in the Table of Contents. Links within the Table of Contents will take you to the topic of interest with a click of a button. The material is organized by topics of general interest, and then by specific diseases that often affect Westies. To help tie them together, the diseases are arranged according to the system of the body affected. Within the discussion of each disease, is information intended for all readers; where appropriate, we have included new illustrations and photographs to help clarify specific points. We also have included brief reviews of selected recent scientific publications related to each disease; this information may be of particular interest to veterinarians and scientists, but we've done our best to ensure that the major points are understandable by everyone. Finally, we have included lists of recent reference materials relevant to each topic area.

Health and Disease in Dogs – A Brief Overview

Dogs are amazingly hearty and healthy. The owner of any new puppy is amazed at the number of “delectable” items puppies eat – and how they grow and prosper.

There are several things that determine the health of all dogs. First, and foremost, dogs need a nutritionally adequate and complete diet, plenty of clean, fresh water, and a safe environment (**Diet**, page 3, and **Environment**, page 5). Second, dogs need humans to attend to their health problems. Owners of dogs are the front line in providing regular visits to the veterinarian for vaccinations and physical examinations (**You and Your Veterinarian**, page 7). Third, the breed of dogs can have a very strong influence on the development of some health problems. We know that some types of health problems, such as cancer or skin disease, are more common in some purebred dog breeds than others. One example of this is an increased incidence of bladder cancer in Scottish Terrier breeds, such as the Scottie and Westie (**How Breed Influences Health in Dogs**, page 9).

Diet

Korrin Saker, DVM PhD DACVIM (nutrition)

Dogs prosper on many different diets. How can you be assured the diet you choose will provide adequate nutrition for your dog? The American Association of Feed Control Officials (AAFCO) has developed policies for regulating the manufacture, labeling, distribution and sale of animal feeds. The Nutrition Claim or Nutrition Statement on all pet food labels will indicate if and to what extent the manufacturer has followed AAFCO guidelines in formulating and testing that diet.

You will be able to ascertain, to some extent, if the diet is appropriate for your dog at a particular lifestage. Most commercially available diets (dry, semimoist, or canned) are formulated to provide “complete” nutrition for a specific life stage. A separate category of commercial diets, termed “therapeutic or prescription diets”, are formulated to address specific health concerns. Diets that are formulated to provide “complete and/or balanced nutrition” do not require supplementation with vitamins, minerals or other nutrients for maintaining adequate health. Some owners prefer to prepare the diet for their dog using ingredients from the market. While homemade recipes have their place in pet nutrition, they can easily be incomplete or “unbalanced”. Therefore, it is important that you discuss your dog’s diet with your veterinarian to ensure that it provides all the nutrients the dog needs to maintain good condition. The National Academy of Sciences, Board on Agriculture and Natural Resources has created a 400-page report that summarizes the daily nutrient and calorie requirements for dogs and cats. The site also provides free access to the Science-Based Guide for Pet Owners, that is an excellent summary of relevant information. The website is worth a visit if you have questions about nutrition and diets for your Westie: <https://tinyurl.com/3xjvshmx>

In general, most dogs thrive on the same diet – day after day. In fact, some dogs don’t do very well if their diet is changed, and will sometimes develop stomach upsets and diarrhea when this happens. Most owners realize that there are some dietary no-no’s – too much food (exceeding body needs and leading to weight gain), doggie junk food and snacks, and fatty scraps. Although they love them, many dogs will get upset stomachs and diarrhea if they eat bones. Soft bones, such as those from poultry, may actually be a

danger to dogs. These bones can be broken into sharp pieces during chewing and injure the digestive tract and mouth of dogs. All of these should be avoided.

Virtually all pet food companies maintain very good information on dog nutrition on their websites. They also provide information for dog owners on their products. Pet food websites and product information can be obtained by accessing the American Academy of Veterinary Nutrition (AAVN) website: <https://aavnutrition.org/>

Dogs need clean, fresh water. Dogs should have their water changed several times daily, and regularly checked by their owner for debris, cloudiness or discoloration that might indicate the water is unpalatable or potentially contaminated. Water bowls made of stainless steel are generally easier to keep clean and to resist chewing by enthusiastic dogs.

Raw diets, pros and cons.

Dogs and raw diets share a long history, as hunting, killing, and consuming live prey was the only option available for able bodied canines to survive. In the 1800's the first dry kibble was introduced and became a convenient way to feed dogs. Then, in 1993 the primordial way of feeding dogs was re-introduced and referred to as the BARF diet, which stands for Bones and Raw Food, or Biologically Appropriate Raw Food. A true raw diet consists of a wide range of fresh whole foods, including uncooked meats, organs, eggs, vegetables, fruits, and non-weight bearing bones. The popularity of feeding raw diets is generally associated with providing dogs food that closely resembles what they would eat in the wild, as well as avoiding processed foods (kibble and canned diets) which were loosely associated with chronic disease conditions.

The original BARF diet tended to be very high in protein and fat content. These diets resulted in a very healthy-looking hair coat, helped to mitigate allergies, and reportedly a longer lifespan. However, they were nutritionally unbalanced from the perspective of minerals and vitamins, most notably calcium and phosphorus. The inverted calcium:phosphorus ratio in these diets results in skeletal deformities including pathological fractures and carpi hyperextension. Compared to other types of pet foods tested, raw pet food is more likely to be contaminated with disease-causing bacteria resulting in food-borne diseases. *Salmonella* spp. has gathered the greatest attention as a possible risk, however *Campylobacter*, *Clostridium difficile*, *C. perfringens*, *C. botulinum*, *E. coli*, *Yersinia enterocolitica*, *Listeria monocytogenes* and enterotoxigenic *Staphylococcus aureus* are also of concern for both humans and dogs. The presence of bones in a raw food diet can lead to perforation or obstruction of the

gastrointestinal tract, constipation and compacted gut. In short, three main concerns exist with respect to the raw meat (including bones) feeding approach: 1) infectious disease risks (to pets and owners); 2) dietary nutritional imbalance (in pets); and 3) foreign bodies (i.e. pets swallowing bones).

The BARF diet has undergone many iterations over the past 20 years to lower the risks noted above, yet still provide a "minimally processed" pet food. Food processing techniques vary; heat (cooking, baking, dehydrating), cold (refrigeration, freeze drying), and chemical, enzymatic or water digestion are currently used techniques. All these processes help to initiate foodstuff digestion and provide some degree of pathogen kill and food preservation. Various raw diets are now commercially available and labelled as freeze-dried, frozen, dehydrated or high-pressure pasteurized; the latter process provides the highest pathogen kill compared to cold or dehydration processing.(Podolak et al) Most commercially available raw diets provide a Nutritional Adequacy Statement based on AAFCO guidelines implying that the diet is nutritional balanced and complete for a canine specific life-stage, which addresses the concern that raw diets are unbalanced and/or nutrient insufficient. While raw diets may help minimize food allergies, they have been reported to cause these problems in some dogs if the animal protein source is not novel.

A final consideration for raw diets is the increased commitment to food preparation, feeding and hygiene protocols recommended to safely feed raw. Ideally raw diets should be prepared in a separate space and with separate utensils from the family's food. Furthermore, feedings should be scheduled to minimize diet spoilage, allow proper food bowl cleaning between meals, and in a feeding space away from all age/immune-compromised individuals.

Although raw diet options have come a long way from BARF regarding food safety and nutritional adequacy, many veterinarians are reluctant to recommend this type of feeding approach due to the higher risk to both pets and pet family members inherent in an uncooked pet food. While guidance can be provided by your primary care veterinarian, it is recommended that you work with a certified veterinary nutritionist to design an appropriate recipe and feeding plan for your dog before feeding a non-commercial home-prepared raw diet.

Providing a Safe Environment for Your Westie

Westies have a reputation of being irresistible in a small dog sort of way. Beneath that cute veneer, however, this breed is known to be alert, intelligent, strong, rough and plucky. In short, they do not require pampering and they love to chase after anything that moves. They welcome daily exercise and, due to their independent streak, it works well to exercise them on a leash or in a fenced area with plenty of space to romp. Due to their energy and can-do attitude, Westies excel in a variety of canine sports and activities, including obedience, rally, and agility. Additionally, true to the breed's original purpose, they have the instinct to go to ground and are superstars at earthdog events. Please do your best to provide an environment that helps your Westie thrive.

Although their hair looks smooth and fluffy, it is actually a hard, double-layered haircoat. Daily brushing or combing helps keep that spunky "Westie look," but keep bathing at a minimum, as too much can be detrimental to their skin and haircoat. It is recommended they visit the groomer every 4-6 weeks.

Despite their plucky attitude, Westies should not live as outdoor dogs. They are very social beings and thrive on human companionship. If they spend an extended period of time outside in a cold environment, they can become hypothermic. When it is too cold, they will show a reluctance to walk or play, curl up, and actively seek shelter or warmth. Therefore, in cold weather, consider shorter, more frequent walks and indoor play sessions. Provide mental stimulation through interactive toys and indoor games to help keep them active and healthy during the colder months.

One of the most important things Westie owners can do to ensure the health of their animal is to keep it in a safe environment. Dogs that are allowed to run free potentially may encounter other dogs having infectious diseases. Although Westies have the courage of African lions and will stand their ground against much larger dogs, they may get severely injured in dog or cat fights. Dogs that run free also run the risk of being struck by automobiles, ingesting dangerous substances (e.g., antifreeze), or being injured from falls or from malicious acts. So, keep your Westie safe!

The importance of providing a fenced-in yard, the pros and cons of invisible fencing

Exercise should be an essential part of husbandry for growing puppies as it promotes both physical and mental health, and Westies are active dogs! The best exercise for puppies is

safe, supervised free running in a fenced space where they can choose their speed and directions, and freely wander to explore. Traditional physical or invisible fences are options with pros and cons for each.

While an invisible fence can help keep your pets safely in your yard, they don't prevent other critters from getting in. On the other hand, they don't obstruct the view as much as traditional fences and they can be less expensive to install. Although not life-threatening, a concern with invisible fencing is the need to "noise shock" the dog when it challenges the invisible barrier. This can foster barrier frustration in some dogs. Physical fences will not require dog training using behavioral correction, but since Westies are known diggers, they can easily dig under a traditional fence to escape. An alternative to an invisible fence is a hidden fence that uses a 'distance-based reaction' to prevent your dog from crossing the barrier. This approach is marketed as being safer and more consistent than the 'time-based' correction used by invisible fencing.

The effects of exposure to pesticides/herbicides used on lawns

Pesticides and herbicides can be dangerous to dogs and can cause a range of symptoms, including:

- Immediate symptoms: Skin rashes, nausea, vomiting, eye irritations, and respiratory problems
- Gastrointestinal irritation: Abdominal pain, vomiting, diarrhea, lethargy from fertilizers that contain pesticides and herbicides
- Seizures: A common result of ingesting poisons; muscle tremors, paralysis, and death from organophosphate and carbamate insecticides

Although most weed killer bottles recommend that you and your pets should keep off sprayed lawns for only 6 to 24 hours, (Knapp, et al) studies show that chemical residue can linger on surfaces for up to 48 hours after application. The best way to avoid these dangers is to prevent your dog's contact with pesticide- or herbicide-treated areas until the product has dried completely (i.e., at least 48 hours post treatment).

The dangers of backyard swimming pools

Jumping into the pool to cool off on a hot day can be safe for your dog as long as it is a supervised swim. There are three commonly encountered dangers associated with swimming pools. The first and most devastating is accidental

drowning. The best ways to prevent this are to teach your dog to swim and how to exit a pool safely, use a well-fitted dog lifejacket with a handle, invest in an alarm system, and fence in the pool. The second danger is water intoxication after swallowing water having a high sodium content. This can be addressed by keeping a fresh water bowl outside the pool and limiting your dog's time in the pool or salt water. The third danger is irritation to your dog's skin, eyes, and respiratory system caused by pool chemicals. - hose down or bathe your dog after a pool swim. The fourth danger is pool cleaning and chemical toxicity. Be sure to store all pool chemicals in a safe/secure location.

Dog parks, risks and rewards

Dog parks can provide both physical and social benefits to dogs and their caregivers. These confined off-leash areas offer opportunities to socialize and exercise legally. They also separate the dogs from non-dog enthusiasts, who prefer to avoid canine contact in public places. There are some inherent risks of frequenting dog parks that warrant consideration.(Chen,et al) For example, aggression and fighting between dogs can result in pet injuries. Similarly, incompatibilities in dog size and age can result inadvertent physical harm to a puppy or small dog. Finally, there is the possibility of transmission of viral and bacterial disease as other dogs may not be adequately vaccinated or in prime health and feces may not be removed properly. Therefore, before you journey into the local dog park with your pet, ensure it is adequately vaccinated, observe the current dog population to determine if it is a safe fit for your dog, and introduce your pet to the play space with structed time-limitations.

Dealing with weather extremes... heatstroke, frostbite

Extreme weather conditions can be physically and mentally harmful to our dogs. Because they can suffer from heat stroke, it's important to provide shade shelters to prevent overheating when dogs are outdoors. It's also critical to ensure they have access to clean, freshwater to avoid dehydration. Under conditions of extreme heat and humidity, keep your dog indoors and never leave them in a parked vehicle. It's also advisable to walk/exercise your dog in the early morning or late evening to avoid the hottest part of the day and choose unpaved exercise paths to avoid excess heat from hot asphalt. Excessive panting, struggling to walk, lethargy, bloody diarrhea or vomiting are potential signs of overheating and warrant immediate intervention. Overweight and obese dogs are more prone to overheating, but hot weather is NOT the time to encourage exercise for weight control. Lastly, keep in mind that your Westie's white haircoat can increase their susceptibility to sunburn.

At the opposite end of the weather spectrum, it's important to know that dogs are susceptible to frost bite and hypothermia. So, be sure to keep them indoors during extreme cold weather. Although Westies have a course white double coat that protects them from cold, they can lose body heat quicker than larger dogs. As a result, you should consider a dog sweater/jacket and booties for puppies and/or dogs with thin haircoats for outdoor cold weather walks. Be sure to take care on icy surfaces as your Westie can fall easily and sustain musculoskeletal injuries.

Many dogs can sense a change in static electricity in the air, foretelling thunderstorm activity which unsettles them. They may seek comfort in a small, dark place and /or exhibit signs



of anxiety (e.g., tremble, whimper, pace excessively, vocalize). In these cases, Thundershirts® or anti-anxiety jackets can be helpful, and your veterinarian can prescribe anti-anxiety drugs to give prior to an impending storm.

When traveling by car, transport your Westie in a crate

Westies make great travel companions due to their adventurous, confident, and adaptable personalities, and, of course, their small size. It is advisable to get puppies accustomed to car rides at an early age by taking short trips to fun destinations for a positive experience. Training your puppy to travel in a crate is not only safe but also may reduce the incidence of motion sickness. Regardless, a training period is advisable. Briefly, obtain an appropriately sized crate, secure it in the vehicle, and put their favorite blanket and toys in the crate. Use a ramp to give your dog easy access into the crate. Keep the vehicle door open, close the crate and walk away. Repeat this for increasingly longer periods until your dog appears comfortable. At that point, it's time to initiate short drives to fun places!

Become aware of poisonous plants and the poison hotline for pets

There are numerous plants that can be poisonous to your pet. The most common toxic plants are sago palm, lily, azalea, rhododendron, tulips and any early blooming plant. Here are three important links that provide a list of poisonous plants that can harm your dog -

<https://www.petmd.com/dog/poisons/plants-poisonous-to-dogs>

<https://www.asPCA.org/pet-care/animal-poison-control/dogs-plant-list>

<https://www.bluecross.org.uk/advice/dog/health-and-injuries/plants-poisonous-to-dogs>

A pet-safe repellent (not cayenne pepper) applied to plant leaves or soil can deter your dog's interest. If you are concerned that your dog has ingested something that may be poisonous, contact your veterinarian or **The ASPCA Animal Poison Control Center (APCC) 1-888-426-4435**.

Types of leads and the dangers of flexi-leads

Westies may be petite, but they are a sturdy breed and can be strong leash pullers. To avoid unnecessary strain on the neck, reduce pulling, and provide better control, it is recommended to use a harness for "leash walking". There are basically 3 types of dog harnesses: back-clip, front-clip, and dual-clip. The dual-clip harness is most versatile if your Westie has different walking styles. Regarding the type of lead to attach to the harness, options include standard, retractable (flexi-leads), adjustable, and slip leads. Veterinarians and dog trainers have varying opinions on which lead type is best; generally, they do not recommend a flexi-lead. This type of lead can wrap around your or your dog's extremities resulting in burns, cuts and in unfortunate situations, amputation. Once the leash is abruptly stopped or runs out of cord, the sudden jerk can cause neck wounds, tracheal lacerations or spinal injuries. Additionally, some trainers report that retractable leashes inadvertently reinforce pulling behavior. As a result, I recommend the other types of leads.

Protection from fleas, ticks, and parasitic worms

Dogs of all ages should be on a regular parasite prevention protocol. The timing and dose for puppies will be different from those used for adult dogs. Puppies can be born with parasitic worms contracted from mom's milk, while other worms are from fleas and/or the environment. Your veterinarian can provide you with the safest puppy parasite prevention plan for your particular region of the country.

You and Your Veterinarian

You and your veterinarian function as a team dedicated to maintain the health of your Westie. After completing undergraduate courses and being accepted into a veterinary school, they must spend the next four years in classes and being mentored during practice experiences before they are able to take licensing examinations and begin to practice veterinary medicine. Most new veterinarians will work with more seasoned practitioners to hone their skills. Some veterinarians will take additional years of training (as in internship and residency training programs) to learn a veterinary specialty like dermatology, cardiology, neurology, oncology (the study of cancer), or orthopedic surgery. If you are interested in veterinary training or in the scope of the veterinary profession, several very good websites are maintained by The American Veterinary Medical Association (www.avma.org) and the American Animal Hospital

Association (www.aaha.org). These websites also contain a wealth of information on the health of companion animals (such as dogs, cats, and horses) and are worth a visit.

Regular visits to your veterinarian are critical in maintaining the health of your Westie. These visits allow the veterinarian to get to know your dog and to know you. The visits allow you to communicate to the veterinarian what a special dog you have and to allow the dog to understand the environment and examination procedures. It is well known that dogs that know their veterinarian and the practice environment are more at ease with visits. This lowers the stress levels your dog might have when going to a place where there are other dogs and cats, unfamiliar people and strange smells.

Regular visits also help the veterinarians in the practice do a good job in assessing the health of your dog, because they can develop a baseline of health and potential medical problems, detect diseases at early stages, and, most importantly, gain the trust of you and your Westie (**Figure 1.1**).

How often you and your Westie visit your veterinarian depends on the age and the health of your dog. Most veterinarians would like to see your dog frequently (every few months) as a puppy, for vaccination against infectious diseases, to provide information on diet, to detect early signs of health problems, and to assess whether or not your puppy is affected by parasites. When dogs become mature, visits to the veterinarian may only be needed every 6-12 months. Of course, you and your dog should always see the veterinarian

if there are any health problems, so they can be accurately diagnosed and treated.

Most dogs in the United States are now regularly maintained on medication to prevent the development of canine heartworm disease (“*dirofilariasis*”), a disease spread from one dog to another by mosquito bites. Veterinarians may also recommend the use of medications applied regularly to minimize the effects of fleas and ticks on dogs that go outdoors.

Breeding, Spaying and Neutering

Breeding, spaying and neutering are critical topics for discussion between you and your veterinarian. If you are an experienced dog breeder, you have a wealth of knowledge regarding breeding – perhaps more than your veterinarian. Most veterinarians will readily acknowledge this and will be happy to learn from your experiences. They may also have questions and observations that will foster dialogue, including discussions about the optimum timing for breeding, frequency of breeding, suggestions about nutrition for dam, sire and pups, vaccination schedules and protocols (to optimize puppy immunity), and a number of other topics. The ultimate outcomes of the dialogue between a breeder and veterinarian are happy, healthy Westie pups, Westie moms, and their human families!

The topic of spay/neuter is a personal decision, it is encouraged to follow your veterinarian's recommendation



Figure 1.1- Regular visits to your veterinarian's office will allow him/her to assess your dog's health status.

as to timing. The benefits of early spay/neuter are obvious and do have some health advantages such as reduced mammary and testicular cancer. Recent literature, especially in large breed dogs, encourages sterilization after sexual maturity to prevent some common orthopedic injuries.

Spaying your female dog (“ovariohysterectomy”) removes the ovaries and the uterus of the dog, so that she will not have puppies. Neutering male dogs removes the testes, and these dogs are sterile. These operations are done by your veterinarian in the hospital. Veterinarians first examine your dog to ensure that the dog is healthy enough for surgery, and then schedule the operation. Dogs that are spayed/neutered are placed under general anesthesia and prepared for sterile (aseptic surgery - **Figure 1.2**). After the operation, dogs will have a portion of their fur shaved, a sutured/stapled surgical site, and will require observation and aftercare. This will all be discussed with you by your veterinarian.

As noted above, there are important health consequences of spaying and neutering. Several studies have noted that the incidence of uterine infections (“pyometra”) and mammary gland tumors is markedly reduced in female dogs that have been spayed. The beneficial effect on the development of canine mammary gland tumors is seen in dogs that are spayed in the first year of life and somewhat in dogs spayed between 1-2 years of age. Female dogs of any age have a reduced risk of developing pyometra, as the spaying operation removes the uterus.

The benefits (aside from preventing pet overpopulation) of neutering male dogs may be a reduction in the incidence and growth of some types of skin tumors (“perianal gland adenoma”), decreased incidence of perianal fistula and problems associated with benign enlargement of the canine

prostate, including prostatic cysts and abscesses. The results of recent research has not shown that neutering of male dogs decreases prostatic cancer in dogs; in fact, some findings indicate that neutered male dogs may be at a slightly increased risk for developing this very uncommon tumor.

The effect of spaying and neutering on the development of other diseases and on pet behavior (such as aggression) is less clear cut. Once again, a discussion of these topics with your veterinarian will help you make important decisions on pet breeding and pet neutering.

How Breed Influences Health in Dogs

One of the many things that are very important in determining the health of every dog is genetic makeup. Each cell in every dog contains a “blueprint” for the cell and for the dog. These “blueprints” are made up of DNA, formed into specific genes contained in chromosomes. The entire set of genes that contain the “blueprint” for each dog is known as its genome. The genome specifies how cells are made, how the cells form tissues, and how the tissues (such as the heart or skin) function.

Selective breeding of dogs, following domestication from wild dogs and wolves, has resulted in the evolution of specific dog breeds, like the West Highland White Terrier. The genome of one Westie is likely to be very similar to other Westies, because selective breeding over several hundreds of years has focused the genome on certain desirable characteristics that make them Westies. For example, the pale and white coat color of Westies, the shape of the body, and even things like their lifespan are encoded in their genome. Interestingly, Westies tend to live longer than Great Danes!



Figure 1.2 - Spaying and neutering your dog has many health benefits, as well as helps reduce pet overpopulation.

It is very likely that the differences between the genome of Westies and those of other dog breeds are small and caused by the variable expression of certain key genes. These variations in gene expression are termed “polymorphisms” or “mutations” by genomic scientists. Many such variations in the genome are beneficial, conferring selective advantages in appearance, performance and health. On the other hand, some variations are not advantageous for dogs. It is well known that cancer, for example, is the result of mutation in certain specific genes that control cell growth, cell division, and cell lifespan.

How does this relate to Westies?

There are some diseases that occur more commonly in Westies than in other breeds. The reason for this is undoubtedly tied up in the genome of the breed. Selective breeding over hundreds, if not thousands of years, has developed the Westie with certain characteristics such as size, stature, coloration and even personality. At the same time that these desirable characteristics were selected by careful breeding, other less desirable characteristics also developed. Some of these less desirable mutations were linked (literally, in the DNA and chromosomes) to more desirable breed characteristics – sort of ‘hitching a ride’ in the Westie genomic pattern. Because of these linked mutations, Westies are predisposed to the development of

some diseases, just like Golden Retrievers are predisposed to develop malignant lymphoma and Bulldogs get more brain tumors. We know that while dogs may be predisposed genetically to developing some diseases, there are also many identified and unidentified environmental influences on disease development, expression and severity. This complex interplay between genome and environment is an area of intense scientific study.

A very good first step in making progress in understanding which diseases are common and for beginning the study of genome/environmental relationships are health surveys, conducted by the Westie Foundation of America and also the West Highland White Terrier Club of America. The results of recent studies serve as an excellent starting point for discussion of diseases that follow.

It is now our job to find the specific genes in the Westie genome that are related to common diseases. Once this is done, more effective treatments for these diseases can be found, and concerned breeders, owners, veterinarians and scientists can work together to eliminate these problem genes, while maintaining happy, healthy populations of Westies for centuries to come.

Comparison of prevalence of targeted diseases in 2000 and 2005:

2000	2005
Atopic Dermatitis	Atopic Dermatitis
Aggression	Luxated Patella
Luxated Patella	Aggression
Dry Eye	Inflammatory Bowel Disease
Legg-Perthes Disease	Legg-Perthes Disease
Cranio-mandibular Osteopathy	Dry Eye
Pulmonary Fibrosis	Addison's Disease
White Shaker Syndrome, Addison's Disease, Diabetes	Lymphoma
	White Shaker Syndrome

Targeted diseases ranked by prevalence among dogs by sex in 2005:

Females	Males
Atopic Dermatitis	Atopic Dermatitis
Luxated Patella	Luxated Patella
Aggression	Aggression
Dry Eye	Inflammatory Bowel Disease
Inflammatory Bowel Disease	Dry Eye
Legg-Perthes Disease	
Addison's Disease	
White Shaker Syndrome	
Pulmonary Fibrosis	

Targeted diseases ranked by prevalence among deceased dogs in 2005:

2005
Atopic Dermatitis
Pulmonary Fibrosis
Conjunctive Heart Failure and Lymphoma (tied)
Diabetes
Dry Eye (Keratoconjunctivitis sicca)
Luxated Patella and Inflammatory Bowel Disease (tied)
Copper Toxicosis, Aggression and Bladder Cancer (tied)

Common Diseases of Westies

In 2005, the Westie Foundation of America and the Health Committee of the West Highland White Terrier Club of America conducted a study to determine the owner-reported prevalence of 27 diseases in West Highland White Terriers using an anonymous survey distributed by mail to approximately 6,000 homes owners and breeders in 2005.

Follow-up mailings to non-responders were not conducted, as no effort was made to track returns. This was the result of a decision to make the surveys completely anonymous in an effort to increase response rates and the validity of reported information.

The results of that study were made available in 2007 on the Foundation's website. In the report prepared by Dr. J.

Kevin Grayson, author of the report, the following conclusions were made:

The prevalences of targeted diseases remain essentially unchanged between the 2000 and 2005 surveys. For some common diseases, such as: atopic dermatitis, deafness, luxated patella, and Legg-Perthes disease; the prevalences have actually increased. For others, such as: aggression, deafness, diabetes, and pulmonary fibrosis; modest decreases were realized.

Progress is being made at many veterinary schools on determining the mode of inheritance and new treatments for many of these conditions. Continued financial, data, and case material support for these programs will greatly benefit the breed in the future. Some of the interesting findings of the 2005 study are summarized below.

An ongoing health Survey (2012-present) can be found at www.ofa.org. The WFA and West Highland White Terrier Club of America conducted the survey as a joint project. We encourage all Westie owners to participate in this survey answering for dogs both past and present. This information determines how the WFA designates how research dollars are spent.

Aggression in Dogs: What does it mean for Westie owners?

John Robertson, VMD, PhD

One of the most controversial issues for owners, breeders, veterinarians, and the public is canine aggression. This chapter is written not only from the viewpoint of a dog owner and veterinarian, but also with unfortunate personal insights; I was 11 years old when severely mauled by a German Shepherd. This chapter 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, Westies are solid and predictable canine citizens (**Figure 1.3**).

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 or 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% 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, as they 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 catch and eat 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 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 7 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.

Aggression was the second most common behavioral problem that resulted in dogs being surrendered for



Figure 1.3 - Westies typically are loving dogs, with very predictable behavior patterns.



Figure 1.4 - Aggressive dogs should be approached carefully to minimize biting incidents.

adoption or euthanasia at shelters (Salman, et. al., 2000). Ten percent of all dogs relinquished had displayed aggression toward people and of the dogs surrendered, 69% had bitten at least one person. Eight percent of all dogs relinquished had displayed aggression toward other animals. Several studies have shown that approximately 40% of dogs presented for evaluation and treatment of 'behavioral problems' at veterinary practices are displaying aggression, with a majority of dogs showing aggression toward people (Figure 1.4).

Dogs that bite people are a significant public health problem. According to information provided on the Centers for Disease Control's website, approximately 4.5 million dog bites occur each year in the US. Of these, they estimate that 1 out of 5 bites become infected. 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 and severity of injury were highest among children aged 5-9 years old, and 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. Biting incidents 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%). While 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 rooms 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 were available (1979-1998), Sacks and co-workers demonstrated that 25 breeds of dogs (including crossbreeds 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.

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! 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 their 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 for 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 ignored. 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 of age 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 (i.e., 'protection dogs'). Dogs were evaluated with the standard measures of Schutze 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 that 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

“There are times when aggression in dogs is appropriate and times when it is not.”

metabolism. This may lead to the development of drug and behavioral therapies for problem dogs.

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 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. For example, puppies play out aggression as they become socialized in litters (**Figure 1.5**). 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, access to food, water, toys, and 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. Many animal behavior specialists and veterinarians 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 5 weeks and 5 months of age. 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 behaviors later in life. Unfortunately, no one really knows how much early socialization is optimal for an individual dog.

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). Barking to warn humans of impending threats and also displaying more direct forms of aggression (biting) were highly desirable (and rewarded) behaviors. Highly controlled aggression displayed by well-trained dogs in response to commands during field trials is highly desirable (**Figure 1.6**). In fact, 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). However, Pfleiderer-Hogner (1979) was not able to show this with Schutzhunden. Some trainers of protection dogs feel that aggressive tendencies are more individualized.



Figure 1.5 - It is very common for puppies to play out aggressive behaviors as they socialize.

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). 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).

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
- 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. However, 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



Figure 1.6 - Highly controlled aggression can be displayed by well-trained dogs in response to commands during field trials.

dogs presented to veterinarians for 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 penetrating wound.

For most dogs, conflict management is important. Cues signaling stress and conflict include repetitive yawning (unrelated 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 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. 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 in these dogs, to prevent escalation of aggressive behavior.

Prevention and Treatment of Aggressive Behavior

Veterinarians and other professionals find that inappropriate aggressive canine behavior 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 concern to breeders. Luescher and Reisner offer the following guidelines for development of well-adjusted puppies (growing, hopefully, into well-adjusted dogs):

- 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
- 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).

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 agents (rabies for instance) may be a cause of aggressive behavior. A study of 238 dogs examined for potential links between "itchiness" (pruritus) 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) and American Veterinary Society of Animal Behavior (www.avsabonline.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, etc.) and that controlling the expression of behavior is not a simple matter of giving a pill 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 offensively aggressive dogs and transforming them into well-adjusted and predictable pets.

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

1. 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.
2. Take a history that assesses how the dog interacts in the environment, with familiar and unfamiliar people and situations, and its attitude toward major daily events.
3. Study the actual aggression problem: when does it occur, how often, what triggers it, what does it look like and 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 the 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 is to simply place food in a room without the dog being present, allow the dog into the room to eat, and then remove 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, which is influenced by genetics, environment, upbringing and training. 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, as 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 or 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.

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Health and Disease in Dogs

Complementary and Alternative Medicine

Stephanie Shrader and John Robertson

Introduction

Complementary and alternative medicine has been practiced in various forms for thousands of years, originating in ancient Asian and Indian cultures. Through trans-oceanic exploration and colonization, non-traditional medical treatments eventually spread to Western civilizations. Many of these therapies were, and still are, practiced by folk healers. The use of complementary and alternative medicine therapies has become an emerging niche in the fields of human and veterinary medicine in the past 30 years. In 1982 Carvel G Tiekert, DVM, established the American Holistic Veterinary Medical Association. According to their charter, holistic veterinary medicine combines conventional and complementary (or alternative) modalities of treatment. Diagnoses and treatments are based on physical examination, behavioral history, medical and dietary history, and consideration of the animal's environment (including diet, emotional stresses, etc.).

Complementary and alternative medicine therapies are considered to be so important in human medicine that one branch of the National Institutes of Health – the National Center for Complementary and Alternative Medicine (NCCAM) – was founded specifically to study them. The National Cancer Institute maintains an Office of Cancer Complementary and Alternative Medicine.

The Basics of Complementary and Alternative Medicine

The NCCAM defines complementary and alternative medicine as a group of diverse medical and health care systems, practices, and products that are not presently considered to be part of conventional medicine (also known as allopathic medicine). Complementary medicine, by definition, is used in conjunction with conventional medicine, while alternative medicine is used instead of conventional medicine. Complementary and alternative medicine can be divided into four general categories: mind-body medicine, biologically based practices, manipulative and body-based practices, and energy medicine.

Mind-Body Medicine

The first category, mind-body medicine, includes prayer, mental healing, and therapies that utilize creative outlets such as art, music, or dance. Oriental practices, such as tai chi, qi gong, meditation, and relaxation techniques are included in this category as well. This category has little practical relevance to the veterinary profession, although there is some research that supports the use of music to ease canine anxiety. One such study was conducted in Belfast, Ireland by Dr. Deborah Wells (Wells, et. al., 2002), a psychologist and animal behaviorist. The study focused on the influence of five types of auditory stimulation: human conversation, classical music, heavy metal music, pop music, and a silent control (i.e., no music). Results revealed that classical music had a calming effect on dogs in animal shelters when compared to the other types of auditory stimuli.

One of us (JR) has successfully used classical music therapy, in his practice, for dogs with obvious anxiety disorders, including dogs that are severely reactive to loud, sudden sounds (Fourth of July fireworks, for example). It is known that dogs have a considerably larger frequency range and increased perception of sounds compared to humans. Exposing dogs to regular, rhythmic, and complex sounds (symphonies, for example) at the same time that they are being rewarded and comforted, allows dogs, over time, to associate the music with positive and relaxing experiences. Playing music at times when dogs are experiencing stress (Fourth of July fireworks!) will relax them and also dilute perception of any sudden or unexpected background sounds. This type of therapy is inexpensive and allows owners alternatives to the uses of sedative, tranquilizers, and antidepressants for calming anxious dogs.

A web search reveals a number of companies that make and market CDs specifically for dogs that experience anxiety problems. One company, Through A Dog's Ear, markets a 3-CD set designed for this purpose.

Biologically Based Practices

Herbal medicine (also known as phytomedicine) has been used for thousands of years in the prevention and treatment of human disease. In recent years, it has become accepted as standard allopathic therapy to make use of substances found in flowers, roots, berries, and herbs (**Figure 1.8**). Many potent and effective therapies, in common use, were derived from plants. For example, corticosteroids were derived

from the molecule diosgenin, originally isolated from wild yams (*Dioscorea villosa*). The cancer chemotherapy agent, vincristine, is derived from compounds found in periwinkles. Aspirin, a non-steroidal drug, is a salicylate related to compounds found in willow tree bark and cambium. Quinine, a preventative for human malaria, was also derived from Cinchona tree bark (Chevallier, 1996). Antibiotics, such as penicillin and streptomycin, came from molds and fungi. The drug digitalis, from purple foxglove (*Digitalis purpurea*), is a mainstay of therapy in dogs and people for treatment of heart failure.

It should be pretty apparent that substances derived from plants can also be extremely toxic. A small dose of aspirin may lower the body temperature in a person with a fever or help prevent blood clots from forming by keeping blood platelets from becoming sticky. Two or three times that small dose may cause heartburn, stomach ulceration, and bleeding tendencies. We pointed out (above) that some very common and useful antibiotics are derived from growing molds. The growth of other molds, like the fungus *Aspergillus flavus* on peanuts and grains, can produce mycotoxins which are capable of causing cancer (aflatoxin B) or destroying brain tissue (*Fusarium* toxin – fumonisin). Methylxanthines found in chocolate (derived from the cocoa plant – *Theobroma cacao*) are very toxic, even in small amounts for dogs. Dog owners should understand that the metabolism of dogs and people are very different. Herbal remedies that may be relatively safe for people, may not be safe for dogs. The doses of drugs used to treat disease in humans and dogs have been established through scientific studies. The doses of herbs for treatment of disease in dogs have not been well-studied.

According to the World Health Organization (WHO), in some Asian and African countries, 80% of the population still depends on traditional medicine for primary health care. The WHO also notes that herbal medicine is the most popular worldwide form of complementary and alternative medicine. Herbalists seek to treat a variety of human conditions, including arthritis, depressed immunity, Alzheimer's, asthma, depression, fatigue, skin problems, and a host of others.

Three common herbal remedies used in both humans and animals are St. John's wort, ginseng, and echinacea. St. John's wort (*Hypericum perforatum*) is used in humans as an analgesic, anesthetic and an anti-inflammatory agent. In dogs, it has been used to treat obsessive problems such as lick granulomas, aggression, barking, jumping, scratching, chewing and separation anxiety. Its use is contraindicated with antidepressant drugs.

Ginseng root, from the plant *Panax ginseng*, is native to North America and China. In Chinese, the word ginseng means "the essence of man." This is because it has been used to treat a wide variety of ailments. In humans, Ginseng is administered to treat fatigue and headaches, stimulate the appetite, and to increase both vitality and immune function (Kim et al, 1990), especially in older individuals. It is marketed to treat many of the same conditions in both dogs and cats.

Ginseng, when chemically analyzed, is shown to contain over 35 distinct chemical compounds (ginsenosides, triterpenoid saponins, panaxans, sesquiterpenes) that may have medicinal actions for humans (Chevallier, 1996; Blaylock, 2003). Studies have shown that ginseng will



Figure 1.8 - Herbal medicine makes use of substances present in specific flowers, roots, berries, and herbs

inhibit human tumor cell growth in tissue culture (Shinkai, et. al., 1996). Whether these findings can be extrapolated to dogs would require further studies.

Echinacea is a wildflower (*Echinacea angustifolia* and *E. purpurea*) native to the central United States. Its main uses are to improve the function of the human immune system, especially against the common cold and influenza. It can also be used to help wounds heal faster and decrease inflammation. In dogs, echinacea has been used to bolster the immune system, aid in the treatment of viral infections, and prevent cancer.

And now, a final word of caution and warning about herbal remedies and phytotherapy for your Westie. While plants and herbs have been used for literally thousands of years as folk remedies in humans, much less is known about the effects of plant-based compounds as therapies for disease in dogs. Before beginning any herbal remedy with your pet, always consult your veterinarian first. When in doubt, leave them out - as therapy for sick dogs.

Manipulative and Body-Based Practices

The use of chiropractic/osteopathic manipulation and massage are well-known forms of manipulative and body-based complementary and alternative medicine therapies. Osteopathic manipulation is used by osteopathic physicians, combined with physical therapy, in order to shorten patient recovery time. Reflexology, Tui Na, rolfing, the Bowen technique, Trager bodywork, and many other techniques are also included in this category. Most of

these therapies are impractical for veterinarians and their patients, but there is a growing chiropractic movement within the veterinary field.

Formal animal chiropractic education began in 1989 with the formation of the American Veterinary Chiropractic Association (AVCA). The first courses were taught by the founder, Sharon Willoughby, DVM, DC. She began the practice of teaching Doctors of Veterinary Medicine and Doctors of Chiropractic side by side. Doctors of Veterinary Medicine receive a foundation of chiropractic theory and technique, and Doctors of Chiropractic learn common animal diseases, zoonotic diseases, comparative anatomy, and animal handling techniques.

The AVCA has a multi-tiered mission: to provide a professional membership group, to promote animal chiropractic, and provide certification for doctors who have completed animal chiropractic training. The AVCA also seeks to provide the public with access to doctors trained in animal chiropractic.

Animal chiropractors treat a variety of animals with an array of problems. Cats, dogs and horses are the most common patients, but chiropractic medicine is also used to treat zoo animals, wildlife, and exotics. A chiropractic exam includes evaluation of the patient's history, radiographic findings, a neurological exam, and the adjustment of vertebral joints, extremity joints, and cranial sutures (**Figure 1.9**). Animal chiropractic has been used in the treatment of neck, back and extremity pain, muscle spasms, injuries, internal medicine disorders, and temporomandibular joint syndrome.

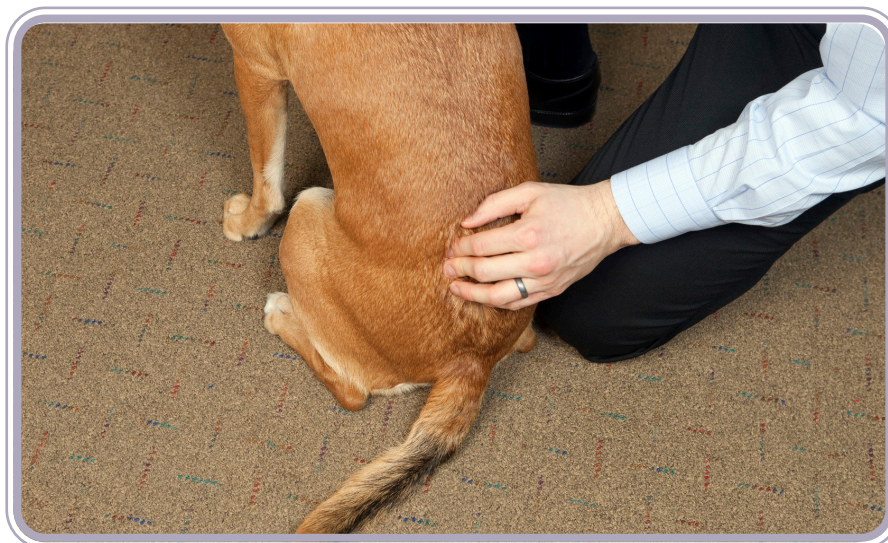


Figure 1.9 - Chiropractic can be used in the diagnosis and treatment of specific conditions involving the back, neck, and extremities, as well as pain associated with muscle spasms and certain injuries.

To find out more information or to locate an AVCA certified veterinarian, review the following website:

www.AnimalChiropractic.org

Most Westie owners know that their dog enjoys being petted and held. Some dogs seem to particularly enjoy massage, if they are acclimated to it and rewarded for 'participation'. Dogs that have suffered injuries may be painful and resentful of manipulation and massage, but may benefit from the gradual introduction of common-sense physical therapies, including gentle massage and range-of-motion exercise, warm and cool compresses and even hydrotherapy. Most veterinarians receive little, if any, training in physical therapy and rehabilitation of their patients. However, they may work with you and local physiotherapists to custom design programs for dogs with injuries that would be helped by therapy. This should be discussed with your veterinarian.

Energy Medicine

Energy medicine, perhaps the least studied and least understood of all the complementary and alternative medicine therapies, involves manipulation of the energy fields that purportedly surround living beings and the use of electromagnetic fields for therapeutic outcomes. Energy medicine includes Reiki, Therapeutic Touch therapy, light and sound therapy, qi gong, homeopathy, acupuncture, and a host of other treatments. Although we have known some pet owners to practice Reiki and Therapeutic Touch therapy, the most common energy medicine techniques practiced by holistic veterinarians (and endorsed by the American Holistic Veterinary Medical Association) is homeopathy and acupuncture.

Homeopathic remedies date back to the time of Hippocrates, and include the use of plants, minerals, drugs, viruses, bacteria and/or animal substances to treat illnesses. Homeopathy involves treating an ill patient using a substance that can produce, in a healthy individual, symptoms similar to those of the illness. This substance is created through serial dilution of the normally toxic agent. For example, snake venom, poison ivy and opium have been used to make homeopathic remedies, but in high enough concentrations can cause serious problems. Homeopathy has been used to treat a wide range of problems in both humans and animals, but has not been studied scientifically to prove effectiveness or safety.

Acupuncture, by definition, is the Chinese practice of piercing specific areas of the body along peripheral nerves with fine needles to relieve pain, induce surgical anesthesia,

and for therapeutic purposes (Dorland's Pocket Medical Dictionary, 25th ed. W. B. Saunders Co., 1995). Acupuncture dates back thousands of years and is considered part of traditional Chinese medicine. According to traditional Chinese medical theory, the qi (life force) flows through various meridians (channels) throughout the body. When this flow is disrupted, it manifests as pain, and other ailments. In the United States there are currently more than 50 schools and colleges of human acupuncture and Oriental medicine. Many offer masters degree programs and are accredited by or have been granted candidacy status by the Accreditation Commission for Acupuncture and Oriental Medicine. Here is a website for finding out more about the acupuncture schools in the United States and the programs they offer: www.acupunctureschools.com

The National Cancer Institute website for complementary and alternative medicine (www.cancer.gov/about-cancer/treatment/cam) provides a wonderful overview of the use of acupuncture as a treatment for individuals (humans) with cancer or cancer-related side-effects. Research supports acupuncture as an effective complementary therapy to reduce nausea and vomiting after surgery and chemotherapy, as well as an effective pain inhibitor. There are many studies currently underway involving acupuncture and its ability to relieve lower back pain, breast cancer, limb pain, menopausal symptoms, nausea, dry eye, and the list goes on, and on. One of us (JR) has undergone acupuncture treatment of painful lower back spasms (due to disc prolapse) and will personally attest to its effectiveness! A full list of current clinical trials involving human acupuncture can be found at: www.clinicaltrials.gov/search/open/intervention=acupuncture

There are a growing number of veterinary acupuncturists (**Figure 1.10**). According to the AVHMA, the main goal of veterinary acupuncture is currently to strengthen the body's immune system. The etiology of acupuncture's therapeutic effects, however, is not well understood. As you might imagine, dogs that are going to be acupuncture subjects may not understand what you and the acupuncturist are trying to accomplish – or how you are doing it. It takes little imagination to realize that your Westie might not think it is such a good idea to get stuck with one or more long needles and then to hold still for the therapy to work (5-30 minutes). It is probably a very good idea, if you are considering acupuncture therapy for some painful condition, to discuss this with your veterinarian and the veterinary acupuncturist. It may be worthwhile to get the names of clients who have had dogs treated with acupuncture and to contact them to see how the therapy worked. Remember: dogs don't seem to experience a "placebo effect" – there is no amount of

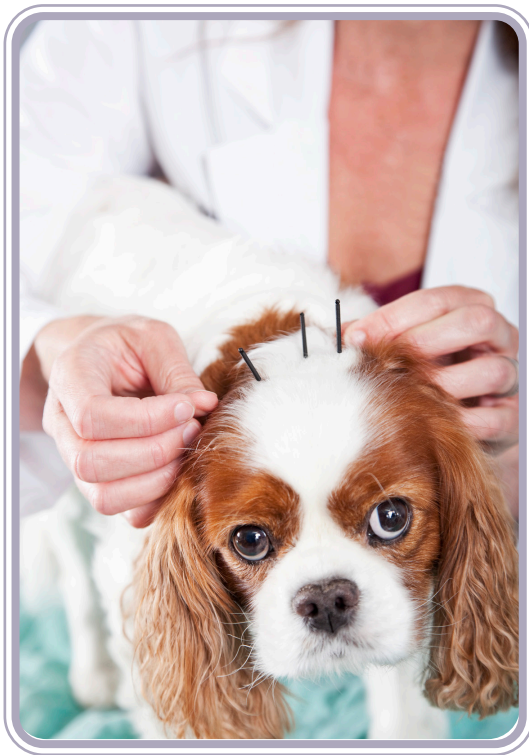


Figure 1.10 - Application of acupuncture to treat a painful condition in a dog.

talk that will convince the dog it is going to feel better! To contact and/or locate a holistic veterinarian who practices homeopathy or acupuncture, check out the websites listed at the end of this chapter.

A Personal View of Complementary and Alternative Medicine – John Robertson

Imagine for a minute that you are sick. Perhaps suffering from arthritis and the ravages of age on our bones and muscles. How do you view your disease and suffering? The result of normal wear and tear? Perhaps the result of injuries sustained many years ago? Bad diet? Not enough vitamins? Poor posture, a bad mattress or old shoes? It is very hard to say if any or all of these factors are the cause of your current disease, but you know you want some relief. What are some things that might be effective?

- Anti-inflammatory drugs (cortisone, non-steroidal drugs like aspirin) to decrease joint inflammation and potentially slow the progression of disease
- Anti-inflammatory drugs to decrease pain, allowing more normal mobility and better quality of life, with normal daily activities
- Application of topical heat to sore joints and muscles, with or without application of heating and cooling

topical gels and ointments

- Vitamin and mineral supplements, including calcium and magnesium, to help rebuild and maintain bone
- Vitamin supplements, including chondroitin-glucosamine, for helping the healing process
- A balanced program of exercise, perhaps including exercise in water, and stretching to gain/regain mobility, decrease stiffness, and increase a feeling of well-being
- New mattress and new shoes
- Better diet, coupled with sensible weight loss (if overweight)
- Rest in a comfortable place when tired
- Avoid repetitive injury than makes the arthritis worse

If you did all the things (ten of them) on the list, do you think you would feel better, especially if you did them over and over? At least 80% of the items on the list (the bottom 8 items) are not a pill prescribed by your doctor. Each, however, would be complementary to the occasional use of drugs (steroids and non-steroidal anti-inflammatory drugs). Complementary therapy provides a system of holistic healing, optimizing diet, exercise, and judicious use of drugs that have been proven to be effective. This would work for you and for your dog. And (I hope) you would accept that neither strict medical therapy (the drugs alone) nor the combination of medical and complementary therapies are going to cure your arthritis.

Suppose, now, that your dog has developed a serious cancer, such as malignant lymphoma. Malignant lymphoma is one of the most treatable forms of cancer in dogs. With multiagent chemotherapy, many (over 50%) dogs, even those with moderately to markedly advanced cases, may live 1-2 years. The drugs, however, do not cure the cancer, and virtually all dogs diagnosed with malignant lymphoma will succumb to the disease or complications of the disease. We know this from studying the outcomes of treatment of thousands of dogs that have developed malignant lymphoma. In general, about 10% of dogs getting chemotherapy (the treatment of choice for malignant lymphoma) will develop treatable side effects during therapy, including vomiting and diarrhea. Dogs with moderately to markedly advanced malignant lymphoma that do not receive multi-agent chemotherapy rarely live more than a few months.

What do you do? Treat? Not treat? Hard choices. Life and death choices. Some owners, concerned with the potential suffering that their dog might have, decide on humane euthanasia, and this is both a personal and rationale choice. Some other owners might decide to go ahead with chemotherapy, realizing it is expensive (perhaps \$3,000 to \$6,000), and that they may prolong life, good quality life, for up to a year or two. And that your dog is going to

very likely die as a result of the cancer. For most owners, making this decision is very difficult and there is almost always sadness and frustration for your canine friend and companion having an incurable disease. But, there are two rational choices – euthanize or treat.

In trying circumstances, some owners may reject rational choices, feeling that traditional allopathic and complementary medicine has failed them and their pet. When they ask the veterinarian to cure the incurable and treat the untreatable, they indicate that current medical and surgical practice has failed them. They may wish to avoid well-documented and supportive therapies in favor of treatments whose value, effectiveness, and safety have not been established. While it is quite normal to feel frustrated that our pets get ill and eventually die, it is not rational to reject proven therapies for unproven alternative therapies. I've lost eight dogs and as many cats to disease. As much as I hoped I could fix them, in the end I could not. There were no magic medicines, no secret herbs, and no intervention that would keep them with me. I've reflected on my limitations and failings quite a bit. In the end, I always come

back to the same answer. As pet owners, as veterinarians, as scientists, we owe our pets the best possible life we can provide for them and we need to constantly work harder to make the years they have with us quality time, free of disease. We need to understand disease and develop better treatments, not harbor resentment over the limitations we now experience. In the end, it's all about understanding more and doing more, not rejecting treatments that aren't perfect or foolproof.

In summary...

There are many forms of complementary and alternative medicine that have a place with common and traditional medical and surgical therapies in treating disease in dogs. There is a lot of information available (see below) describing some tested and helpful therapies. Westie owners should be cautious about subjecting their dogs to unproven therapies and should reject stuff that promises unrealistic results (like curing or preventing cancer). Do not use toxic and potentially deadly plant/herb products.

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Related Websites

- National Center for Complementary and Alternative Medicine: <http://www.nccam.nih.gov/>
- Academy of Veterinary Homeopathy: <http://www.theAVH.org>
- American Academy of Veterinary Acupuncture: <http://www.AAVA.org>
- Veterinary Botanical Medicine Association: <http://www.VBMA.org>
- World Health Organization: <http://www.who.int/en/>

Links to Practitioners of Complementary and Alternative Medicine

- <http://ahvma.org/>
- <http://www.ivas.org/>
- <http://www.petsynergy.com/>
- <http://www.AnimalChiropractic.org>