

Best Friends BULLETIN



Dear Clients & Friends...

I love to learn new things. I just spent the day at a seminar on anesthesia, where I learned some new drug combinations, strategies for anesthetizing pediatric patients and techniques for dealing with anesthetic complications. Every time I learn something new, I make plans for implementing what I learned and for teaching you, my clients, about it. I usually also think of several patients I could have helped had I only had this information sooner, and another few I can treat more effectively who have appointments coming up.

Human beings love to explore and try new things, though at the same time we also fear stepping outside our comfort zone. Whether we are brave enough to venture onto new ground depends on our personality. Part of what has kept me current during 35 years of practice is my love for innovation and change. It's increasingly difficult to keep up with the rapid pace of change in medicine today, not only for us but for pet owners. If we don't keep moving forward, we quickly fall behind.

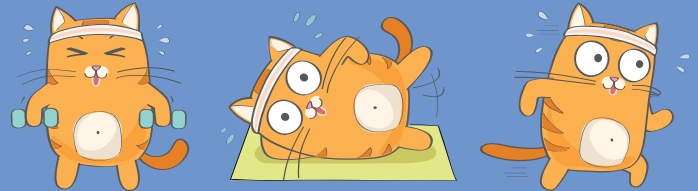
Different people learn best in different ways. Some of us are more auditory, some need to read things to remember them and others are kinesthetic learners, who do best with hands-on activities. Most of us, at least those who are not blessed with photographic memories, need multiple repetitions of new information to remember it.

I think about this a lot when I am launching into a discussion on pet nutrition or arthritis or dental care - things I've already talked to thousands of clients about over the years. It may be the ten thousandth repetition for me but it may only be the first or second for you. I expect it may take a few visits before you may remember enough to change something. Sadly, while it's taking us several years of discussions about pet food, for example, for you to remember what we are teaching, you are hearing 1000 misleading commercials that run counter to what we are saying. You are bombarded with information, not all of it credible or



Cat Tidbit...

• Veterinarian Brita Kiffney has taken in a 25-pound, 8-year-old domestic shorthair cat named Cinderblock whose owner could no longer care for her and brought her to Dr. Kiffney for euthanasia. Videos of Cinder's exercise routines -- and her displeasure -- have gone viral, and Dr. Kiffney says she released the video to raise awareness about the prevalence and danger of pet obesity.



accurate. We often have to work pretty hard to counteract some pretty powerful marketing.

For pet owners in a busy world, implementation can be hard as well. Everyone is in a hurry and distracted by a thousand other things. If I talk to you about nutrition but you don't need to buy a new bag of dog food until three weeks from now, you may already have completely forgotten about our discussion by then. Part of the reason we send handouts home with you is to provide repetition of our messages, because if you don't revisit new information at least 7 times in the first 21 days after you learn it, you won't remember it and you won't change how you care for your pet. Handouts also give you more detail than we may have time for during your visit with us, it lets you share what you learned with family and friends, and sometimes it helps make up for us being tired or behind schedule.

One of the ways I provide repetition of new information for myself is to write newsletters and handouts for all of you, and another is to teach it to my team members. If it's a story or a fun fact, I also will make an effort to talk to you about it in the exam room over the course of the following week after I learn it. The more I use it, the more likely I am to remember it and to make the leap from knowing something to doing something. Knowledge is useless if it's never implemented. If we don't change our habits, our medical protocols or our treatment plans, why bother learning at all?

Thank you for allowing me to share new information with you via this newsletter. I hope some of what you read is worth acting on!

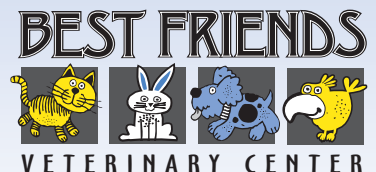
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What's New In the Wonderful World of the Microbiome?

By Dr. Nan Boss

I love TED talks. Every evening, while my elderly cat eats her dinner and I am supervising to stop my dog from eating it instead, I browse Youtube and find something interesting to watch. As likely as not, it's a TED talk. After listening to several interesting talks on the effects of nutrition and intestinal bacteria on brain function and mental health, I purchased an audiobook called *The Mind-Gut Connection*. It's fascinating, albeit a bit disgusting here and there.

Did you know that bacteria invented most of the chemical messengers and neurotransmitters our own bodies utilize? They don't always use these messengers in quite the way mammals do, but all the chemical signals used between one-celled organisms affect our body systems as well. The bacteria in our intestines produce proteins and hormones almost identical to our own. These include the neurotransmitter serotonin, which is a vital signal involved in emotion and mood; insulin, which affects the absorption of sugar by all of our cells; and gastrin, which is the chemical signal that tells us we are full.

Since the bacteria in and on our bodies outnumber our own cells ten to one, all these chemical messengers going back and forth between bacteria affect our own bodies – profoundly and immensely. The health of our microbiome affects brain development and aging, emotions, hunger and whether our bodies are storing or burning fat. All sorts of diseases are affected by what we eat and what microbes are living inside us, including Parkinson's disease, Alzheimer's disease, depression, autism, schizophrenia and many others.

Recent studies in humans and laboratory animals have shown the microbial community inside the gut plays a central role in brain function and development. For example, "germ-free" mice, who are born by c-section and are raised in sterile environments, with no exposure to bacteria and no microbiome, do not have normal brain development. The 'gut-brain axis' represents a multi-directional signaling system that encompasses neurological, immunological and hormonal pathways. Without these signals the brain functions differently.

In particular, communication between the brain and the gut is tightly linked with the hypothalamic-pituitary-adrenal axis (HPA), a system that regulates stress hormone release and influences brain development and function. Experimental examination of the microbiome through manipulation of diet, infection, stress

and exercise, suggests direct effects on learning and memory.

Many other body systems and functions are also influenced by gut bacteria. Mammals have more immune system cells patrolling the intestinal tract than in the rest of the immune system put together – blood, lymph nodes, bone marrow, etc.

The immune system and the intestinal microbiome are in constant communication. Probiotics, which are healthy, "good" gut bacteria we introduce into our bodies via probiotic supplements, Kombucha, fermented foods, yoghurt, etc., are part of the treatment plans for more and more diseases. Upper respiratory infections, asthma, inflammatory bowel disease, all kinds of intestinal infections, allergies, chronic infections, mental illness, anxiety disorders and even arthritis pain are all problems for which probiotics might be prescribed.

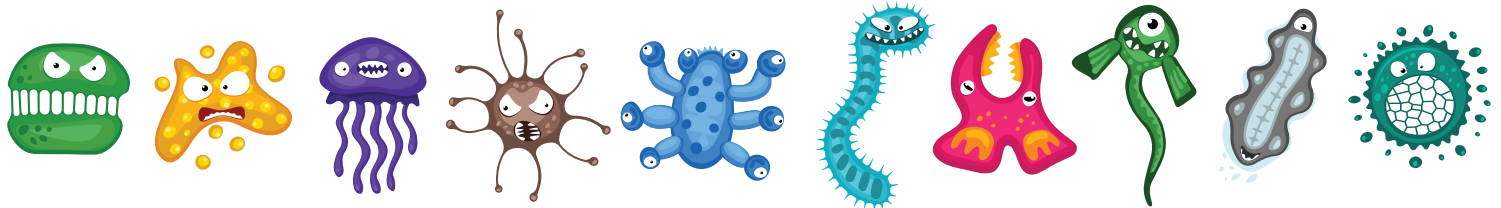
We included an article about Calming Care in a previous newsletter. Calming Care is a probiotic supplement made by Purina that has been clinically proven to reduce anxiety in about 2/3 of dogs who consume it. I am starting to think we should be using probiotics for all dogs with behavioral abnormalities. We don't understand right now how a human's or an animal's individual, unique microbiome affects the brain and vice versa. We know that the gut-brain axis is important. We know we do better eating a diet with more fiber and less sugar and other refined carbohydrates, in part because soluble fiber supports the growth of gut bacteria. For now, until we have a more exact understanding of what, when and how influencing the microbiome can improve health, eating a healthy diet and supplementing with probiotics should be a blanket recommendation for everyone.

This is not as simple as it might seem. For one thing, you have no way of knowing from a pet food label how much soluble versus insoluble fiber is in the food. Insoluble fiber provides bulk to the stool but does not support healthy microbes like soluble fiber does. All you will see on a label is maximums and minimums of protein, fat and carbohydrate. Both types of fiber are part of the total carbohydrate amount. There are only a few pet food manufacturers that know and provide specific information on fiber content. Chances are good that what you are feeding your pets does not have an ideal amount of fiber.

Another problem is that most probiotics on the market do not contain what is stated on the label. When tested in independent laboratories, only two of about 30 different over-the-counter brands of probiotic supplements had live bacteria in the amounts stated on the label, and zero of 19 brands of dry pet food contained any live bacteria. The two brands of probiotic supplements that passed the testing were FortiFlora, made by Purina, and Nutramax's Proviola.

Purina's research laboratory has been working on the development of probiotics for years, focused originally on the treatment of diarrhea, which is what FortiFlora is used for. In order to provide enough "colony-forming units" of bacteria

I love TED talks too.



to have effects beyond the intestine itself, higher numbers of bacteria are needed than are provided in FortiFlora. Purina's Calming Care probiotic is a particular strain of bacteria in a large amount, so it's different from FortiFlora.

Provable has increased the potency of its products recently, to keep up with newer research findings. A new probiotic called Visbiome is also a high-potency product. The other probiotic we have been using for years is a prescription human product called VSL#3. This last one is our go-to probiotic

for cat respiratory infections. It has recently been shown to be as effective as a combination of prednisone and metronidazole for treating inflammatory bowel disease in dogs.

We have been modifying many of our medical protocols over the last few years to minimize our use of antibiotics. The more antibiotics, the less healthy the microbiome, and once damaged it can take months or years for normal intestinal bacteria to recover. This can have lasting effects on many body systems. If your pet has had diarrhea, you may have noticed that we are trying to use less metronidazole, and a probiotic is almost always being used as part of our treatment. Skin infections are

another area where we are using more topical treatments, such as sprays and shampoos, and fewer antibiotics. We are shortening the length of antibiotic treatment for urinary tract infections as well.

In summary, if your dog or cat has any sort of behavioral or anxiety disorder, then Calming Care would be a good product to try, especially as it has none of the side effects sometimes seen from prescription medications. We also recommend pet foods that contain whole grains, beet pulp and/or chickory, which are all good sources of soluble fiber. Lastly, we will be minimizing antibiotic use when we can.

We are minimizing our use of antibiotics and recommending healthier foods!



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More Cat Tidbits...

- Cats form either secure or insecure bonds with their owners in the same way babies and dogs do, according to research. Securely bonded cats will explore new areas with their owner present, while insecure felines will either hide or cling to their owner when they are in unfamiliar places.



- A study published in the Journal Viruses found an association between domestic cat hepadnavirus and certain types of feline hepatitis and liver cancer. This finding might bring about new treatments and

vaccines, says researcher Julia Beatty, a professor of feline medicine. The findings mirror a link between hepatitis B and liver cancer in humans.



- Revised guidelines from the American Association of Feline Practitioners list 36 diseases that can pass from cats to humans, although overall incidence of feline-to-human zoonosis is low, says co-author and veterinarian Michael Lappin. Regular deworming,

vaccination against rabies, treatment to prevent fleas and ticks, as well as basic sanitation, mitigate risk of disease and can protect humans against many of the zoonotic diseases cats can carry.

- A new two-part test assesses canine and feline urine samples for infection and then checks for susceptibility to antibiotics, enabling more targeted, effective treatment. The U-Treat assay, which was validated by researchers at the University of Tennessee and Cornell University, demonstrated 97.1% sensitivity and 92% specificity, and it is being investigated for use in horses and maybe eventually humans.

- Biologists are working to better understand the chemical compounds and messages cats leave behind when they mark around the house, and a recent study examined microbial cultures from a Bengal cat living in California. The team found Tesseractococcus accounted for 83% of the bacteria, followed by Bacteroides, Anaerococcus, Peptoniphilus, and Finegoldia, and they isolated 51 chemicals believed to contribute to odor and the information it conveys.



Diet-related Heart Disease and Your Pet

By Dr. Nan Boss



Over the past four years or so, the FDA has been receiving more and more reports of serious heart disease and heart failure in dogs that improves when the pet's diet is changed. We have known for years that a deficiency of taurine in the diet can lead to heart failure in both cats and dogs. In these recent cases, however, taurine levels are not usually low and supplementing taurine has not worked, so there is some other problem with the food in these cases. We don't yet know whether there is a toxin involved or a nutritional deficiency other than taurine.

The vast majority of diets reported to the FDA for causing heart failure have been grain-free. It is thought that potatoes and legumes, such as lentils, green peas and chick peas, which are substituted for grains in these diets, are involved in the problem. Green peas have already been shown to increase risk for heart disease in cats and bladder stones in ferrets.

The specific form of heart disease we are seeing in dogs is dilatative cardiomyopathy, DCM, a disease of the heart muscle. **90% of the pet food products associated with DCM are labeled as grain-free, and 93% of those products contained peas and/or lentils as a major ingredient.** (The FDA described a major ingredient as anything that comes before vitamins and minerals on the ingredient list.)

Grain-free diets have become very popular, making up 25-50% of our patients' diets. The grain-free concept originally arose from anti-corn sentiments and diets marketed as having "no corn," implying that corn is bad. You'll find loads and loads of information out there proclaiming that corn is bad for dogs from a nutritional aspect. That is myth, not fact, but it has been heavily used as a marketing ploy and most pet owners believe it.

The marketing of grain-free diets as being low carbohydrate fits in with what people are eating for themselves and what they feel good nutrition is supposed to look like. There are health benefits **implied** with grain-free diets but there is no scientific support for these claims.

In the grain-free diets that we're seeing in association with cardiomyopathy, much of the grain has been replaced with tubers or legumes. Across the grain-free diets

in the reports, there are a wide range of nutrient profiles and ingredients—so this is not an issue isolated to just a couple of diets or a couple of ingredients.

Proteins are made of amino acids. Not only is there a requirement for protein in general, but our bodies need adequate amounts of each individual amino acid as well. A lot of grain-free diets use legumes and/or tubers as a carbohydrate source, but also to supply protein and fiber. Legumes are high in protein and they're high in fiber—but they're limited in sulfur-containing amino acids.

Protein sources that have a lower concentration of sulfur amino acids, such as the afore-mentioned legumes, can lead to nutritional deficiency over time. In a similar way, lamb meal and rice diets were identified as a risk factor for heart disease in the '90s, because lamb is pretty low in the amino acid cysteine.

You may be familiar with the concept of complementary amino acids, meaning that if you have two different foods limited in different amino acids and you put them together they fill those gaps for each other. That's why meals containing beans and rice or beans and cheese are healthy - they have complementary amino acid profiles. Grains and legumes often go well together. Diets for swine, which are omnivores like people and dogs, usually contain corn and soy both. Combining the two provides all the amino acids necessary, where feeding just one or the other would be nutrient-deficient.

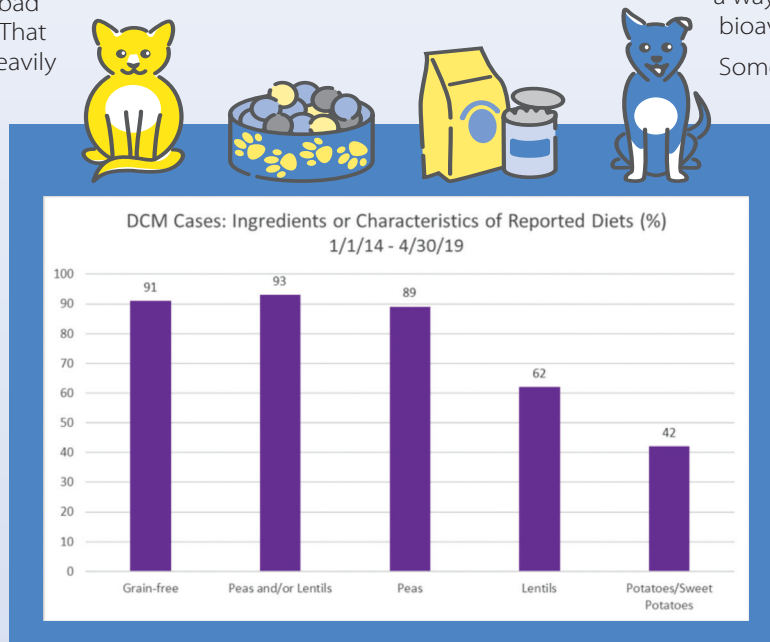
Some of the grain-free diets that are on the market aren't very high in protein because they tend to have more unusual or exotic, and therefore more expensive, protein sources. The companies that make them are relying on those legumes or tubers for a large proportion of the protein and the amino acid in their diets.

Not only must the sum total of the ingredients in a diet contain enough of each amino acid but the ingredients must be cooked or processed adequately to release them. Proper processing is essential to maximize amino acid digestibility, especially in legumes. This is one of the problems with raw diets. A few nutrients are degraded by cooking but many are not available to the animal that eats them unless they are cooked.

Legumes have some anti-nutritional factors, too - things like trypsin inhibitor and phytate. We can decrease the concentrations of those factors by heat treatment and processing of food. The amino acids lysine and methionine are both really sensitive to processing damage. We want to make sure that a pet food is processed in a way that maximizes amino acid bioavailability.

Some types of fiber can bind with taurine, a particular amino acid essential for heart function. The type and amount of fiber in a food and in what amount is also a factor in the availability of specific amino acids. Even if there is theoretically enough of a certain amino acid in the ingredients used, putting the whole ingredient panel together may lead to deficiencies because certain nutrients bind to each other.

If this all sounds complicated, that's because it is! **Most pet food manufacturers**



simply put a bunch of ingredients together that add up to sufficient amounts of nutrients on paper – but that doesn't guarantee that nutrition is still adequate in the finished product.

Let's look at a real-life example. Let's say we are making a dog food that is made of a combination of lamb, chickpeas, lentils and peas. This diet has adequate protein concentration for an adult dog, so about 24% of the calories are coming from protein. If we were going to turn this into a commercial diet and make an ingredient list in order of weight, then lamb would be listed first. However, not all of the meat consists of protein. Lamb is a pretty fatty protein source. About 20 to 25% by weight is fat, which is pretty typical for raw ground meats. Further, meat also has water in its content, which will be removed when the food is cooked, reducing the weight of the protein and fat to only 25% or so of the original weight.

When we look at our protein and amino acid profile and compare it to the AAFCO nutrient profiles for adult dogs, the protein amount in total about 137% of the target amount. That sounds like plenty. However, if you look at the amino acids individually, you'll see that methionine-cysteine is only 103% - that doesn't leave much margin for error. If you decide your pet has gained a few pounds and you cut her food amount back a bit too far, she will no longer be receiving an adequate amount of this amino acid.

In this example diet, the lamb is only providing about a quarter of the protein in the diet, and about a third of the sulfur amino acids. When a lot of pet owners look at a pet food ingredient list and they see meat as the first ingredient - which is what you have probably been told to look for - you assume that's where the protein is coming from. In this case, that's not true because once the water

is cooked out of the food and the fat is subtracted out, the legumes are actually providing more. Just because there's meat there doesn't mean that's where all the protein is coming from.

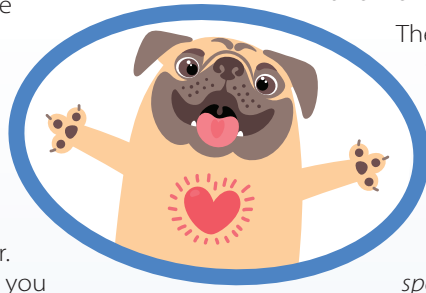
Then let's suppose the diet is undercooked or contains a fiber mix that binds to some of the amino acids. You can see how easy it would be to end up with a deficient diet – and possible heart failure.

Multiple diets have been implicated in the causation of DCM. The June

In response to reports of diet-associated heart disease, some manufacturers have added taurine to their diets. Taurine is not the only amino acid that can be a problem and in the cases the FDA has been tracking recently, it's not the deficient one. It's not sound nutritional practice to attempt to simply supplement a diet with taurine to make up for formulation mistakes. Essentially, you can't really supplement your way out of poor nutrient content.

2019 FDA report provides a list of pet food brands that have been implicated. Almost 50% of the cases reported to the FDA were being fed Acana, Zignature or Taste-of-the-Wild diets. However, 13 other companies' diets were also listed. These brands are likely the tip of the iceberg, because very few veterinarians have been reporting cases to the FDA. Just because the diet you are feeding your dog isn't on the list doesn't make it safe.

What should you feed your dog?
Exactly the same brands we have always



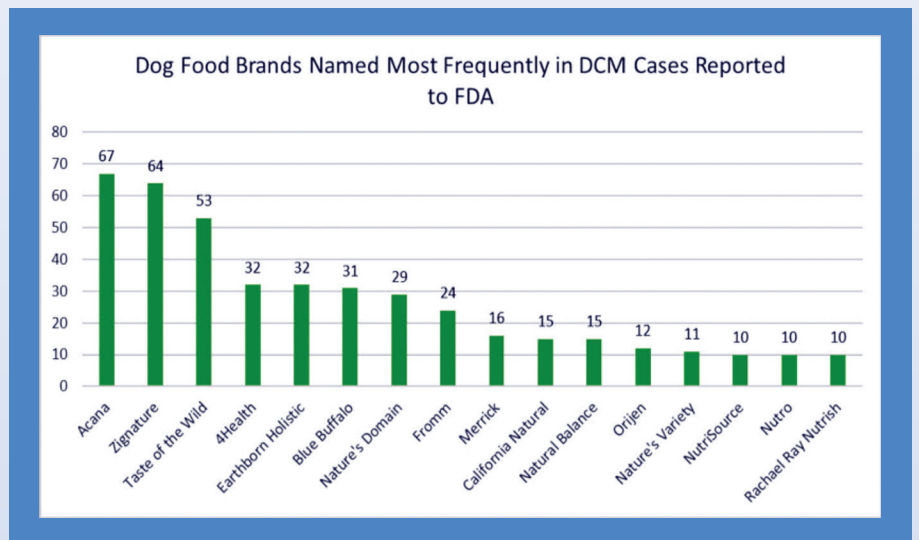
- recommended, and for the same reasons. **1)** We want a diet manufactured in the company's own plant, not in a giant production facility that makes diets for dozens of different brands. This ensures the company has control of the ingredients, the processing and the cleanliness of the plant.
- 2)** We want a diet formulated by a nutritionist – that means a PhD in animal nutrition or a veterinarian board-certified in small animal nutrition. Nutrition is way too complicated to formulate on paper from a chart.
- 3)** We want ingredient testing before those ingredients go into the food – for purity, for heavy metals, for fat and water content, for fiber balance and a host of other things.
- 4)** We want the company to perform and publish nutritional research.
- 5)** We want feeding trials, where the food is fed to live dogs who are tested and monitored for things like heart disease and kidney failure.

There are only four pet food companies that do all this. We used to give you a list of other brands we thought were acceptable but we have cut way back since this heart disease issue came to light last year. Our four brands are:

- Hill's, makers of Science Diet and our most-prescribed line of prescription diets for specific diseases and problems
- Purina, specifically ProPlan, which is their premium pet store line of foods, and the therapeutic diets, again for specific diseases and problems.
- Iams, specifically their Eukanuba pet store line.
- Royal Canin, which makes breed-specific diets that are tailored to meet the needs of specific types of dogs and whose therapeutic diets we also highly recommend.
- If you want to purchase your pet food in the grocery store, we suggest Iams and Purina ONE.

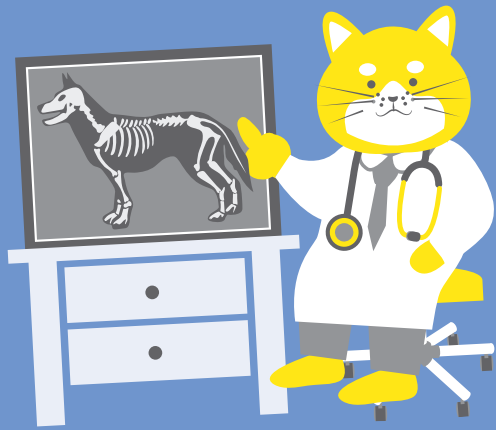
IN SUMMARY: unjustified fear of grains has led to grain-free diets making up about 1/4th of the dog food market. Not only is there no evidence of health benefits from grain-free diets but there is mounting evidence to show they are causing harm.

For information on specific parameters for 240 different brands, check out the Pet Nutrition Alliance Dare to Ask program at www.petnutritionalliance.org. If you look at the data you will see that many pet food companies would not answer any of the Alliance's questions. You should assume from this that they do not meet our criteria for a good quality diet.



Medical Management of Torn ACLs

By Dr. Alexandra Ripperger



The most common hind leg injury in large dogs is a tear in the cranial cruciate ligament (CCL), located deep inside the stifle joint. In humans, this same ligament is known as the anterior cruciate ligament (ACL) and the stifle is known as the knee, so we commonly refer to this injury as an ACL tear in the knee.

If your dog tears an ACL - what's next? An examination and x-rays of the joint confirm the injury, pain medication is started and we discuss options. Surgery is the gold standard for helping your pet regain normal function of its knee, but with a price tag of over \$3500, not including rehab afterwards, it is not feasible for many families. (An ACL tear is one of the best ways for pet insurance to turn out to be a good investment!)

If surgery is not an option, the alternative is rest and rehab. In addition, pain medication and supplements such as glucosamine and fish oil, reduce inflammation and promote healthy joints. These both play a vital role in improving quality of life in dogs with torn ACLs. But what other non-surgical options do we have to promote healing and help your pet live comfortably?

Weight management or loss: Numerous studies have shown that overweight dogs are at much higher risk for torn cruciate ligaments than dogs who are of appropriate weight. A lean and fit dog is less likely to tear the ligament and more likely to have a partial tear than a full tear.

Additionally, research has shown a strong correlation between a dog's weight and age, and the severity of ACL degeneration; in other words, the older and more overweight your dog is, the higher the likelihood he or she may tear their ACL. If your dog is overweight, a top priority during medical management of a torn ACL is weight loss! In humans with knee pain or injury, losing as little as five pounds reduces pain by 15%.

Exercise restriction: Does this mean strict cage rest? NO! We want to prevent hind limb muscle atrophy. We recommend that your dog have 6-10 weeks of limited activity though no running, jumping or stair use. We recommend only short walks outside for bathroom breaks, and your dog

should be confined to a small area or room when left alone. A "Help 'Em Up Harness" (helpemup.com) or "Walkabout Harness" (walkaboutHarnesses.com) can be helpful in assisting larger dogs with marked lameness or mobility issues during this time period.

After the initial period of rest, we will determine a plan for slowly increasing your dog's activity level over the next 3-12 months. Dogs are at risk of causing further injury to the knee if activity is increased too quickly.

Therapy Laser: Many of our patients have benefited from "cold" laser. Laser therapy uses light to stimulate cell regeneration, increase blood circulation, and reduce inflammation and pain. We typically recommend twice-weekly treatments for 3-4 weeks.

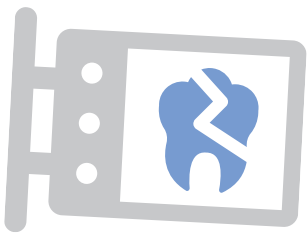
Rehabilitation exercises: These may include passive range-of-motion, massage, strength training, underwater treadmill therapy, and/or acupuncture. Did you know Dr. Boss is trained in canine rehabilitation, and we have an underwater treadmill at Best Friends?

Injections: There are numerous substances we can inject into your pet's knee, under sedation, that can provide benefits in the healing process.

- *Platelet-rich plasma (PRP): PRP contains growth factors that reduce inflammation and increase collagen, which protects the cartilage in joints. This is a good option if your dog has a partial ACL tear, has significant inflammation, or has joint fibrosis. Expect 2-3 injections over a 4-6 week period*
- *Hyaluronic acid (HA): HA acts as a lubricant and shock absorber in the joints. This is a good option for dogs with hind limb anatomic abnormalities, damaged menisci, or degeneration to the point of bone-on-bone contact. A single injection encourages growth of healthy cartilage cells, reduces inflammation, and decreases cartilage cell death.*
- *Steroids: Two commonly used steroids for joint injections include methylprednisolone acetate and triamcinolone. These are good options for dogs with end-stage arthritis or when fast-acting relief is needed for very inflamed/swollen joints. The effects are immediate (within 24 hours) and last for months.*

Braces: Knee braces are seldom used in veterinary medicine. We have little evidence of benefit, and a poor quality brace can actually worsen the situation. A custom brace is greatly preferred to a "one-size-fits-all" brace ordered online. A custom knee brace requires visits for casting and/ or measurements to be taken, and some companies require pets to be sedated for this. Important considerations include breaking in the brace appropriately, monitoring for rubbing sores, and continued exercise restriction. A custom knee brace can cost as much as \$1500, which is a lot of money to spend for a device that may not provide any benefit.





During a recent conversation at our weekly doctor rounds, Dr. Boss, Dr. Paige, and I were discussing our goal of increasing education in the Best Friends community on the benefits of dental care for pets. Periodontal disease is widely regarded as the number one medical condition in small animal

medicine - yikes! At Best Friends, we regularly perform dental procedures on pets to address various oral health concerns. While there are many aspects to high quality oral care for pets, in this article I'm going to focus on an indispensable tool we have in the hospital: dental X-rays. You have X-rays performed when you visit the dentist or oral surgeon, and guess what? Your pet should too!

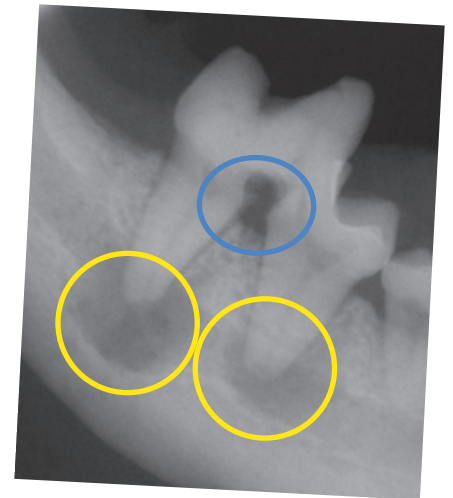
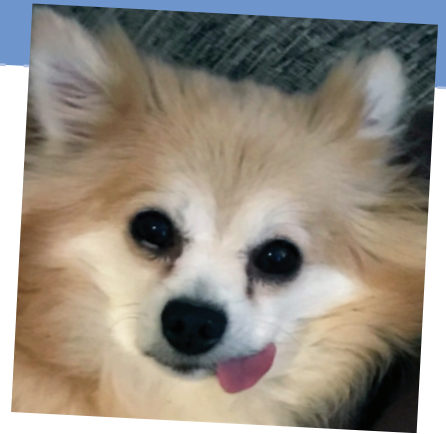
The American Animal Hospital Association's (AAHA) Dental Guidelines strongly recommend that every pet undergoing a dental procedure have dental X-rays performed while under anesthesia. The ONLY way to accurately evaluate the entire tooth is to take an X-ray. Teeth are a little like icebergs: the part above the gumline we can see, called the crown, is only part of the story. Dogs and cats have long roots (one to three per tooth depending on the type of tooth) below the gumline. It is

not uncommon for the crown of a tooth to look normal, yet a dental X-ray reveals a problem hidden below the gums that necessitates treatment, such as extraction or referral to a veterinary dentist.

We take pain very seriously at Best Friends. If you have ever had oral pain, you know how distressing and debilitating it can be. I was ready to go to the ER at 3 am when I got "dry socket" after my wisdom teeth were removed because it hurt so badly! Our pets are very stoic even when they are hurting, and dental X-rays safeguard against missing hidden causes of pain in the oral cavity. Overall, dental X-rays ensure your pet goes home happy and with a healthy mouth!

Dental X-rays: Getting the Full Picture

By Dr. Alexandra Ripperger



Little Peanut didn't have any sign of an abscess on the outside. If we hadn't taken x-rays we would never have known how infected this tooth was. The yellow circles show the black halo around each root tip that indicates an abscess. The bone has been eaten away and there is pus there instead, which shows up black. Peanut also had several teeth with resorptive lesions, in the blue circle. These are a type of cavity that forms when the immune system gets carried away attacking plaque bacteria and dissolves the tooth away. Both of these problems are very painful.

Here is a LIST OF POTENTIAL PROBLEMS a pet may have that dental X-rays help find and diagnose:

1. Periodontal disease (infection of structures around the teeth, including the gums)
2. Abscessed teeth
3. Tooth resorption (see caption)
4. Fractured or discolored teeth- recent studies show as many as 49% of pets have fractured teeth! Discoloration means damaged blood supply to the tooth.
5. Retained root tips after a previous extraction
6. Missing teeth
7. Abnormally located teeth
8. Malformed teeth
9. Osteomyelitis (bone infection)
10. Bone lysis (disintegration) due to cancer
11. Traumatic injury



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Is Petco's Ban on Artificial Ingredients Beneficial to Pets?

There is a widespread perception by many people that artificial is bad and "natural" is good. Unfortunately, it is a misconception that things found in nature are always safer than things made by humans. Asbestos, cyanide, E. coli and Salmonella are all perfectly natural. Vaccines, antibiotics, vitamins, insulin, indoor plumbing and toilet paper are all artificial, yet few of us want them banned.



The fact that something is a "chemical" doesn't make it bad either, since almost everything in the world around us is a chemical, including water and oxygen.

There is little in the way of scientific evidence behind Petco's blacklist and not much logical consistency either. Many of their banned "chemicals" are in fact natural ingredients or components of food.

For example:

- *Acetaldehyde* is found in fruit and is a product of fermentation
- *Acetoin* is found in butter, yoghurt, fruits and vegetables
- *N-Butyric acid* is found in milk and cheese, and it's produced inside our colons by our gut bacteria
- *Carvone* is found in caraway, mint and dill
- *Cinnamaldehyde* is found in - you guessed it - cinnamon

The last three listed above show evidence of having beneficial effects, so not only are they not bad for us but they are probably good for us.

Some of the banned ingredients are preservatives. Preventing spoilage, pathogen growth and loss of nutrients in pet food is critical to providing healthy diets. Most of these additives have been used for decades and reviewed periodically by regulators with no convincing evidence of negative health effects in humans or pets. Meanwhile, Petco is continuing to sell raw diets, which have well-established health risks, and homeopathic remedies, which have been shown repeatedly in many studies to have no benefit whatsoever.

Unscientific reasoning is not likely to lead to good health care choices. Please don't let Petco's scare tactics and marketing strategies affect your buying choices when there is no scientific evidence to show any benefit in their program.

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